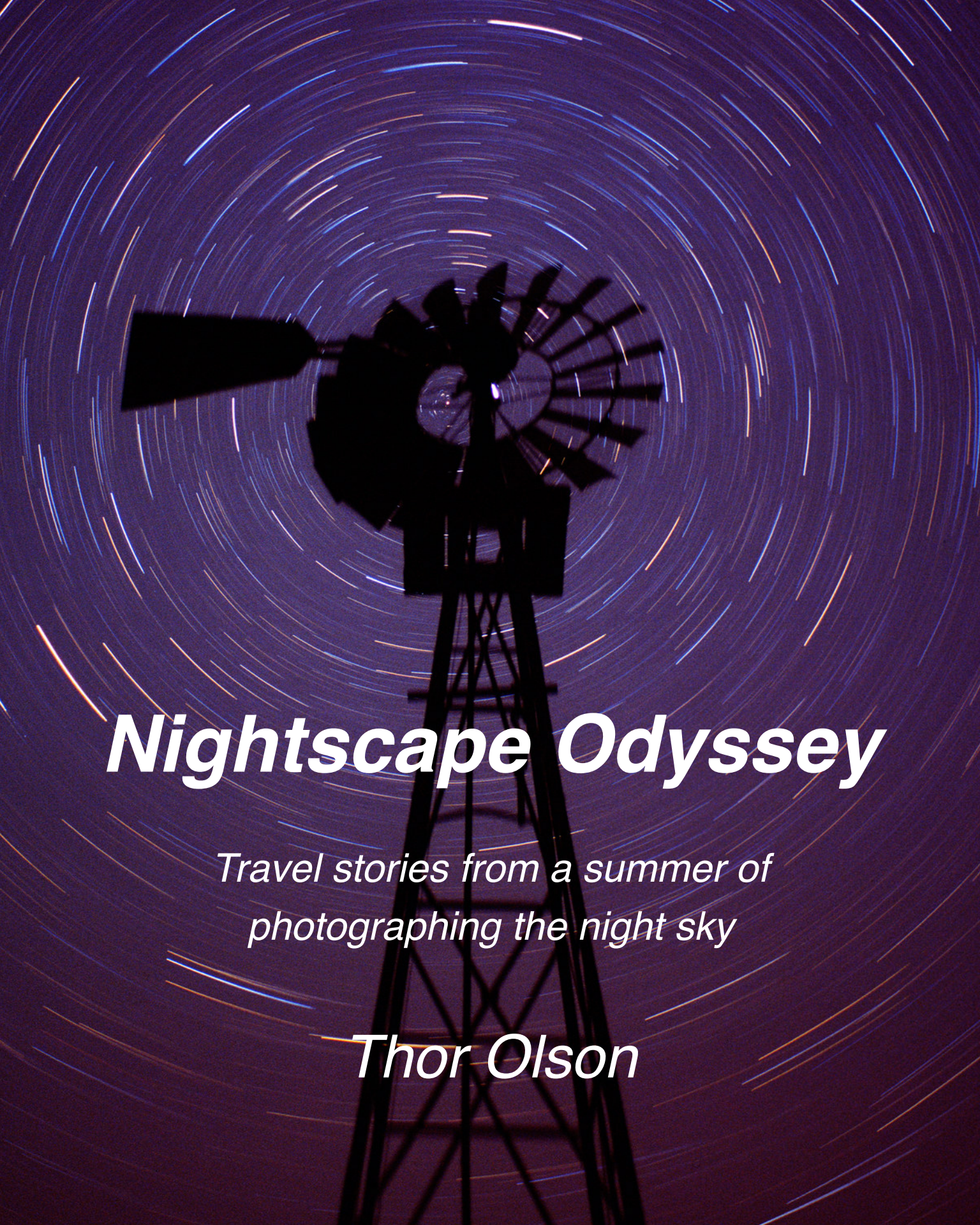

Nightscape Odyssey

Travel stories from a summer of photographing the night sky

Thor Olson

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The essays in this book can also be found at:
thorolson.com/nightscapeodyssey

To Vicki, who encouraged me to undertake this adventure.

To Poldi, who encouraged me to write about it.

Beginnings of a Journey

The Windfall

A windfall is a sudden, usually unexpected, influx of wealth. Winning-the-lottery windfalls are rare. Smaller, but still welcome, are an employee bonus, an inheritance, or a lucky run at the casino. People react in different ways to the experience of unexpected wealth or "found money". It tells you something about a person: the easy-come, easy-go gambler versus the frugal saver who salts it away for an indefinite future.

I have experienced a windfall not of money, but of time. A new company benefit designed to attract and keep employees in a climate of dot-com employment frenzy was announced. It seemed like an inexpensive benefit to advertise: long-term employees of five years or more could take a one-time additional 3-week period, a sabbatical of "disconnect time-off". Combined with conventional vacation time, one could be absent for six weeks! But it would never happen. What high-tech California company had employees that stayed long enough to collect such a benefit?

But I wasn't a California employee. I had held on for over twelve years in stoic scandinavian style at a small Minnesota company, a business whose flicker of success first caught the attention of, and then was acquired by a Silicon Valley company desperate for people to help it grow, and eager to retain them. It was an unexpected gift, and I now had the dilemma of how to spend it.

My wife Vicki encouraged me. She advised that at the end of this period I should be able to point to what I had done in this sabbatical so that I would always feel that it had been distinctly and purposefully, if not wisely, used.

This isn't everyone's choice. Just like gambling winnings and found money, different people make different choices. I noted that my coworkers, saddled with the same dilemma, chose widely varying ways to use the time. Those who traveled heavily in their jobs stayed home, content to relax in a way they yearned for while on the road. Those with little or no work travel signed up for exotic cruises and other adventures.

Vicki had watched me strive in my off-hours to learn the arcane skills of taking astrophotographs. Although simple in principle, pictures of the night sky are difficult to make in practice. She had seen me experience the thousand things that go wrong in this peculiar hobby, from the tortuous wait for weather conditions that are beyond control, such as clear skies on a moonless night, to learning by trial and error to use a telescope, camera, and dozens of pieces of various support equipment, in the dark, only to then

discover yet another element that must be mastered before a good picture of a galaxy or nebula can be obtained, Vicki knew that this would be the right way to spend my unusual gift of time.

I had had the unfortunate experience of beginner's luck. Some early astrophoto efforts had yielded attractive results, and I had spent the years since trying to replicate them. Now I could focus entirely on this purpose. I could stay up all night every night, practicing, testing, trying, learning, and not worry about reporting to work the next morning!

While pursuing my astrophoto goals, I had also discovered that nighttime landscapes, with their distinctive long exposure startrail patterns make stunning pictures, especially with the right foreground. And what better foregrounds are there than the trees, mountains, and lakes of our western states-- states known for their big skies, skies that are not cloudy all day?

A plan was made. I would go on the road, taking my astrophoto equipment with me, seeking out the dark skies and mystique of the western landscape to make pictures. I would start before the new moon, the best time for this type of activity. When the moon starts to become full again, astrophotography becomes difficult as the brightening orb throws light into the sky, washing out the faint cosmic targets. But this would be an excellent time to join with my family to enjoy the mountain scenery and the hiking and exploring that comes with every camping trip.

My wife and son would fly out to join me in Seattle and we'd explore Washington and Oregon until their return flight two weeks later. The moon would be waning again, and I would find my way home following whichever direction seemed to hold the clearest weather, resuming my astrophotography sessions.

This was a plan that promised to meet the criterion that Vicki posed. I'd be able to forever describe how I had spent my windfall.

The curse of beginner's luck. I had taken this beautiful picture of the Andromeda Galaxy and then spent the next years trying to take more such images but discovered all the ways that astrophotography can go wrong. If only I had some more time to practice this craft.

Preparations

My family has never travelled light. The weeks prior to my scheduled departure were hectic as I figured out how I could transport all the usual camping equipment plus telescopes, cameras and tripods. I had a very ambitious list of photography projects, which in total required nearly all of my accumulated gear. I might not be able to try every experiment on my list, but at least I would have the right stuff with me.

A mental calculation showed that it couldn't all possibly fit into my minivan, even using the cartop carrier that we had overflowed into in previous years. I also had to keep in mind that I would, for part of the time, have two passengers, including my teenaged son who had recently grown into a large-scale young man. Hauling a trailer was a skill I didn't want to master. Acquiring a larger vehicle was not an option. So I decided to add additional cartop storage. I went out to find a left-handed version of the "Yakima Rocket Box" I already owned so I could carry them side-by-side on my roof.

Alas, they no longer made them in their original white color; the new ones were black. I hesitated, but after learning that there was only one remaining in stock, I decided that this was actually a desirable feature; I would be able to distinguish them by their color… for all those moments where I might otherwise be confused about where I had stowed what. Ok, maybe it's not a strong benefit, but I didn't need much to make the purchase decision.

And so as I prepared for my upcoming trip, I was seen driving around town in my green minivan with black and white cartop containers. When asked what they were for, I explained that the white one was for carrying salt, and the black one contained pepper, of course.

Never mind the odd reactions, I had a legitimate need for all this space. As I approached the last week before departing, I made a trial fit of most of the equipment and convinced myself that it might work.

I also realized that I had never succeeded in the two critical basics of deep sky astrophotos: accurate tracking, and good focus. Before leaving home, I needed to be sure that I had the right equipment and components to be successful on the road. It would also be nice if I had the right technique, but this required practice. I spent as many evenings as I could doing this practice. This proved beneficial because it helped identify additional things I needed: better power supplies, dew prevention, connectors, off-axis guiding adapters, and all the special purpose tools to maintain them. I made a flurry of purchases, including orders for film.

There is no special-purpose film specifically designed for astrophotography. In general one needs fast film for low light conditions, but this is not enough. Just because a film has a high speed rating does not assure that it will work under the trickle of photons making it through a telescope. Film choice is always an emotional topic with photographers, but in this case it is augmented by a large amount of trial and error exposure tests by a small core of astrophotographers around the world. As a result, there is an established film lore that prescribes certain types over others for this application, one that the film designers never considered.

I had accidentally stumbled across one of the successful film types in my early efforts. A Kodak engineer had offered samples of a new Ektachrome slide film, E200. Not knowing better, I loaded it into a camera and took some pictures of the Milky Way. They were stunning! Only later, after trying to reproduce the results with other films did I discover that E200 was one of the greatest films ever produced for my purpose. I ordered a "brick": 20 boxes, packaged as a 4-column by 5-row bundle.

Another film that has wide respect among astrophotographers is PJM640, a Kodak emulsion designed for photojournalists. This film has a checkered history. PJM640 was no longer made, a result of competitive turmoil in the film market. It lived on however in new identities, each attempting to reach a market that would bring revenues to the company. It was renamed PJ400 ("photo-journalist 400-speed) and offered to professionals for a few years. This was eventually also discontinued, but a new film, LE400 showed up, marketed to law enforcement for reconnaissance and evidence gathering. It was the same emulsion. It too was discontinued, but inventories still existed in some parts of the country. I located and ordered two bricks fearing that this time the film might not be reincarnated.

I had started a project of taking pictures of the crescent moon using a black and white film, TechPan. I thought I would be able to make more of these exposures on this trip, and so I would need a supply of this special-purpose high resolution film.

A final film type I ordered was truly an experiment. I had admired the pictures of astrophotographer Jon Kolb who, like me, enjoys making startrail photos. He had posted some of his work using Fuji Provia-100, an actually somewhat slow transparency film, but one which captured star colors beautifully.

Although all of this film is commercially available, it is not available at just any drugstore, and so it was important that I have my supplies available before heading out to areas where the professional film suppliers don't have retail outlets. I ordered and received the film in the weeks and days before my leave. I repacked it into Tupperware containers,

each with a vial of desiccant to keep moisture and humidity away-- another lesson from earlier years.

Years ago I had been struck by a photo made by the talented couple of Tony and Daphne Hallas showing the array of equipment that they bring to their Mt. Pinos dark sky site. When arranged on the ground next to their carry-it-all truck, it makes a humbling display of what it takes to make world-class astrophotographs.

I had it in mind to make my own scaled down version of this shot. I was following a list compiled by another inspiring mentor, Jerry Lodriguss, of what to take on an astrophoto expedition. The list was admired among the world's small band of amateur astrophotographers, but critiqued as not including a kitchen sink (it did include darkroom developing tanks), and speculations on the size of the vehicle to haul it all. I didn't own the full extent of Jerry's recommended equipment, but it still provided a nice guide, and it caused me to acquire further items I hadn't previously realized I needed.

I spent the morning of my departure day in the dual effort of gathering everything I would be taking, and arranging it for my picture. In the back of my mind was the nagging question of whether it would really all fit. It didn't matter. I took my picture, and decided I'd make it fit. Maybe there were things I could jettison.

I didn't have to abandon anything. I tucked it all away, then climbed in and backed out of the driveway. In spite of the enormous cargo I had just packed up, my nagging background thoughts shifted to what I might be forgetting. I recited my usual reassuring self-talk when this happens: if I had my tickets and my credit card, I should be able to negotiate any setback. Of course, this was not the usual 3-day business trip. There were no tickets, and if I had left behind some critical component like a field-flattening corrector lens, or a wide-mount T-adapter, there was no strip-mall where I could pick up a replacement. I used my other self-reassurance: whatever I had forgotten, there was plenty enough to keep me busy and happy. Even if I ended up with nothing to show for it, the trip would be an experience of a lifetime.

A display of equipment that got packed into the minivan and its cargo carriers. Selected items (left to right): observing table and chair, chart case, cold weather clothing duffel, autoguider, laptop computer, cooler, telescope accessories, power adapters/chargers, batteries, eyepiece case, camera case, tripods (5), telescopes (3).

Crossing the Prairie

Even as one exits daily life, its anxieties drag along. I headed west on highway 12, a route that could take me to Montana and beyond. The interval between rural Minnesota towns was a consistent five miles, a day's round trip in the days of horse-driven vehicles. Although I had no need or desire to stop, I found these distances between oases of civilization annoying--my progress seemed so slow. As I crossed into South Dakota however, and the distances started getting longer, I found my tempo slowing to match. The rhythm of the car on the pavement was beginning to seem more natural. I had no appointments or obligations, other than my desire to reach Washington for the Table Mountain Star Party. And even that was not an obligation, I could change my plans at will!

Go west! Ride the road and make my plans on the run. I could go as far as I wanted, stop where I felt like it, and make my way, my way. And like the title of the book by William Least Heat-Moon, I was traveling the blue highways. Except by the conventions of today's maps, the lesser traveled roads are marked in red, not blue. The two-lane roads serviced the rural business, farms and ranches, and the segments between the small-town hives of activities became longer as the hives themselves became smaller.

In my mind's eye, I pictured a composition of a windmill in front of night sky star trails. Windmills, once a common but neglected artifact of an earlier technology, had become historical oddities, replaced by invisible electric machines. Most windmill structures had been dismantled and removed from the terrain.

I realized the windmill's current status as a rarity after thinking about how to set up the shot. I needed an intact windmill, not near any security or residence lights, and a reasonable distance away from any road traffic, but still accessible to my camera and tripod. I wondered if any windmill that I could see from the road would ever meet these conditions. And then I realized that I wasn't seeing *any* windmills. Where were they? How could the very icon of a farm have disappeared? And just during my short lifetime!

Eventually, as I drove for miles across the agricultural heartland, I did come across the occasional windmill. It usually hugged a barn or farmhouse, sometimes even bearing the security lamps that have sprung up at every rural residence in the last decades. I began to wonder whether the isolated dark windmill that I needed even existed.

The sun entered its late afternoon angle. I checked my maps to find a possible place to camp for the night. The sky was clear and maybe I could take my first night pictures of this trip. I was an uncertain half-hour from a state park when I caught sight of a silhouetted windmill, apparently a short distance down a gravel road. As usual, some

buildings were near it, but were these abandoned buildings? With nothing but fields and pasture around me, I drove past at highway speed. The processing in my brain finally caught up to what I had just seen, and I moved to place a marker for the location.

I have a global positioning system (GPS) receiver on the dashboard of my car, a generous gift from my mother-in-law. With bemused skepticism that such a gadget would ever help me get unlost, she accompanied her gift with a magnetic compass. I'm pleased to tell her I've been sufficiently lost to need both.

The GPS is a wonderful accessory for this trip. With the push of a button, it records my exact location on the planet. As I drive it displays a small map of my wanderings in its electronic breadcrumb format. When I "place a marker", a small symbol shows up on the map. The symbol for my windmill drifted behind me on the display as I continued my drive toward what I hoped would be tonight's campground.

Lake Louise is the famous beautiful alpine lake in the Canadian Rockies, but here was Lake Louise in South Dakota, also beautiful, a state park oasis in the agricultural vastness of the prairie. I set up my tent and a small telescope and was visited by curious campers, including a young amateur astronomer eagerly setting up his new telescope and hoping to try out more than his single eyepiece. I let him try some of mine and was impressed at the skill this thirteen-year-old had in locating his favorite objects, even as the sky was still darkening.

By the end of twilight in the summer, it is actually quite late at night, and most campers are in bed. This is the start of prime time for me. I must decide how to spend the few precious hours of darkness before dawn. I could set up my big scope and work on prime focus technique, but that's a lot of setup and everything is so carefully and tightly packed I'm reluctant to start down that path. I could take some wide-angle shots of the Milky Way, another project in the works. I could look for photogenic areas around the lake for taking startrail pictures.

Or I could drive back and find that windmill and see if it really is in a dark setting. This is a bit of a risk because if it isn't, I'll have spent over an hour driving around not taking pictures. On the other hand, it could be the only windmill west of the Mississippi that qualifies for my composition and I will have passed it by. I pack up and start driving.

I cannot say enough about the merits of surveying a dark sky site during daylight. The world somehow changes when the sun goes down, and the more you know about an area, the fewer surprises and hazards you will have when you later set up in the dark. In this case I had no choice. The only thing I knew about this windmill was a flashed mental

image of driving past it on the highway. Now that it was dark, I couldn't even see it to find it.

Dakota skies are some of the darkest I've ever known. And with no moon, no nearby towns, no farmhouse security lamps, there is no visual signal from outside the range of my car's headlights. This really was the dark setting that I needed; now where exactly *was* that windmill?

I'm fairly certain that I would have given up, or at least spent much of the night looking, had I not placed my GPS marker earlier. My current location on the glowing map drew closer and closer to the symbol where I knew the windmill would be found. I turned on the gravel road and, still not actually seeing it, drove to where it had to be.

I had to turn off the headlights and let my eyes adjust for a moment. I could make out the abandoned buildings, and then finally the tower, its outline apparent only by the eclipsed stars behind it.

I got out of the car and experienced a feeling I often get when I strike out at night to take pictures. It's the "What am I doing here?" feeling, a complex mix of doubt, fear, and foolishness that must be overcome in order to keep pursuing the image in my mind that brought me here. And therein lies the antidote: I tell myself, "You're this far, you might as well make something of it." This usually causes me to focus on something concrete, like extending a tripod, or loading some film. As soon as I busy myself on the details of setting up, the larger impossible context of why I am there soon is forgotten.

Only to be recalled when there are setbacks in the dark. Like encountering the barbwire fence, nearly invisible. Now I have one more emotion to add in the mix, guilt, over trespassing in someone's pasture at midnight. There was another bout of hesitation, this time overcome by working the puzzle of how to get over the wire. Now I'm committed, it's too late now, I may as well go all the way and take my equipment into the field

I navigate the field, avoiding the cow pies and find the windmill. Concentrating on the task at hand, positioning the camera, focusing, connecting a dew heating strip, setting the aperture and refocusing takes my mind off of the unfamiliar situation. When I have fussed over it long enough and decide to accept the barely visible composition in the viewfinder, I open the shutter and step back.
The exposure will take an hour or more. The air is humid, filled with the omnidirectional sound of crickets, and distant thunderclouds on the horizon occasionally glow with silent lightning. I suddenly have nothing to do but stare in wonder at the brilliant sky full of stars. So many stars I have trouble finding the constellation patterns. The Milky Way

stands out as a river of light across the sky. "Stark raving dark" is a description I have heard for such conditions. This is the reward for persevering through the little obstacles along the way.

I spent the rest of the night making trips back and forth between the car and the windmill, scaling the fence each time, setting up another camera, making several exposures on each until a golden crescent of moon climbed over the eastern horizon. It was accompanied by Saturn, Jupiter, Venus, and the Seven Sisters star cluster, a conjunction that had been forecast months earlier, but I had forgotten. Too bad, I might have tried to capture it on film. It was a beautiful scene, one that marked a dramatic end to an auspicious first day of my Nightscape Odyssey.

It seemed like I had found the only intact windmill on the dark Dakota prairie. The bright stars of the Big Dipper are seen above the abandoned farmhouse.

When Sabbaticals Collide

I returned to the campground as the sky lost its deep darkness to the dawn. I was tired now and falling asleep was an easy matter. Staying asleep was not. Campgrounds come to life at an early hour and become noisy collections of waking families preparing for a new day. Even after the commotion subsided when most campers had driven off to their destinations the midmorning sun, radiating through a cloudless sky, heated up my tent. And after moving the tent into the shade I still found it difficult to sleep. By 10:00 I gave up and decided that I might as well start traversing some more of the miles toward my appointment in Washington.

Heading west on blue highway 14, I share the road with rural traffic and the occasional bicyclist. I enjoy seeing the bicyclists; they ignite the memory of an earlier epoch in my life when I would bicycle for weeks through beautiful countryside, carrying everything, and camping along the way. Bicycling is just the right speed to experience the land. A car travels too fast, there is not enough time to truly let in the details of the terrain. Walking is too slow, the details become stale before you reach the next vista. But a bicycle brings you close, living and breathing the environment you travel through, giving you options to linger or to move on.

I started seeing quite a few more bicyclists. Almost all were headed east, taking advantage of the westerly winds that never seem to quit on the Dakota prairie. Some were loaded with panniers, most were traveling light. Whenever I see cyclists wearing brightly colored jerseys, I think back to a chart I had once seen that graphed "the desire to wear lycra" versus the cost of the bicycle.

I stopped at the next opportunity to get gas. It was at a crossroads that included a tavern and a bowling alley among the convenience-store-equipped gas stations. A small park could be seen a block down the gravel road, and in front of it a flock of brightly clad cyclists grazing at a canopy-covered buffet. This was a CycleAmerica stop!

CycleAmerica organizes a number of bicycle tours through diverse sections of the U.S. I was familiar with them from a trip through the Colorado mountains with my son in an earlier summer. They take care of the enormous logistic details of finding places to stay and enough to eat. They provide physical and mechanical support each day, ensuring that your possessions, if you don't care to load them on your bike, will end up with you at the end of the day.

If you string the right set of CycleAmerica tours end to end it is possible to travel from coast to coast across the United States. In fact, this is exactly how one of my colleagues, Jeff, had chosen to spend his sabbatical time. He had departed a month earlier for his

adventure, starting in Seattle and heading for Boston. I wondered about where he might be, a month into an 8-week itinerary. My hamster-powered brain (my wife's affectionate description of how the obvious frequently eludes me) concluded that he might be at about the middle of the country, say in South Dakota!

I intruded on the lunching cyclists to make some inquiries. Before I could find out the details of this tour, a brown-skinned Jeff on his sleek recumbent bicycle pedaled up, recognizing my profile before his full arrival. It was a purely coincidental encounter, my travel west had intersected his path east at just this place. Our lives had intersected in the workplace on projects whose importance had made us a close team of two, now we find each other again at random, as if we are members of the same Vonnegutesque karass.

Jeff briefs me on his recent experiences through the mountains of Wyoming relating additional trials of heat and wind on the South Dakota plain. He wonders what day this is, a sign that he has truly disconnected from the weekly schedule we all keep. I show him my minivan packed with gear, and we discuss cameras and film. Jeff is the proud owner of a Leica, a compact and silent 35mm camera that he has carefully packed behind him on his bike and with which he has been accumulating portraits of landscapes and people. We take pictures of each other, still amazed that our paths had crossed. We bid each other good luck, knowing it will be many weeks before we meet again.

My colleague Jeff, and his recumbent bicycle, on his way to the Atlantic, a random meeting as our paths crossed at a wide spot in the backroads of South Dakota.

The corresponding frame from Jeff's Leica.

When Art Speaks, Listen

It wasn't long before the clear nights of photographic activity and subsequent days of driving took their toll. I camped in the remote Sage Creek area of Badlands National Park, where the campground was an oasis in the middle of those badlands, an oasis with no water and no open fires allowed.

The sky was dark and clear, but I was exhausted. I made a feeble attempt to ready my equipment for what promised to be a beautiful evening but decided to nap instead. As I "rested my eyes", I could hear a neighboring camper who, with more energy and an eager audience, had set up a telescope and was conducting a tour of the night sky. Someday I will return to this unusual and remote site; maybe then that night sky guide will be me…

Sage Creek Campground in Badlands National Park, a well-kept secret in South Dakota. The terrain looks pleasant enough in this photo, but a few miles away are the examples of extreme erosion that aptly gives the area its name. Here in front of the tent, you see my green minivan, equipped with the giant salt and pepper shakers that I loaded with astrophoto equipment and camping gear for my six-week odyssey.

The next morning, eyes rested, I saw that the previous day had been a bust: only a short distance traveled and no pictures to show for it. I decided to change my travel strategy, turn off the blue highways onto the interstate, and drive a full 800 miles to Missoula, Montana. Here was a good time and place to stay at a traveler's hotel. The gathering clouds and subsequent rain meant that there would be no picture-taking tonight. Along with a do-not-disturb sign, I now had permission and the ability to sleep-in with zero guilt.

In the morning as I checked out, I once again admired the large artwork above the fireplace mantel in the lobby. I had immediately noticed it the night before while checking in: a beautiful rendering of Montana grasslands, with mountains and distant weather building in the background: big sky country. It was a work of pastel, that ambiguous medium between drawing and painting, and there were other similar but smaller pieces on the lobby walls. I inquired about them and learned that they were the work of a local artist, Kip Herring, who was represented by a nearby gallery, "Marie's Arteries".

Despite the name, I decided to visit. In the past I had regretted not acquiring artwork when first encountering it. A series of woodcuts by a Vermont printmaker had struck me when I first saw them in a countryside gallery during a bicycle trip through New England. I admired the prints, but then continued on. In the years since, I always wished I had acquired them so that I could enjoy them each day in my home. Here was a similar situation, works of art that somehow resonated with me, encountered by accident while passing through.

At Marie's Arteries I found a few more samples of Kip Herring's work. Despite the risk of damage to the delicate prints while transporting them in a vehicle filled with camping gear and telescopes and headed to the back country, I purchased two modest pieces and protected them as best I could with cardboard. They would remain buried flat on their backs, on the floor of the van, for the next six weeks. I planned to frame them and start a small collection of original art prints. As I left Missoula to continue my westward drive, I felt pleased that this time when the art spoke to me, I had listened.

"Moonstruck", Kip Herring, 2000

The beargrass caught my attention in this print depicting the scenery of Glacier National Park.

***Note from the future (2019)**: Kip Herring's work has evolved in the years since this virtual encounter, as has his artistic identity. He is now Arthur Herring and his work continues to attract attention, though perhaps less for the intimacy with the Montana landscape of his earlier works than for its subsequent cosmic connections. It is all a masterful depiction of the world around us and it is fascinating to see his exploration of it in the medium of his choice. [https://www.arthurherring.com/about].*

Table Mountain Star Party

The Approach

I had embarked on this "Nightscape Odyssey" to search out dark sky locations in the western U.S. and to hone my astrophoto skills. Although the Table Mountain Star Party (TMSP) in Washington's Cascade Mountains was a long way from Minnesota, I had selected it as a fitting launch point for my ambitious summer plan.

The "star party" is an interesting concept, especially to those who are not close to amateur astronomy circles. For them it creates an amusing image of revelers eating and drinking outside, occasionally looking up at the sky, pointing to various stars and having a good laugh over them.

Maybe there are some star parties like this. They certainly come in different sizes and settings, but I had never attended a large regional star party such as the TMSP. The largest gathering of telescopes and their avid owners I had attended probably numbered around 20. I understood the basics of the event: arrive, set up telescopes before twilight ends, find your way around with dim red flashlights, and share your enthusiasm for viewing the night sky with the anonymous others who wander past in the dark, hoping to get a look through a telescope at an interesting celestial object. This is the general outline of an amateur astronomy star party. Oh, and have some cookies sometime during the night.

The Table Mountain Star Party had the same core principles, but it was on an enormously grander scale. The setting deserves it. Most people think of the state of Washington as a lush rainforest region in the Pacific Northwest. In reality, only the western edge of the state deserves that description: most of the state is an arid, sparsely populated desert. Arid, but irrigated. And fertile. The famous fruit orchards of Washington are here, and its towns are oriented to the business of agriculture. Ellensburg is such a town and is nearly at the geographic center of the state. It's the closest civilization to TMSP, but its small size and remote location keep the light pollution of the desert’s dark skies minimal.

I was in some danger of being late to the party. I had delayed my departure from Minneapolis to attend a last important social event, and then on my way through South Dakota, the skies were clear and I was compelled to start my nighttime photography sessions. This was a consequence of an important lesson I had learned early on: if the sky is clear now, take the picture. Who knows what conditions would exist by the time I get to Washington? It's the sure thing over a yet-to-be-decided situation. There were forest fires out west-- the smoke could be bad, or the access road could be closed, or clouds

could cover the state, or a dozen other things might interfere. So this is why I spent a night in a cow pasture in South Dakota, and was now desperately trying to make up the delayed miles.

I got to Ellensburg in the late afternoon on the first day of the event. I was pleased. Table Mountain was some uncertain distance from the town--I had a not-to-scale map--but I was sure I could figure it out before dark. I took the prescribed forest road and headed up.

The prescribed forest road was one serious road. In different weather it would deserve the adjective treacherous. I had never been on a mountain road like this one: a single lane, hairpin turns, no guardrails, no recommended speed signs (in fact no signs at all), and steep! These forest roads are no-nonsense pathways to the top.

The telescope field. The campers in the background are just the edge of a vast "RV mosh pit".

Somehow the single lane works. When traffic meets, there are enough wide spots to eke past, maybe someone has to back up a little, but it seems to work. Or at least mostly work. I noticed occasional skid marks, punctuated at one location by shards of glass.

At the twenty-mile mark I encountered a team of cyclists. I was startled to have the brightly colored lycra-clad athletes suddenly appear as I rounded a blind curve. The road was too steep to walk, but here they were, cycling as if training for the Tour d' France. Maybe they were. If so, they'd selected the right road. As extreme as it seemed to me, it was actually luxurious by forest road standards: it was paved!

The telescopes are shrouded against the intermittent rain.

Eventually however, the asphalt ran out. A few more miles of gravel reached a last curve that revealed an expansive view of a sea of vehicles: cars, trucks, vans, RVs and tents covering the hilltop. It was the first indicator that this was no small-scale star party.

Although I had arrived on the first official day (Thursday), it seemed that everyone else had arrived the day before. I registered at the entrance and was ushered by a group of highly organized parking directors who offered the choice of parking in the mosh pit of campers (the field had been marked off into rows and columns of parking territory and a few cells remained), or of finding my way to the overflow area. After a quick survey I opted for the overflow, a fraction of a mile further. It was out of the thick of the action, but still had a great view, and some room to pitch my tent and spread out a bit.

But even the overflow area was full. I eased my minivan off the road into a vacancy. It was vacant for a reason; the sudden ditch and the large rocks had discouraged prior vehicles, but I was becoming desperate as other vehicles were claiming the last of these remnant spaces. The minivan lurched into position. I wondered whether and how I would get it out again, but decided I could put that problem off for a few days. I wanted to set up camp and set up my equipment before dark. After all, that was my whole purpose for being here!

Flat Tires, Cloudy Skies

I started lugging stuff out of my car and was struggling with my oversized tent when I met my neighbor to the east, Barry, a friendly bearded fellow who reminded me of a mild-mannered graduate student. In reality he was a programmer, but his interests fell strongly in the areas of ham radio and astronomy. He was modest about his beginner status in astronomy, but he had attended prior years of TMSP and enjoyed them immensely, hence his return this year.

Barry felt responsible for letting me know that the rear tire on my car was flat. I was surprised at this news, since I had just arrived and had not experienced any sort of tire problems on my way up the mountain, but there it was. It wasn't just low on air-- it was dead flat! Had I been driving on a rubber-covered rim all the way up that road? I suppose it's possible, but let's instead think that it must have happened as I maneuvered into the field. A sharp rock maybe?

Barry inspected more closely and found a nail embedded in the tire. More mystery, but what to do for now? We made a plan. Prop the car up on big rocks to avoid further damage to the tire, and then see about getting to town tomorrow. This sounded good to me; I was fine with putting the problem off. I had more important things to do.

Like find something to eat. I had pre-registered for the star party, and one of the options was to sign up for several meals that were offered during the event. It was not difficult to decide that if someone else would take on the overhead of preparing food, I would be happy to consume it. I had the meal tickets in my pocket, but on arriving at the food tent, I found that I was moments too late. The operation had shut down, the kitchen was being cleaned up. But recognizing my haggard state from driving all day, the cooks found some remaining foodstuff to satisfy my immediate calorie demand. I did have some provisions in my car, so it wasn't a real emergency, but it was nice that the food guys were so accommodating.

After meeting this priority, I could now fully engage in the essence of the star party. I was in the ideal dark sky location and intended to take full advantage of it. I assembled my mount, telescope and camera adapters. The light was fading, and I was able to do a "drift alignment", a lengthy but precise method of aligning the telescope mount to the polar axis of the Earth's rotation. I took a look at Mars, the brightest thing in the sky, and then located my first photographic target, the Trifid nebula. The next step was to find the proper focus. With my f/4 scope, I had to find the exact location to place the film to within 50 microns. I had never reliably succeeded at this, so I wanted to figure out a method to achieve it. As I struggled with finding the "knife-edge focus" on a nearby bright star, I noticed that the nearby bright star wasn't very bright anymore. In fact, it

would periodically disappear. Then it disappeared altogether. Looking up, I saw that the sky had been overtaken by clouds. There were occasional openings, but otherwise it was completely opaque.

I abandoned my scope and decided to catch up on my note-taking and general metabolism recovery. The temperature had cooled rapidly after sunset and I was almost too late in putting on my various additional layers of clothing. Eventually, not seeing any change in the cloud cover, I proceeded to disassemble everything and pack it up. I considered going to bed and making up for days of sleep shortage accumulated while traveling.

Some of the "big guns" at the Table Mountain Star Party. Large aperture Dobsonians abounded in the telescope field. The height to the eyepiece occasionally requires a ladder, one of them is seen here, strewn like many others on the ground. Also visible in this picture are a platoon of observing tents (middle right); multi-room tents with sections that open to the sky. The threat from the clouds kept the telescopes covered and the tents closed for much of the time.

My neighbors to the west appeared. Scott and Matt, members of the Portland "Rose City Astronomy Club", returned from their sessions in the telescope field. Remember, I was in the overflow area; most of the participants had set up in an enormous alpine meadow, the "telescope field" on the other side of the RV mosh pit. Scott and Matt both had large, personally hand-designed and crafted Dobsonian telescopes out in the middle of the field and had been there observing all evening, up to the moment of full cloud cover, and then returned to their base camp next to me.

Striking up a conversation with them was easy, then inspirational. This is why star parties can be a success regardless of observing conditions. The passions for the night sky become even more intense when observing is thwarted, and finding others with similar passions will only fire them up further. Scott and Matt were active members in their club and their obvious enthusiasm was infectious. "Think of what we might be seeing, if only we could see it!"

After enough talk with the neighbors, we looked up to discover that the skies had cleared! It was a bit too late for me to go through the full setup procedure again: by the time I finished it would be dawn, but the Dobsonian boys could instantly re-insert their eyepieces and be cruising the skies in a moment. And so, I was invited to the telescope field to look through two award-winning telescopes. I was in the middle of a desert, at an elevation of over 6000 feet with no large cities within hundreds of miles and looking through large aperture telescopes at the treasures of the night sky. It was a peek at Heaven.

Rainy Days, Espresso Nights

Most attendees had given up and gone to bed with the cloud cover at midnight. A few of us accidentally enjoyed its clearing after 2:00. We took in views of galaxies, nebulas and star clusters until the near-dawn when Saturn, and then Jupiter and Venus appeared. This was the intoxicating finale of the evening, and with the brightening sky, I staggered to my tent sometime after 4:00.

It is logical to think that one would then sleep until eight hours later, about noon, but in my experience, this never happens. I seem to have some sort of internal chemical clock that, after years of getting to school, and reporting to work, is conditioned to get me up and active long before midday.

So by 8:00 I was up again, now faced with the problem of the flat tire. I had several options. In such a large gathering, helpful resources abound, and I knew that I should take advantage of them before the end of the star party, when I expected everyone to evacuate in an urgent return to their jobs and real life. I received an offer from Bruce "Harpo" Berghoff, the other Minnesota Astronomical Society member who was attending (a coincidence, this really is rather remote for us), to drive me back to Ellensburg with my tire to get it repaired. This was a generous offer, knowing how far the town was and the nature of the road to get there. Harpo has a unique combination of interests that almost meshes in this environment. In the day, he likes to take on challenging trails on his mountain bike; at night he slows down to marvel at the sky with the rest of us. On this day, he had a mission to find a replacement part for his bike.

In the end however, I took the sage counsel of neighbor Barry, who thought that maybe I had a slow leak and if I could re-inflate the tire, I could get to Ellensburg and have it repaired. Barry had a 12-volt compressor, a noisy contraption that slowly, but inexorably, pumped air into my dead tire. And, as Barry predicted, the leak was slow enough that this method successfully re-inflated it, and more, it seemed to hold after disconnecting. I could now drive to town.

Great. I could now drive down that mountain road back to Ellensburg. I suspected that this would consume my day, and in fact, it did. Getting down was a problem. I made several wrong turns in the unmarked forest road system. Only later did I remember that my GPS unit on my dashboard which entertained me with current direction and speed had also recorded my trail the previous day. The electronic breadcrumbs showed clearly which turn I should make, but only after several miles of discovering dead-ends, did I figure this out. What good is a GPS if you don't look at it?

In spite of this setback, I was able to find exactly the right place in Ellensburg and have my tire professionally repaired for a grand total of $8.00. I then found a place to have lunch and prepared myself for the trip back up the mountain.

On the way back, the road was becoming familiar. Of course, I could anticipate the route ahead of me since I was now looking at my GPS. Somehow this didn't help. Did I mention that this was a serious mountain road? I got back to the top just in time for the afternoon rain.

This was a new experience. In all star parties I had previously attended, the arrival of bad weather was a signal to pack up and go home. In this case, telescopes had been set up with many complex, or heavy, hard-to-break-down support systems. The solution was to properly enshroud them during non-observing hours, protecting them from wind, dust, rain, and excessively inquisitive\passers-by. The telescope field was covered when I returned, but my own telescope was still exposed! I hastened to improvise a tarp wrap for it.

The clouds continued intermittently dropping moisture throughout the afternoon, ceasing by evening, occasionally thinning, creating great optimism, then closing in again. I went through my alignment and focus procedures again, as the openings permitted, thinking that I could at least accomplish these tasks and be ready when and if the clouds did clear.

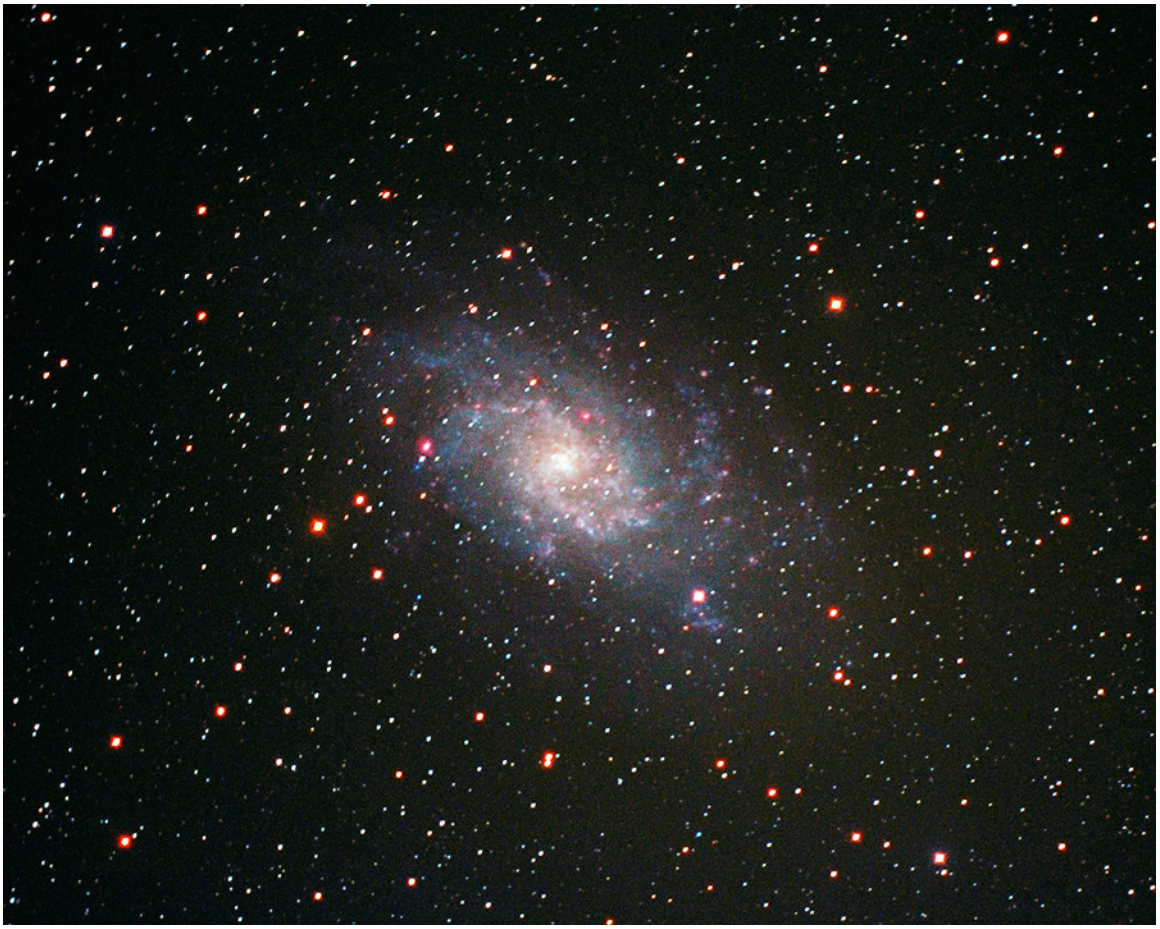
Eventually they did, mostly, and the persevering among us had several long periods of clear dark skies. I managed to make several deep sky exposures, and then visit my new friends in the telescope field.

The open sky is not pitch black. It is actually a large diffuse light source, which illuminates the world at the very limit of human perception. You can see this most easily when you are dark-adapted and can hold your hand up against the sky. Your hand will be in deep silhouette; the sky will be light gray in appearance! It's enough light to keep from stumbling (over even ground) and enough to find familiar shapes and people in a sea of telescopes and equipment.

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.

Navigating the sea brings you past islands of nocturnal activity. It is an interesting experience. As you move around, there is a buzz of conversation in the dark. The tone is one of a controlled but urgent enthusiasm, overlapping verbal notes of the visual experience at the eyepiece, comparisons between telescopes, recollections of past views, advice and suggestions, and a large collection of expressions of awe. It's odd, walking in the dark and hearing chatter all around; people not seeing each other but nevertheless communicating their love for the night sky.

Some areas of the sea are augmented by music. Somehow rock-and-roll, new-age, and classical all share the field without aural conflict. One fades from one to the next as you roam the ocean of sound.



A target I keep trying to capture, M33, the Triangulum Galaxy.

The sea is red, illuminated by the dim LED flashlights used to read star charts and find focus knobs. The red light preserves your visual sensitivity while inspecting the faint fuzzies in the eyepiece. This is common knowledge among amateur astronomers but must seem strange to other visitors. Preserving night vision becomes an issue of courtesy, and finally of enforcement. Those who did not make it up the mountain by twilight were held at the gates further down the road. Vehicle headlights were a serious offense.

The red lights are everywhere, including the vendor tents that supply coffee to this army of insomniacs. Yes, there were two entrepreneurial businesses that saw a market for their product and brought it (somehow) to their consumers. For me, an avid caffeine ingestor, this was what every star party needs, an all-night espresso shop. There is a bit of java culture that goes with it that I'm not fully familiar with; however, on the advice of other consumers, I accepted the "natural additives" to enhance the already potent properties of espresso. I couldn't really tell. It was a night to stay up for regardless.

The telescope field at night is a sea of red. The LED flashlights used by everyone to illuminate charts and find one's way accumulate in this 1-hour exposure, including a trail evidently made by an arm-waving enthusiast wandering past the open shutter of the camera.

Dinner and a Moonset

The next day's weather was a repeat of the previous: partly cloudy, occasionally overcast, a threat of rain, but then open periods of bright sun. Canopies were set up next to the coffee vendors, there were other canopies set up for astronomy-related businesses and causes. Artists, photographers, telescope and accessory retailers, social and political organizations: all had the equivalent of a wilderness storefront along "vendor row".

There was also a huge semi-cylindrical meeting tent where presentations were made by various guest speakers, and where a swap meet occurred during the pre-noon hours. This was Saturday and, not having to go to town for any urgent repairs, I wandered through the swap meet, visited the vendors, and planned which presentations I would attend.

Something that surprised me on arriving at Table Mountain was the large number of families present. Not only spouses, whose tolerance of their partner's nighttime passions extended to accompanying them to a remote location with no amenities (bring your own water), but also children. Many of them. Their play lent a musical high note to the overall sound mix.

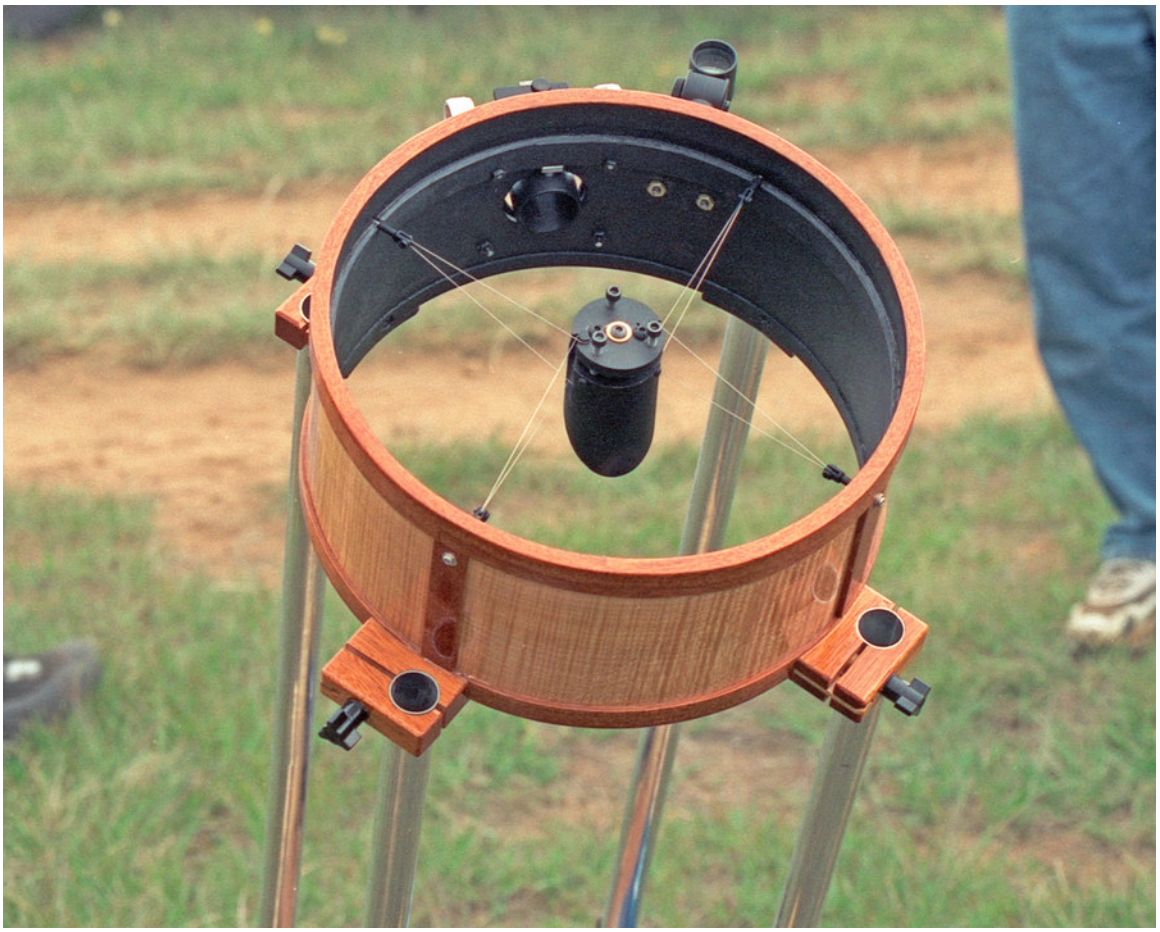
This seemed to be an important part of the star party, anticipated and planned-for. There were organized activities for children that kept them busy most of the day, and those who could stay up and participate in the evening viewing were always welcomed.

Among the daytime activities planned for the adult stargazers was a showing of craftsmanship. I've often felt that there are two kinds of astronomers: those that have a fascination with telescopes and optics, and those that have a fascination with what can be seen with them. Amateur astronomy accommodates both types, and I got to see the beautiful workmanship and clever design work of the former at the amateur telescope making competition. Some remarkable features were shown: a rotating secondary cage, a 12-inch Dobsonian that collapsed to an-under-airline-seat package, delicate custom designed wooden inlays that gave a unique style to these beautiful instruments. They were all on display in the morning as the judges reviewed them.

The meeting tent was apparently new to the TMSP, purchased from registration fees of earlier years. The audience brought collapsible camping chairs and assembled on the grassy floor of the big room. The presenters could show slides and video because the tent was opaque and kept the space dark when the door was closed. Unfortunately, it kept the room dark at the expense of heating it up, at least when the sun was at full strength.

I learned this while attending one of the presentations, a description of how the initial problems with the Hubble Telescope inspired a wave of software development that could

correct the optical aberrations in its images. The software methods could also fix images from other telescopes, like amateur telescopes looking through the full thickness of the atmosphere. Imagine that -- getting images from your personal telescope that looked as good as those from the Hubble! To me, a guy trying to get presentable pictures from his telescope, this was fascinating stuff. I recognize that this is not everyday fare for most people, but the people at this star party were a rather skewed sample of interests, and I was not alone in finding this captivating.



Beautifully crafted telescopes also included superb engineering, such as this secondary mirror suspended by a nearly invisible wire spider.

I had the chance to meet quite a few other amateur astronomers at this gathering. One of the most enjoyable encounters was with a couple from Seattle, Mark and Carrie. They had arrived just behind me in a Volkswagen Eurovan, a vehicle I was beginning to suspect was a better choice for my intended travel style than my aging minivan. Beyond the personal tour of their van, I found out that Mark was at about the same place on the

learning curve of astrophotography. Even though his equipment was different, using CCD image sensors instead of film, the obstacles for making good pictures are the same: good focus and good tracking. Carrie was an adventurous partner in their activities, and both were accomplished rock climbers, hikers, skiers, and world travelers.

As the hours moved into the afternoon on Saturday, there was a gathering of the entire population of the mountaintop. The high attendance was generated by a must-be-present-to-win raffle of astronomy-related prizes ranging from books and calendars to eyepieces to entire telescopes. Before the winners were announced, other items were covered. We found out that over 1300 people had attended this year, an enormous number speculated to have been even higher if the weather had been solidly clear.

We also learned about the close-call in having the star party at all. Earlier in the week, a forest fire had started, perhaps caused by lightning. The smoke had been seen by some eagle-eyed residents of Ellensburg, and a group of volunteers had rushed up the mountain and somehow been able to contain it and extinguish it!

The winners of the telescope-making contest were announced. There were a number of categories, but not enough to award all of the talent that was evident in the work.

Acknowledgements were made to the organizers of the star party. As the committee members were identified and applauded, the Port-O-Let tank truck rumbled through, having emptied and replenished the portable toilets that were installed at critical sites throughout the grounds. A thunderous cheering let loose. There are a million details to making a star party of this scale successful, and this one was not overlooked.

An appreciated feature was the meal service. I was pleased to be able to register for these meals, which freed me from finding and preparing my own campground class food. A couple hundred other attendees felt the same way. Not every star party detail was without problem however, and one of them was the unanticipated properties of propane when burned at high elevations. The throughput of the grills and stoves was significantly reduced, and this created bottlenecks in the delivery of fully cooked food to the hungry masses. The Saturday dinner menu of chicken and baked potatoes was a nice finale to the meals served on the mountain, but the serving line extended for well over an hour as the energy-soaking potatoes, starved by the low-energy fuel, became the rate-determining step.

The line did not become unruly; we spent the time comparing notes on what we had experienced at this star party and how it compared to previous years. This did however detain me from an activity I had planned: climbing the trail to Lion Rock to watch the

sunset and photograph the young moon. Trapped in the food line, I didn't dare leave and lose my long-held position in it, but the sun wasn't going to be rescheduled.

My inertia kept me in the line, and I relished the food, rapidly, when I finally received it. I hastily assembled a tripod, telescope and camera and started the short but steep hike up to the end of the mountain road.

Lion Rock is the name of the spectacular overlook at the end of the road. From here one can see Mount Rainier, Mount Stuart, and the entire Stuart Range. I found it to be a popular place: couples, kids, and sunset photographers all lingered here after what must have been a beautiful sunset. They were a bit quizzical when I started to setup my gear, but the bands of clouds were brilliantly lit in red and purple shades, still a legitimate scene for an after-sunset shot. But when I started asking if anyone had seen the moon set yet, there were blank stares.

I had figured that the moon would be quite close behind the sun, but I didn't know exactly how close. The new moon had occurred the day before, so in principle, it should be 1/29th of a full circle away, or about 12 degrees, or about 50 minutes behind. But I didn't know exactly when the new moon condition had happened, I was in a different time zone and my charts were from a different location (Minneapolis). There was a wide margin for uncertainty!

I scanned the openings between the cloud banks hoping to find it. The sky continued to change color, but with no obvious crescent visible. I recruited the others to look, but they were unconvinced that there was anything to look for. Eventually, after another 10 or 15 minutes of scrutiny, I found it! A hairline crescent, gently breaking the smooth blue-green sky in the west. Averted vision, an astronomer's trick to find faint objects in the dark by looking just slightly to the side of it, also works in the day and helped reveal its location. I pointed it out and eventually convinced a few others that there really was something there. They showed it to more onlookers and soon we were all gazing at this faint feature of the sky.

As the sun dipped further below the horizon, the sky darkened, and the thin crescent became somewhat easier to see. I set up my telescope to get a closer look but discovered that I had left behind my eyepieces, and the camera had no viewfinder and no way to get it in focus to take my moon shots. This was a big disappointment. I had made it this far, the weather had provided a break in the clouds, I was at the right place and time, but was missing a critical part to actually take a picture. This is more common than I would like to admit, but the truth was I had come this far to take pictures of the moon, and I had blown it.

Among the folks at Lion Rock were a couple of astronomers with big Dobsonian telescopes. While I was scrutinizing the western sky for the moon, they were trained on Mars, to the south. Mars had recently been at its closest and brightest in many years and was keeping these astronomers busy and preoccupied with their early evening view of it. When my own telescope failed, my small group of moon-viewing followers turned to these unsuspecting observers, assaulting them with questions about whether they could see the moon.

"The Moon!?"

"The Moon!?"

Completely surprised that the moon might even be visible, the two astronomers swiveled their "light canons" on their turrets to the west and focused on the setting moon. We all took turns looking and marveling at the razor edge of this beautiful crescent.

I had been unable to take a picture through my telescope, but had my regular camera with me, and even though I could not see the faint crescent in its viewfinder, I aimed it in the general direction, released the shutter and hoped I would later be able to find the moon when the film was developed and printed.

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.

Exodus

The last night on the mountain had perhaps the best viewing with regard to clouds, but the dew conditions were severe. The temperature dropped to the thirties, but the dewpoint was in the forties. This means that the air could no longer hold the water vapor as part of its gaseous mix; the H2O had to go, and the way this happens is for it to condense on any nearby cooler object. Just like a cold glass of iced tea collects moisture from the humid summer air, cool natural surfaces like leaves and blades of grass will collect dew when their temperature drops below the dewpoint. The lenses and mirrors of telescopes are no different; they will collect a fog of moisture when the temperature drops and will cloud and block the view through them.

The solution is to keep the optics warm, above the dewpoint temperature so that the surfaces stay clear. It's the same principle as defogging your car's windshield and is done by wrapping heating wires around the most vulnerable eyepieces and lenses. I had purchased some commercial "dew heaters" for this purpose and had also made some of my own from electrical resistors and Velcro straps. A twelve-volt battery powered these gadgets on nearly all of my optics, but the unheated secondary mirror in my telescope was not protected, and it eventually succumbed to the night's moisture conditions. My photography came to a halt.

With my own telescope shut down, I sought the company and optical performance of the seasoned astronomers in the telescope field. The gentle cacophony of sounds in the field was comforting, and I again enjoyed views of the sky through larger, and dew-free instruments, finally returning to my tent at 5:00am.

I woke up a few hours later to the excited report that a telescope had caught fire! Someone had left their telescope aimed low to the horizon, on the ecliptic (the path that the sun makes through the sky). As the sun rose, it climbed gradually to the exact position that was focused on the eyepiece holder. There are not many materials that can withstand a one-foot diameter magnifying glass aiming the sun onto it, and the result was smoke pouring out of the big tube as it started burning!

An observant bystander noticed the smoke, took action, and turned the telescope away from its unintended subject. The flames subsided, and the owner will never make that mistake again. Neither will the rest of us that heard about it.

I made many acquaintances at this event. I found that most of the attendees were from the nearby population centers of Seattle and Portland and were quite outgoing and friendly. The Pacific Northwest style seems to be one of appreciation for wilderness and

outdoor activities combined with an easy manner quite compatible with my Midwest upbringing. It has been a very pleasant experience.

I met my new friends Mark and Carrie on this last morning. Mark had spent a good part of the previous night working on getting some pictures from his CCD imaging sensor. After he set up, completed his alignment, focus, and tracking, and taken some trial exposures, he realized that he had just spent the last few hours looking at a computer screen. What he really wanted to do was to look directly at his subjects, and so he put his imaging equipment away, put his eye to the telescope, and pursued the pleasures of direct, visual observing for the rest of the evening.

This was just another story confirming to me the importance of actually seeing things visually, yourself, with your own eyes. That experience just can't be replaced by a computer screen representation of what's at the eyepiece.

As I packed up and headed down the now-familiar forest road, I was in "traffic", meaning that a number of cars were going down with me in an informal caravan. It was unlikely that there would be vehicles heading upstream today, but even so, I'm glad not to be in the lead. The sky is clear and as we work our way down, the open turns reveal an impressive view of Mount Rainier; in fact, it's so spectacular that everyone in the caravan slows down to take a lingering look. It's a nice visual memory to finish this chapter of my Nightscape Odyssey.

Mount Rainier dominates the horizon as a procession of vehicles descends Table Mountain. This is the view from the overlook at Lions Rock.

Glacier Park

Follow the light, stay for the night

I thought I would have plenty of time. But I had forgotten about Highway 2. On the map it looked like any of the other roads, but U.S. 2 in Montana was different. Since it was the only way to reach Glacier Park, it had to maneuver through the surrounding mix of grasslands, river valleys and mountainous terrain. Sudden curves were sprinkled along the route to accomplish this, many of them blind to oncoming traffic. White crosses marked points where the risks had exceeded a driver's judgment, making for a spooky drive at night, when my headlights would suddenly expose clusters of crosses at the road's gully.

This time I was driving during daylight however, and the winding route kept my speed to a lower number than my accustomed average. I had composed another picture in my mind's viewfinder, and I needed to get to the heart of Glacier Park before dark.

When at last I reached West Glacier, the small tourist outpost at the edge of the park, it was late in the afternoon. Highway 2 had taken its toll on me and I stopped to refuel my car and myself at a café-motel-gas station at this last point of civilization. The food was good, the huckleberry ice cream a signature treat of this part of Montana. I found out I was still a couple hours away from Logan Pass, the top of Going-To-The-Sun Highway, the not-for-the-timid route through the park.

I was stopped at intervals by road construction, but on a clear day in late afternoon, the scenery took on a magical appearance and I savored the drive. The road steepened and narrowed, taking me through tunnels, hairpin turns and cantilevered sections hanging from the side of the mountain, eventually reaching the top of the pass. The sun was low, but not yet setting on this long July day as I turned into the parking lot at the visitor center.

The Logan Pass Visitor Center is a very popular destination, and the parking lot that serves it is immense. In spite of its size, it fills up beyond capacity and not everyone gets the opportunity to explore the visitor center and the trails beyond. At this hour however, I could find a place to park, and I eagerly headed up to the log building to check in with the rangers, find out about the weather and hiking conditions, and generally just catch up as an old friend of the park. The door was locked, the sign explaining that it closed at seven. I looked at my watch. Seven.

People were drifting back towards their cars from family excursions down the boardwalk that penetrated the alpine meadows. The end of the day is tough on some, particularly

young children whose enthusiasm takes them obliviously beyond their threshold of hunger or thirst or fatigue. Various dramas played out as I watched from the periphery of the parking lot.

I looked around. 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. To the west silhouettes of their profiles, to the east, peaks that glowed in gold. I had been here before, but as I now examined the site of my photographic goal, it didn't match my mind's 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. Pollack Mountain loomed to the north, Mt Clements and Mt Reynolds to the south and west. The valley to the east was bathed in the afternoon light and realizing that it wouldn't stay this way, I headed back to my car to get a camera.

In the parking lot I found several other photographers setting up tripods and selecting their right lenses. More cars were arriving, and more photographers piled out of them. I was surprised at this. I knew that Logan Pass was popular, but I had no idea that its photographic possibilities were so widely known. Are there photographers hanging out here every afternoon waiting for sunset?

I gathered my camera with its one and only wide-angle lens and installed it on a tripod. There. I could be a nature photographer now too. I tried to strike a conversation with one of the others in this apparent fraternity.

"So, what are you guys shooting?" It was kind of a stupid question, but I had to start somewhere; I'm not really familiar with modern cameras, and not confident enough to ask about their equipment.

"Pretty much everything." I guess I deserved that.

There were various terse bits of advice and comments that exchanged between some of them. They all were setting up and shooting, everyone something different: wide mountain views, telephoto shots, close-ups of beargrass, panoramic vistas.

"Yeah, I guess it's pretty hard to take a bad picture in this place." I was struggling, but I got a smile out of him and he responded with a modest quip about being able to screw up even something this nice.

I went to the edge of the parking lot to take pictures of the valley while it was bathed in the afternoon beauty light, bracketing my exposures to make sure that one of them might turn out. I turned back to find the league of photographers climbing back into their cars and heading down the pass to the west. I managed to ask my contact where everyone was going.

"We're following the light!" he called out.

I wasn't following the light. My light was still to come, and I waited patiently for the coming sunset and twilight.

The late afternoon breeze pushed cumulus clouds through the pass, some of them containing excess water. The rain drained from them in dark smears as they proceeded down the valley, to eventually disappear 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! While 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.

The miracle of optics that makes a rainbow is well-known, but not widely-known. Descartes explained it by tracing rays through raindrops with geometry. It has been explained with principles of quantum mechanics (ref: Scientific American 1976), but it really doesn't require advanced mathematics to understand and appreciate. I like to think about how the light coming from the sun behind me encounters raindrops: every optically significant surface reflects and refracts the light. In the case of clear spheres of water, there is a front surface and a back surface where the speed of light changes as it crosses between air and water and then back into air.

Can this be? Didn't Einstein tell us that the speed of light is constant, and maximum under all conditions? This is true in a vacuum (if there is such a thing), but when light encounters a material, it is diverted and detained by clouds of electrons around the atoms that make that substance. The ratio of the speed of light in a vacuum to the speed through its atomic hurdles, is the material's *index of refraction*.

And whenever light encounters a change of index along its path, some is reflected back. Some is reflected from the front of the raindrop, and some is reflected from the back.

In the shower curtain of raindrops from the cloudburst, a little light is reflected from the fronts of each drop. Most of the light continues into the drop and a little reflects off the backs of each. Some of the light bounces twice inside before coming out. Of this twice-reflected light, most of it comes out of the drop at a very specific angle, one that is aimed right at me when I look 42 degrees from my own shadow. Some of the light is reflected back to me at smaller angles, but none reflects back at greater. Within this magic angle the backsurface-reflections lighten the scene. Outside it, nothing, just the view of the sky, obscured by the rain in front of it. So I see a circle of illumination 84 degrees in diameter, distinctly brighter than everywhere outside it, a backscattered reflection of the sun centered on my shadow.

At the circle's edge, another effect shows. The speed of light is not the same for all colors. In water as in most substances, red is slightly faster than blue. The **f**ast red light bends less than the slow blue resulting in its angle being slightly larger, with the other colors falling in between. By the time the light bounces off the backwall and comes back, there is a difference of 2 degrees, enough to splay the colors out into the rainbow boundary. It is breathtaking; it takes our attention so fully that we don't notice the huge circle of reflected sunlight it contains.

I was essentially alone in the parking lot to witness and capture this event. I thought about the gang of photographers that had been here moments earlier. The sun had now lowered even further, changing the light to that impossible mix of cold blue and warm red. The distinctive shape of Going-To-The-Sun Mountain was catching the last direct rays, the shadow of its neighbor squeezing the orange band of light to its summit.

As I recorded this scene, I heard cars entering from the road. The photographers had returned, evidently following this new phase of sunlight. I asked if they had seen the tremendous rainbow. Yes, yes, they explained with frustration, but they were on the road and couldn't shoot it. I knew what they meant. Going-To-The-Sun Highway is a remarkable engineering achievement, taking its travelers to places normally impossible to reach by vehicle. The price paid is the absence of shoulders, there is no place to pull over and stop other than the emergency turnouts sometimes found on the inside of the curves, where the exposure was less and so too the view.

Once again there was a flurry of shutters snapping as they captured the dying light on the mountains. I discovered that this assembly of photographers did not spontaneously happen every evening, it was a class that was being taught in this photogenic outdoor classroom. As they once again packed up and headed out, I waved to their caravan. I didn't have to follow the light. I would stay right there and wait for the night.

Both ends of the rainbow: a late afternoon treasure, a rainbow frames Going-To-The-Sun Mountain.

Going-To-The-Sun at Night

The activities at the Logan Pass Visitor Center died down after sunset. I noticed that I was now alone among a set of randomly placed cars in the parking lot. I wondered where their owners might be. The visitor center had closed hours before. Any day hiker on the trail would normally try to get back before the end of the day. Perhaps they belonged to people deeper in the park, backpackers equipped to spend their nights in truly remote regions.

I recalled that this is exactly what we had done years earlier while on a family backpack trip. A car had been left in this very lot, and we had gotten a ride to our starting trailhead. Five days later, physically sore but spirits restored by our time in the backcountry, the Highline Trail emptied us abruptly into the Logan Pass parking lot. Unshaven and dirty, but mostly eager to reach the point of civilization that would serve us some food that had not been rehydrated from pouches of powder, we were put to one final trial: waiting while my brother properly reorganized and repacked his car. He was the only one in our group qualified to do it, and suggestions to him for just tolerating the disorganization for now only compounded the test. Fortunately, Logan Pass has a beautiful and intriguing visitor center that presents the plant and wildlife found within its alpine setting. We patiently endured the detainment, checking the parking lot periodically to see if the task was yet done. Perhaps the delay enhanced even further our enjoyment of faux marmotburgers and huckleberry milkshakes when we finally arrived at the St. Mary Lodge, marking the end of that particular adventure.

The sky had dimmed as the first phase of twilight came to an end. I made some test exposures to see how film would record this intermediate state between day and night. I had an idea that if I could set the aperture correctly, I might be able to catch stars emerging from the twilight, white streaks against a blue sky. The prospects kept me busy while waiting for the sky to get dark.

I watched the moon set behind the western peaks. Just as when the sun gets low, the sky stays light even though the moon is eclipsed by the mountain. One must wait until it gets below the virtual horizon before the invisibly blue sky becomes truly dark. I set up my cameras for the long exposure star trails that I wanted to capture behind the distinctive silhouettes of Glacier's mountains. There are no other such profiles. The native Blackfoot tribes considered this area to be holy. Ever since first seeing this park as a boy, I too have known that it is different than anywhere else; it has left its mysterial imprint on me.

After spending considerable time trying to frame and compose the mountains, struggling with obtaining just the right angle and balance, knowing that once the exposure started, I would be committed to that view for pretty much the rest of the night, I finally opened

the shutters on my cameras. There-- it was started. Good or bad, the film began its job accumulating light, building up its latent image. I could relax a little. I wouldn't be needed for at least an hour, depending on how long I wanted the trails to be.

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

With nothing to fuss and worry about, my attention went back to my surroundings. It was dark, I was at the top of a mountain pass, alone on an island of asphalt in the wilderness. I started to wonder how wild this part of the wilderness was. On previous years there had been postings about the presence of grizzly bears. In fact the trail to Hidden Lake had been closed for many of my previous visits because grizzlies are given priority in this park, and humans must yield the use of trails until they are safely unused by bears. Do bears cross parking lots? Would I be able to see one if it did? Has anyone else ever successfully spent the night here at the top of the pass? I worried.

This is the problem of not having something to busy your hands and focus your mind. The danger was no higher than it had been ten minutes ago, but back then I was concentrating on my cameras, blissfully ignorant of any other concerns.

Mt Pollack from Logan Pass

I thought of the first time I had seen one of those grizzly bear postings. It was with a girlfriend, who I was introducing to camping for the first time. She had instantly known this park to be different, to her it was a fairyland.

When we first encountered the bear warning poster, she was spooked, we were spooked. This was one of the few places in the U.S. where grizzly bears were found. She read everything about them, and we consulted the rangers to find out that the warnings were standard at the heads of all the trails, just to keep our awareness up. She eventually came to an acceptance of them, even on one occasion mugging a bear impression next to one of the signs for a snapshot. Then, as now, the distractions of camping chores and day-hike adventures kept us from becoming excessively concerned.

My plan worked, the camping experience became tightly bound with the effect the scenery made on her soul and in subsequent years she found that she had to make periodic pilgrimages to return to Glacier Park. I know, because I married her.

And today was the anniversary of having done so! I thought about the many returns to Glacier we had made over the years. I looked around. The sky was filled with starlight. The familiar mountain shapes surrounded me. The cool air contained the scent of the trees and carried the sound of water tumbling over rocky streambeds. We could not spend it together, but I could spend our anniversary in the spiritual homeplace that she had acquired. A place that always brings her to balance with life and nature, even as it strengthens the bond between the two of us. I was here, and so was she.

This was very comforting to me. Much better than how this line of thought had started, worrying about bears, and I continued to think about how our lives had been influenced by this park. I wondered how many times we had actually been at Logan Pass. How many times had we hiked down the Highline Trail? How many marmots had we seen along the boardwalk to Hidden Lake overlook? How many frames of film had we gone through shooting wildflowers and hanging valleys? When did we climb that impossibly steep goat trail to the top of the Garden Wall? These were the trivia that occupied me while waiting for my startrail exposures to complete that evening. It was a one-sided reminiscence of the highlights of my life, highlights made so by having shared them with another person, a person who had become my companion through this park and through my life, my wife of 24 years this day.

My reverie was interrupted by headlight beams cutting across the trees in front of me. I turned my head away, but too late, my vision had been pierced by blue afterimages. The car cruised through the parking lot. I hastened to close the shutters on my cameras to protect whatever weak images had trickled onto the film. The driver made his survey and

seeing only an odd man cowering against the light next to some tripods, aimed for the exit and headed down the pass.

I advanced the film to the next frame and started again. One doesn't succeed at enterprises like astrophotography or marriage without conviction.

The distinctive three-pointed peak of Going-To-The-Sun Mountain shows left of center in this view from Logan Pass. The trails of the stars arc gently up to the north, and gently down to the south of true east.

A Kodak Moment at Wild Goose Island

There are many iconic views of beautiful scenery in our country. Some are identified by "scenic viewpoint" highway signs where the engineers designing and building the routes through the American landscape couldn't help but be impressed and decided to make it easy for drivers to pull out to stop and enjoy the view too.

At the time it was built in the 1920's and 30's, Glacier Park's Going-To-The-Sun road was an engineering marvel. An easier and less expensive route up and over Logan Pass had been proposed, but the National Parks Director at the time, Stephen Mather, insisted on the more difficult but much more rewarding route that provided spectacular views of the streams, waterfalls and mountains as the road wound its way to the top.

The designers were no doubt aware that the entire route was a "scenic viewpoint". But the road clearances were only enough for two narrow lanes traversing the edge of the mountain. Still, there were occasional openings where a parking area could be carved out, and one of them provided an overlook of St Mary Lake through a stand of lodgepole pines. A photogenic island surrounded by the majesty of glacier-cut peaks has made it a location where thousands of photographers have pounded the ground bare as they positioned themselves to take this iconic image of Glacier Park.

I too have taken pictures from this site, but always during the day. After spending most of the night at Logan Pass, as I drove down the valley with the intent to find a campground to pitch my tent after a long day, I encountered the turnout for the Wild Goose Island overlook. There was a distinctive brown park sign with a camera on it that was essentially saying: "Stand here to take your vacation picture!"

I hadn't planned to take more long duration exposures that night, but there I was, with the famous scene in front of me and a starry night above. I set up my cameras once again. It was unusual to be there alone. Usually there is a crush of tourists politely vying for and taking turns at the spots with unobstructed views. I was able to claim all of them, select my favorites, and extend my tripods with impunity. There was no pressure to get the shot and move on for the next person, I was the *only* person.

I got the cameras mounted, composed and focused by 3:50 am. I opened the shutters and stepped back to let the film do its job accumulating starlight. I had regained my night vision and simply watched the scene. At this hour even the sporadic late-night drivers had quit the road. The Milky Way flowed overhead, and as I watched, an Iridium satellite flare built up, moving slowly across the sky as its brightest object for about ten seconds, then faded back to its invisible path. I wondered how it would appear on the film that was integrating the scene.

I also noticed some clouds building up to the west. The fact that I could see them indicated that there was enough light to do so. The sky was no longer completely dark, it had exited the status of astronomical twilight and entered nautical twilight, the beginning of a new day. I realized that my star trail images were now at risk—I would be unable to make a truly long exposure to capture them, there just wasn't enough night remaining! To avoid having the exposures washed out by a brightening sky, I cut the exposures short at thirty minutes. I would have to come back when there was more nighttime available.

A pre-dawn portrait of Wild Goose Island indicated by the warm glow of morning twilight on the distant peaks. The faint vertical bands in the blue sky are the contributions from the Milky Way. A satellite flare cuts across the short 30-minute startrails and clouds are beginning to build in the west while this exposure was made.

And I did come back. The next day brought tremendous rainstorms; my tent was blown hard enough to pull its tent stakes up, leaving me inside as its sole anchor. Despite this and the loud flapping of tent fabric, I was able to get some sleep and by the time I

emerged, the wet and windy disruption was over. The skies had nearly cleared, and I would be ready to try again at the overlook as twilight ended and astronomical darkness set in.

This time however other things interfered. The late-night drivers were active again, their headlights suddenly popping out of a tunnel and then creating a streak along the route carved from the mountain wall. I would have to live with this photographic "feature", as it was likely to happen sometime during any 60-minute exposure interval.

A superposition of two exposures (30 minutes and 50 minutes) that captured a satellite flare, a car driving down from the pass, and the buildup of fog. Heaters can prevent dew on the lens, but when the fog rolls in, there is no further reason to keep the shutter open.

But it didn't matter: fog was building up in the valley and soon the vista and stars disappeared into a dark featureless haze. Unlike the previous night, which ended with the excess photons of encroaching daylight, tonight's session ended by the complete atmospheric blocking of starlight. An uninterrupted nighttime portrait of Wild Goose Island would have to wait for another time.

Daytime reference image: a cloudless sky is reflected by the windswept waters of St Mary Lake.

The Quest for C-41

Note from the future:
The invention of photographic film, a light-sensitive emulsion on a flexible strip, along with the access to photo labs, allowed photography to become widespread and popular throughout the entire 20th century. But there were distinct limitations associated with film that simply don't exist in modern digital photography. The limited number of exposures that could fit on a roll of film was one of them, requiring careful consideration of what scenes were worthy of each precious frame. There was also a need to keep the film safely stored away from direct light and at the right temperature and humidity. But the most severe limitation was that there was no "preview"; each exposure was taken on faith, because the film needed to be chemically developed and printed before the success (or failure) of a shot could be determined.

I was now a week into my travels and had experienced the luck of good weather and had succeeded in making a few exposures of the night sky from my small arsenal of cameras. Some of them were astrophotos taken at the prime focus of a telescope, and others were time exposures of the landscape rotating under a starry night. I was starting to complete entire rolls of film (although admittedly, some were quite short—only 12 exposures. But even if the film had not been completely utilized, I was eager to find out if my settings and techniques were working. I would happily wind off the rest of the roll to see if those first few exposures yielded successful images. But that meant that I would need to find a place that could develop them.

For those less familiar with photographic chemistry, there are a number of solutions for developing a latent film image into a physical photograph. The "native" response of silver-halide film is to form a negative: where the densest amounts of metallic silver forms where the most light struck the film. To make a picture that corresponds to the original scene, a second light-sensitive emulsion must be employed, reversing the negative, making a positive. We often throw the negatives away (or into a shoebox) once the human-readable prints are available.

Color transparencies for presentation slides use another way to develop film. In this case, the film is first partially developed, but then a chemical process reverses the natural response, and removes the silver that was most exposed, leaving the clear film substrate. When projected, the image is a positive representation of the scene. But because the film went through the development step that reversed the normal response of silver to light, it is called "reversal film".

The two ways of developing film have been standardized over the years by Eastman Kodak and are used worldwide. Color negatives are developed by the "C-41" process, and transparencies by "E-6". The complexity of the E6 reversal process makes it more expensive and time consuming, but C41 has become so efficient that it is possible to develop and print a roll of film in a few tens of minutes, hence the creation of the one-hour photo lab.

I was in Glacier National Park, a popular place, yes, but not a place to find a strip mall with a one-hour photo lab, much less a lab that could handle special processing instructions (film can be overdeveloped to bring out low exposure details by special handling called "push-processing").

There were no developing facilities inside the park, but what about the tourist-serving towns just outside it? I inquired at the park visitor center and learned that the nearest towns were too small to provide much in the way of this particular tourist service. There was the town I had come through two days before, West Glacier, that *might* have a photo lab, but it was on the other side of the park, too far for an afternoon errand. No, the nearest candidate was Cardston Alberta, a forty-minute drive.

I headed up the solitary road north toward Canada, a road that seemed to be the dividing line between the Montana grasslands and the eastern front of the Glacier range. It took me past the grass landing strip known as Babb International Airport ("international" because it serves small private planes from both the U.S. and Canada), and past views of the distinctively shaped Chief Mountain. Eventually I reached the Canadian border, marked by a wire fence, perhaps to keep cattle from emigrating. There was a brief stop to show my driver's license to someone who barely looked at it and waved me on. (This was 2001, pre-9-11).

The town of Cardston was much like the other small towns I had breezed through on my drive across the prairie. I was able to traverse the full extent of it in search of likely places that might host a photo lab. After doing so, finding none, and exhausting all other possible options, I stopped to ask. I know. But this was Canada so I thought I could get away with it.

I learned that indeed there was once a photo lab in the town, but it had closed some time back. I was disappointed that I would not be able to get any feedback from my exposure experiments. Having no further purpose for staying, I began the return trip, reversing my path.

As I re-entered the U.S. at the northern border, a billboard reminded me that the legal rule in Montana was to drive in a “reasonable and prudent manner”. I contemplated my afternoon mission. Would anyone think that driving to a foreign country in search of a C-41 photo lab to see what a few dim frames revealed on an otherwise empty strip of film, was reasonable and prudent?

Dark sky enforcement at Many Glacier

Glacier Park presents its most fascinating face at the end of a road that penetrates as far as it can into the body of the park before being stopped by dramatic features with names like "The Garden Wall", "Iceberg Notch", and "The Salamander". At the end of the road is a hotel that is bathed in views of these mountain features and other spectacular carved peaks, many of which still bear glaciers. Hence the name of this unique place, *Many Glacier*.

In front of the hotel is Swiftcurrent Lake, candidate for my desired composition containing reflected star trails. On the night I was here however, so was the moon. I waited for it to set, a long wait until it finally fell below the horizon. Until then it was eclipsed by Grinnell Point, looming in front of me. 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 the moon's 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; the sky would wash out if exposed longer. During this time the moon drifted down behind Grinnell Point, leaving a trailing glow. I looked around at the scene, wondering what else would be captured on film.

The lake had become so calm and the water was so clear that I could see the bottom! 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 camera would see reflections of the stars at all. How is it that I could see this underwater debris anyway? The moon wasn't bright enough to light the scene in this way.

Behind me, the hotel guests had gradually turned out their room lights and gone to bed. But like all contemporary buildings, modern or primitive it seems, there were outdoor security lights aimed all around, including at me by the shore of the lake!

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 illuminated by floodlights. Here was the source of my unwanted lighting.

The view at Many Glacier, lights on.

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.

A daytime shot of the Many Glacier Hotel

Many Glacier, lights off.

Mount Hood

Sabbatical Hiatus

The night at Many Glacier would be the last for my night sky photography for several weeks as I now was scheduled to meet my family in Seattle for a more conventional vacation. In addition to the usual outdoor camping and hiking activities we typically seek, this time there was an additional agenda.

My son, urged and aided by my wife, had selected several colleges to consider for that distant (to him) time when he would once again be called a freshman. Somehow, he had arranged that the list contained no schools within a 500-mile radius of our home, making the process of visiting their campuses a large undertaking. Several of the candidates however were clustered in the northwest states, and we had devised an itinerary to intermix campus tours with our other activities.

So for the next two weeks I would have little opportunity to aim my cameras at a dark sky. But it was getting more and more difficult to do this anyway, as the moon dominated the sky until late each night. If I thought the wait for the moon to set was long at Many Glacier, it would only get longer from here on out.

I made my way across the panhandle of Idaho, and once again across the desert of Washington, but this time crossing the Cascades into the lush land to their west. I had errands and duties to perform in preparation for reuniting with my family, including finding a place I could trust to develop my film- both E6 and C41 type rolls. Seattle was large enough to meet this requirement, and I would get a peek at my latent images turned real. That peek contained setbacks and failed exposures, as usual, but also some unexpected and enchanting images.

After the college campus touring circuit came to an end, and with my son relieved to be done with it, we aimed the overloaded minivan east of Portland to the Mt Hood Recreation Area.

Skinnydippers

Taking pictures at night is often a solo experience, and while it is true that there are times when one is quite alone, there are plenty of times when the abundance of humans on the planet provides company, desired or not.

In my pursuit of reflected star trails, I encountered Trillium, a small lake near Oregon's Mt Hood. The old volcano presides over a scene resembling a carefully arranged terrarium: duck families diving for underwater nourishment, fish swimming secretly, exposed by sunlight flashing off a silver scale, herons silently hunting among the cattails for frogs, whose vast numbers are never seen but must be the source of the dominant sound that fills the air, a summer sound that includes the occasional flyby of buzzing insects on patrol. The cattails strengthen their ranks at the far shore but are stopped short at the edge of the lodgepole pine ocean that is interrupted by this island of water.

I watched the activities subside in the lake at sunset as the sky changed into its evening colors. One by one the stars emerged: Vega, Arcturus, Deneb, the summer triangle, landmarks to help find familiar constellations. The Big Dipper and Cygnus made their distinctive patterns apparent from their early brightest stars. Polaris, my all-important indicator of true North was indicated itself by the Big Dipper pointer stars.

A high-pressure weather system had stalled overhead and the daytime breezes, starved of their solar propellant, died, letting the surface of the small lake settle to a mirror finish. I gathered my cameras and eagerly made my way to the boat launch at the south end of the lake. I scouted the area and, in the dark, found an access trail that would provide a solid footing for my tripod with a clear view of the sky and its mirror. The northerly view would yield the star trail arcs I sought, and Mt Hood would be the center of attention. Here was the ideal location for my picture and apparently the ideal conditions to take it.

As I unloaded equipment from my car, a fully occupied, muffler-deficient vehicle drove into this 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.

I have a mixed response to unexpected company while shooting night pictures. Initially I am quite wary of people out in remote locations at late hours. I know my own purposes, but I wonder about the motivations of others in these unusual situations. Often the approaching headlights belong to a patrol car; officers or rangers monitoring their checkpoints and ensuring that all is well. I am accustomed to this interruption: they want to see your permit, or they want to look at Jupiter.

Cars without patrol lights and markings are unnerving. I'm never sure what to expect. On this occasion, it was a group of young people enjoying each other's company on a night in the woods, almost oblivious of my presence. It is not always this benign.

"Hey, howarya? You by yourself? 'Ryou a cop? 'Cause we're not drinkin' anything y'know."

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. Josie, one of two women in the group introduced herself, and after confirming my non-relationship with law enforcement explained, "We're going skinnydipping...so what're you doing? Wanna join us?"

On the other hand, having other folks around is a reassurance against even greater uncertainties. I am always a bit uncertain about large predators, or humans with less innocent intents. If I can strike up a congenial connection with these people, I at least have the momentary protection of their company. With this group, already in a festive mood, it is not difficult to find a topic to connect us.

"Are you guys serious?" It was a summer evening, but here at this elevation the evenings aren't exactly balmy, and I had already started to fend off the nighttime temperature drop. I explained that I was there to take some pictures of the night sky, and I was just about to setup my cameras. I also mentioned I was hoping the smooth surface of the lake would reflect the stars. I didn't want to believe that my plans were about to be foiled by a midnight swimming party. Maybe they would realize their impact and change their plans.

"Cameras?" You're not going to take pictures of us, are you? What kind of film 'ryou using? Is this night-vision stuff?"

Josie's sudden concern about my possible role as voyeur slowed her down momentarily until I could reassure her that I had no such equipment, and my film would never be able to capture their moving shapes in the dark.

"Hey Jo, come on, the guy's ok, get your stuff," said one of the guys in the group urging her toward the beach. The "stuff" was her towel and beverage.

As I set up my tripod and framed the picture I had so dearly 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 star trail 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.

One of the guys came over to see what I was doing. He explained how dark the skies were at his grandmother's house in Illinois and how he enjoyed watching the stars at night when he would visit. He asked about taking pictures at night, and now that the shutter was open and there was nothing more for me to fuss over, I could spend some time talking with him about it. I didn't get very far.

A sudden splash followed by an excruciating scream interrupted us. Another splash, another scream, then two more with associated hollering.

"Aieee!"

"Hey Brad, get in here!"

Brad excused himself in a lowered voice, confiding "I've been working all night to hook up with this girl, gotta go."

"Hey camera guy!" It was Josie. "Come on in!"

I hadn't been working toward this at all, and I made my apologies for not joining in.

"Are you sure you're not getting pictures of us?" Josie was still unsettled.

The group was right in front of me and I couldn't see them. But I could see the reflections of the distant resort lights change from delicate points to tall rippled columns. The mirror was broken as the energy from the party propagated across the lake's surface.

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, the possibility remained that some other, unexpected effect might be captured instead.

I also knew that I would not be able to get another exposure in tonight. Even if the party suddenly realized how cold they had become and exited the water now, there was not enough time before the moon was scheduled to rise and wash out the sky. Closing the shutter now would leave the trails already captured too short. I kept the shutter open. I get what I get.

I listened to the frolicking in the water and watched the reflected lights bouncing on the lake's surface. It was a nice evening to be outside, and I relaxed a bit, enjoying the scene and my vicarious midnight skinnydipping party.

Eventually, the gang did get cold and climbed out. More shrieks and commotion as towels and clothing were located in the dark, eventually settling down to a quiet pause between activities. The occasional flare of light as a cigarette was lit showed a brief face, but otherwise the party continued in visual anonymity.

After recovering their breath and warmth, the group gathered themselves and started moving toward whatever next adventure the night held for them. They stopped to check on me, still curious about my purpose.

"Are you sure your camera didn't see us?"

One more round of reassurances, and the party headed toward the car. I urged them to refrain from turning on the headlights until the car was aimed down the road. A glimmer of understanding took hold, and with the same gusto as on their arrival, they noisily arranged themselves in the car; someone had to ride the trunk. There was no shortage of instructions to Josie on how to manage the lights as they maneuvered from the parking spot. Consistent with the entire night's experience, I heard the percussion of the car's bad muffler for a long time before seeing a peek of headlights through the trees.

Josie's fears were not entirely unfounded. The camera did capture them. Their activities 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.

Can you find them?

Please Show Your Permit

Thwarted by the after-hours popularity of Trillium Lake, I studied the map looking for another lake, with even more stringent constraints. It must be on a southern line from Mt Hood in order to capture the circular motion of stars centered above its summit, and it must not be so far away as to diminish its size in the composition. There must be road access to the south end of the lake, and it would be nice if it weren't in the midst of a busy campground or other population center.

Remarkably, there was such a place: Frog Lake. A bit further away than Trillium, but a picnic area at the south end would be unused at night. The lake was small enough that it could calm easily if the wind died. I inspected it during the day to figure out my camera positions and to learn my way around, anticipating a nighttime setup. Then I waited for dark.

The efforts of keeping up with my teenage son during our daytime hikes did not wear down my eagerness, though there is a strong tendency to slow down during the evening campfire and even more as people all around are finding warm refuge in their sleeping bags for the night. This is a difficult moment, to fight the comfort and overcome the natural inertia, to break away and commit to an evening of tending cameras in a cold and unfamiliar place.

But the weather had held, the sky was clear and so I drove the 30-minute distance to Frog Lake and found my way to the vacant picnic area. It looked different in the dark, but I had some sense of what to do from my earlier survey. There was a campground at the north end of the lake, but the dim lanterns and campfires were mostly hidden behind trees, and one by one, they were being extinguished by sleepy campers.

Mount Hood was more distant than the previous night at Trillium Lake, but the lights on the mountain ski resort were not visible from this angle, making the ancient volcano seem dark and silent against the Oregon night sky. I carried my cameras and tripods to the beach, going through my setup routine.

This wasn't so bad, the view was great, the picnic area provided a convenient setting, the weather was calm, and predictions called for another night that would stay comfortably above freezing. The shutters opened, and I prepared for a long and mild night. I considered taking some time and writing some notes about this place while the exposures were building up.

I went back to my car to find my notebook. Although my back was to the lake, I could tell from the suddenly illuminated trees around me, that some car had selected this moment

to drive to the very end of this dead-end road. It always amazes me that there are so many people that have reason to do this. I knew that the film exposures that were in progress would now contain a white streak along the shoreline, and probably lens flares that would obscure the subtle lighting of the sky. I also knew that this was probably not another photographer or astronomer, and I would have to explain myself to someone. This gets annoying, especially when one thinks that since this is "remote", there aren't supposed to be all the interruptions of more urban population centers.

It was a giant pickup truck with blazing lights, lots of them. I grabbed a tripod to help me explain to whomever this was that I was harmless. It drove around, inspected the plates on my car and pulled up next to it. The occupants turned a searchlight on me. I fiddled with a tripod leg and said "hi".

They didn't look very interested in my equipment. I was told that the picnic area closed at sunset. Sure enough, it was an official, well not really, it was a civilian, the campground host and his adult son from the north end of the lake. They had seen me drive in to the picnic area, whose posted hours limited its use to daylight. I couldn't imagine that anyone would object to my being there. After all, this was a national recreation area, it just happened that my particular recreation could only be done after sunset. I tried to explain what I was doing, but there was no negotiating with these guys. Rules were rules.

I learned from the campground host that this end of the lake had been "pretty rough" a few years ago before they took on their positions at the campground, the site of wild parties and unsavory characters, alcohol and other illegal substances accompanied by fights and harassment. They painted a picture of picnic ground depravity.

"You don't wanna hang around here" the host-sergeant explained. "It took a bit of work and it's pretty much cleaned up now but they're still around, and you don't wanna be here if they show up." He obviously wanted some credit for the excellent enforcement work he had done.

I wondered how offensive a party could be back here in the deep woods. Thinking back to last night, I could guess his tolerance for kids skinnydipping. But then what did I know about this region of the country? Just because I'd not encountered outdoors-lovers that were dangerous partiers didn't mean that such wild bands didn't exist, in fact, running into hostile rednecks in the dark is on my list of nighttime worries. It seemed to me however, that this campground vigilante was more effective at harassment than any of the partiers I'd met the night before.

I made one final plea, explaining that since I wasn't one of those guys that caused him so much trouble, maybe I could stay for a while to take some pictures.

No, if I wanted to be here, I would need to get permission from the park management, a special-use permit, and even then, he couldn't assure me that trouble wouldn't happen during the night.

I gave up. I said I would pack up and head out. Maybe I could get the permit the next day and try again. He had won his skirmish with me, and with a look of satisfaction, drove the big loud truck back around the lake, lights scanning the woods looking for other outlaws.

The next day I contacted the Mt. Hood National Forest Hood River Ranger District and was referred finally to someone with authority to deal with my request, Kim Titus. I explained to Kim what I was trying to do and how I had been evicted the prior night.

When I told her exactly where I had been, she responded with a reassuring chuckle hiding her apparently recurring annoyance "Well, yes, we are aware of that campground host, there's been some similar issues with him. I'll get the ranger in that district to issue a permit for you. That should get you by."

She gave me some instructions on how to pick up this permit and finished her business with a request: "Send me a picture of what you get, ok?"

I was relieved. I could now photograph with impunity. I had protection. I spent the rest of the day planning how I would compose my shot, hoping and worrying that the clear weather would hold. Unfortunately, I was unable to follow the instructions to pick up the permit, and by day's end I did not possess the physical piece of paper that would be my ticket to shoot pictures at the picnic area.

I proceeded as if I did, hoping I could bluster my way past the campground guards. My strategy was to visit them preemptively and tell them that I had procured the special-use permit from the head manager. I could drop some names, and knowing we had a discussion about this the prior night, hope they would believe me, and not make me produce that actual paperwork.

The host's son was at the campground. Not the top dog here, but maybe I would have an easier time getting past him. He would tell his old man, and I would be in. I pitched my story and he nodded, waving me on. I drove past and made my way to the picnic area. I had made it. I was there. The campground hosts knew I was legally there and would be nonplussed by unauthorized intruders, I wasn't one.

I set up my cameras again, this time the beach was familiar. The sky was clear. I composed my pictures, opened the shutters and started the exposures. Isn't life great

when things work out? I started to get out my notebook, interrupted the night before, and settled into a camp chair on the beach next to my tripods to continue writing.

Not a word was entered before the truck lights fired up and blazed their way around the edge of the lake. My preemptive visit had failed. The royal guard of the campground had come to cross-examine me. My shots were once again ruined.

I'm not exactly sure why he had driven to my end of the lake. He didn't make me produce the permit. My story was accepted. Evidently it wasn't enough for the Pooh-Bah to approve my presence, the Grand Pooh-Bah had to check up on me himself and confirm I was doing what I was authorized to do and no more.

I waited for the searchlights to return behind the trees at the other end of the lake. I restarted the exposures and hoped there was still time to make nice star trails before the moon came up. I wondered why some people are untrusting, why some groups of people are suspicious, and others are suspects. Why do neighbors and countries have border disputes? As my queries moved up to the causes of world geopolitical conflicts, I decided that not enough people look at the sky at night.

The sky at night. Yes, that was why I was there, and so I claimed my chance to look at it. I owe Kim a photograph.

Frog Lake, Mt Hood Recreation Area. The lights of the year- round ski area are seen on the side of the ancient volcano. It took several nights and multiple aborted exposures before the picnic area security force would let me take this picture.

Tillamook Friends and the Lost Perseids

The hiatus from my astrophoto odyssey came to an end. The two-week interval of visiting college campuses, spraying sand from dune buggies on the Oregon coast, and hiking the Mt Hood wilderness had reached its terminus at the Portland airport. A mixed set of goodbyes were exchanged: my teenage son, eager to return to his real life as defined by his peer group, and my wife, knowing it would be more weeks before I would be returning, and *her* real life could resume.

It was an empty moment driving away after dropping them off. I wandered back to the hotel and took advantage of the guest laundry. I hadn't really firmed up my plans and waiting for the rinse cycle gave me time to resolve an inner conflict. I was "near" (a few hours' drive) to the place where an old high school friend had finally settled and made his home. As with most high school friends, I had lost touch over the years, but remarkably, he had hunted me down and made contact with me a few years before. Here was a chance to return that interest, complete the exchange and perhaps set the stage for a future relationship. This is not my usual inclination. I too often fail to recognize the opportunity, taking instead the natural passive response of an introvert.

Compatible with this usual choice was the immediate resumption of my astronomy interests. Tonight was the peak of the Perseid meteor shower, an annual event of graceful falling stars, sometimes dozens per hour. I could drive east, away from the Portland lights and try to photograph their bright lines across the sky.

As the dryer asymptotically approached, but never actually produced, a dry set of clothes, I considered this decision. Somehow at this stage of life, it seems that the risks of contacting someone you don't know closely are mostly on the upside. The contact could lead to nothing more than an awkward conversation, in which case, there really was nothing lost. Or it could become a marker in your life that could be built upon, or at least fondly recalled at some future date. I decided to visit Dale (not his assumed identity, explained later). Maybe it will be a visit for an hour or so, and then I can still try to get far enough west before midnight, the beginning of prime time for meteor viewing.

Dale was a strong influence on me at an impressionable stage of my life. His was an existence of pure nonconformity. School authority figures (teachers, principals, counselors) when speaking charitably, would describe him as listening to the beat of a different drummer. Their usual descriptions however, were far stronger than faint praise.

What appealed to me was his creative streak. Finding unusual projects to undertake, movies to make, unauthorized artworks during metal shop, exploring beyond the lab

assignment in chemistry, and contributing to my budding efforts at pop-art (all the rage in the sixties), and special-effects photography, these were the things that tangled our paths for a few eventful years.

In those years and after, less benign activities developed and captured my friend's focus. Recreational drugs and the illegal infrastructure supporting them engaged him, and then supported him. As with so many other buddies you share your adolescent agonies and triumphs with, our paths split, and our courses diverged. Yet you never reach a point so distant as to deny the bond that for a short but important time forged a part of what you are today.

These were some of my thoughts as I took the route, not east to the dark Oregon desert, but west, to Tillamook, a community near the coast; a community known for its natural beauty of pastures and meadows amid forests and rivers. The pastures support a hearty dairy industry, and the cheese produced is world famous, deserving of its Tillamook credential. Logging and dairy farms seem like odd partners in industry, and I suspect there are plenty of issues that split opinions among the residents of Tillamook.

The lush Trask River valley, where my old friend is making his life

My trepidation increased as I drove closer to the town. I had gotten voice instructions from Dale and now I was looking for a steep driveway on Trask River Road. I found it, hidden by the effusive undergrowth that results when a rainforest comes to an abrupt halt at the edge of a road. The driveway, a gravel and mud parting of the green sea, made its way up into the dark jungle. At unexpected moments, a mechanical beast would suddenly show its rusty carcass: dump trucks, backhoes, bulldozers and caterpillar tractors, each an apparent warning to unwary and unprotected construction vehicles. My aging minivan clambered the rocks up to a house of handsome and distinct styling that sat nearly camouflaged in its setting in this tall forest.

Dale stepped out and almost before shouting our halloes, gave instructions for easing my van up the side road, presumably as part of the overall traffic management for the narrow winding driveway. And now I could get out and greet my old friend.

Yes, we had both grown up. We both sported beards, his in the mountain man style, and both of us had to suddenly throw away our former mental pictures of faces capable only of peach fuzz.

I had wondered what we might talk about. I should not have worried, for Dale is a natural storyteller, and I realized that we would not merely be exchanging stats on careers or family. I was, as in the old days, rapidly coming under the mesmerizing spell of his fascinating descriptions.

Dale owns a few, tens maybe, acres of Oregon forest. He acquired it in some transactional sleight of hand with a former partner, and he has built his house and some other structures on the land. He shares his land wealth with his family of course, and with a tenant, Becky, who lives in what might be called a loft in the barn, but I suspect is considerably more comfortable. I met Becky, and she seems the sort that would fit in with Dale's natural, if libertarian, lifestyle as nicely as these buildings fit into their environment.

The foundation of the house is built from steel and concrete to amazing specifications. The steel is in the form of cylindrical pilings obtained as remnants from some big construction project. He had acquired them, (I didn't ask, but he suggested it was a beneficial exchange), cut them to size, and installed them as his foundation, the loading and stress factors calculated so that no matter what happens, it will not pull out or collapse under any conceivable earthquake conditions.

The house itself, is built from wood, supplied by the local sawmill from trees in the neighborhood. Dale is down on logging in general, having seen the excesses of the industry and watched its financial influence destroy the old growth forest on the other

side of the valley. Obviously lumber is an important resource, the issue is how best to manage it.

The wood, along with stone walls and other features from materials quarried on-site are what make his house seem so natural in its place. Dale took me on a tour of his property. We got into one of his cars, a model and vintage that still contained a working engine but whose doors had paralyzed shut (Dale was an internal combustion expert). We climbed in through the permanently open windows, and he explained as we drove though the roadway of four-foot weeds, that this route was built by an old and famous roadbuilder who had surveyed the land and known exactly how to carve the hill and fill the hollow to access the best features of the property. And so he had.

We twisted and climbed a hundred feet or more, skirting unprotected dropoffs, and gaining tremendous views of the valley. It was really more of a proto-road, needing a bit more useage to keep the milkweed and grass down to a reasonable height. The beater car mowed down the bramble and continued the climb to an open mound. We climbed out and Dale showed me the stumps of the ancient forest that had been harvested many years back. He also pointed out the few remaining ancients left standing. Perhaps they were deemed too small to trouble with at the time, but whatever the reason for their survival, they stood now as the tall grizzled guardians of the new-growth forest, the Douglas Fir replacements. I got an extensive lesson on the biology and ecology of trees and forests, and the issues in the modern lumber business. He pointed out stands of Larches, the fruits of his labor years earlier and still ongoing: planting thousands of seedlings and protecting them from hungry deer and elk.

There is a natural spring on his property that squeezes out of the rocks near the top of the ridge. Dale had intercepted a portion of this flow and piped it down to his house, where, due to the difference in height, there was plenty of water pressure. He used this as his water supply, never able to consume it all, returning the unused bulk to the stream it would have joined, now just a few feet lower.

We continued the road tour. Dale had terraformed sections of the property, carving it and shaping it to a vision he held. The collection of earth moving equipment I had seen on the driveway approach were the tools he used for this task. They were not dead, but they were in a state of high usage, some in disrepair from overuse. But these were valuable tools, and Dale's remarkable skill set included knowing how to fix them when they broke down, and how to use them to sculpt his land.

His vision included making a retreat-like resort where groups could convene in a natural setting while making plans to improve the world. It included making an amphitheater where summer music festivals could be held (had we been but a year older, we might

have attended Woodstock. The missed experience had never left Dale). He wanted to subdivide his land and build homes for "nice people", by which I took it to mean people kind of like... him, an earthy mixture of self-reliance ethic, a former hippy, savoring life, caring for people and caring for the planet.

It was a long route for Dale to reach this place. His various occupations all seemed to be in the ultra-high-risk category. Even disregarding the turmoil and risks in an underground drug industry, working as a hand on a fishing boat, and as carpenter and construction worker in Alaska qualifies as a hazard to life expectancy. In fact, knowing his personal style and choices, I told him that I was surprised that he was still alive. He confided that there were times that he thought he shouldn't be either, yet here we were, talking about them.

Part of his survival is cleverness, part necessity. He is a wanted fugitive and no longer goes by the name I knew him by, and does not answer to "Dale" either.

Dale has a family now. He married a woman who found riding the rails in empty boxcars with him, and all the adventures that surround Dale's life to be the right mix for her soul. Their adventures are less far-ranging now, making a home for two boys, they have a blend of labor. Lisa holds a job as a health clinic worker, and Dale's career is his land. That, and taking care of the boys while Lisa is at work, and all the other support activities in being a parent. This is more work than most people know, unless they are in that role, and it is more than Dale wishes sometimes as he gazes wistfully at his property. He sees the vision, and he is contemplative of his present age. As he describes, in a comprehensive chronologic listing, a recent trip to the urgent care department, the procurement of X-rays for his son's leg after a carnival ride accident, the monitoring of his activities afterward, and coordinating the errands outlined by his wife, he says, in that mild accepting tone that other fathers, and mothers, understand immediately, "This is my life now."

The tour of his land comes back the same harrowing route, and we successfully return to his house. A neighbor has arrived to share some pictures of his race car, Lisa is home, the boys upstairs busying themselves in late Sunday afternoon activities. Becky checks in, beers are opened, and our small party exchanges stories and unimportant but recent details in our lives. Dale relates with his usual remarkable memory for detail, various episodes along his life path through Alaska and his return to this part of the country. As he does, his hands are busy pulling the leafy parts from the stems of dried cannabis plants into a ceramic bowl. The process is precise but casual, the dexterity automatic from years of repetition. The warmth of the home in the afternoon sun, the accepting welcome by a group of friends, Dale's mesmerizing stories, all are conspiring to keep me here. This of course has been assumed all along by Dale, the invitation to stay the night is voiced as an

unnecessary formality. I can tell that I will need to make a critical decision soon. Just like in the years past, the desire to stay is strong, but unlike those years, there are no penalties of parental reprimand for staying out too late. Still, there are tradeoffs.

The hour-long visit I thought might happen has slipped to more than five, and I think about whether I can make it to the Oregon mountains by midnight. I was not mentally prepared to slip into Dale's lifestyle for an evening, as inviting as it now seems. Explaining my astronomical goal brought a moment's admiration for stargazing, but as much as everyone wanted to participate, it was Dale who brought the practical aspect up, "How can you stay up so late?" A life of chiseling his dreams from the landscape and caring for a family whose activities start at sunrise can be sustained for only so long each day. Even Dale, with his boundless energy and enthusiasm for his plans, needs some time to sleep and recharge.

With reluctant goodbyes and promises to stay in touch, I parted company with the nice people living in the Trask River valley. I wondered if I would regret the choice I made that evening.

The emotional residue from my reunion with Dale would last for days as I drove into the heart of Oregon. In most of my encounters with Dale, I am left with a sense of awe mixed with concern. This was no different. His passion for life, if any stronger, would show as a visible aura. I wondered what his life might have been, if the knob that controlled his nonconformity was turned down just a touch.

I think he would have made an excellent civil engineer, his wide-ranging knowledge and concern for ecological balance are exactly what are needed in the design of society's infrastructure. Most likely, he would practice in remote parts of the world, building structure from chaos, balancing impact with benefit.

I drove east through Portland one last time, being careful not to get mixed up again on the freeway spaghetti over the Columbia river. As I drove, the urban density diminished with the sky's twilight, and I started to think about other things. My next astrophoto target was Crater Lake, but I could never get that far tonight. But I could get somewhere dark, right? I could set up some cameras and try to catch meteor trails. I drove east, then south, hoping for a clue, an inspiration, about where to land for this night. The sky became dark and disappeared behind streetlights and haze. I pulled off the road to check but was unable to gauge whether it was suitable for photographing, which usually means it isn't.

It had been a long day. Was it just this morning that I had put my wife and son on an airplane? The lack of a clear plan and an accelerating weariness started to take control. The plan, unformed as it was, now evolved to include some way of getting some sleep. Maybe I should check in at one of these traveler hotels before it gets too late. Then I would have a nice place to crash after watching the meteor shower. Yes, that sounds like a good plan. I'll check into this one, and then as soon as I drop off some stuff, I'll get back outside and find a nearby park, one without lights. Hmm. I wonder how far I'll have to go to find such a place. Maybe I'll just stay in the room for a while and study my maps, so I don't waste time driving around. Do I want to go that far? I'm pretty tired. Maybe this isn't the year for me to see the Perseids. I should get some rest so I can be ready for tomorrow's drive...

It's amazing what self-talk and the power of rationalization can do. In this case, it was probably for my benefit, I really was exhausted, and having another day to transition back to my astrophoto odyssey was the right thing to do. It was just too bad that I was doing it here, paying for a nondescript hotel room in an unmemorable town somewhere south of Portland, when I could have spent it in the warm company of my Tillamook friends. The Perseids were lost, but the loss was much larger than a recurring meteor shower.

Dale displays a glass of water from his spring-fed supply, explaining the natural bubbles that makes his water taste like "Tillamook champagne." The construction behind him is part of the continuous creation of his home and dreams.

Note from the future (2019): *My visit with Dale did indeed renew our friendship which continued in the years since, with occasional visits as opportunity permitted, back to his Tillamook home, and with him bringing his (now three) boys plus dogs to visit me in Minneapolis. Sadly, his seemingly indestructible life force met an obstacle he was unable to overcome: lung cancer, and he passed away in this last year. He leaves behind a great many people who, like me, were fascinated and inspired by the creatively productive life he led.*

Crater Lake

Forest Fire Crater Haze

Though it doesn't seem so from the maps, Crater Lake is not an easily accessible park. It is tucked away in a zone straddling forest and desert, and only a few roads provide access.

I stopped in the town of Roseburg, the exit point from the I5 freeway to start the blue-highways route to Crater Lake. This was the last town of a size that might have an adequate camera store. I needed a cable release to replace one that had failed. A cable release, the mechanism that provides long duration exposures by keeping the shutter open, is essential for astrophotography. It works by using a flexible wire inside a sleeve. One end has a pushbutton plunger that is used to push the sliding wire down the sleeve, acting as a "finger extender" to trip the shutter. This allows you to take a picture without actually touching the camera with your shaky hands. When the camera is set to "B" (a reference to the now obsolete flash *bulb*-mode), the shutter remains open for as long as the cable is pushed in. For really long exposures, there is a convenient feature on the cable release that lets you lock it in place, allowing you to walk away from the whole setup while the shutter remains open. Come back in an hour and unlock it to finish the exposure.

I am surprised at how often cable releases have let me down. I had learned early on that the simpler models using a set-screw to lock the cable should be avoided. They just can't be operated while wearing gloves, and even without gloves, it's hard to be sure that the set-screw is tight enough and won't slip sometime during the exposure.

The more professional cable releases use some kind of mechanical interlocking ring to accomplish the task. There are still hazards of setting it correctly, but it CAN be done with gloves. It turns out however that there are other weak points in the design of a cable release, specifically the endpoints of the sleeve and where it connects to the plunger, and to the camera. If these become loose, the cable has nothing to push against and becomes useless. This is what had brought me looking for a replacement. The tip had detached from the sleeve during a previous night's shooting. My attempt to do a repair in the dark only resulted in the tip getting lost somewhere in the wild, or in my car, which is about the same thing.

Cable releases are becoming a relic of the past however. Modern cameras use infrared or electronic remote controls, truly decoupling the camera from your shaky hand; it takes a camera store of a certain stature to carry the old-style mechanical ones. It was not clear that Roseburg was large enough to host such a camera store.

I decided that Roseburg was just at that critical threshold, because I did manage to find a camera store that carried camera accessories, including cable releases, but the selection was limited. There was one. Its features were exactly wrong, it was way too long (I like the shortest ones so they don't get tangled in the dark), and had a screwlock, and it was outrageously expensive, but there I was, at the edge of civilization at the last possible source for this essential gadget. I bought it.

The road provides access to Crater Lake, but when it is under construction, that access is even more restrictive. Patience is the requisite virtue for this trip, but because of the delays, I reached the park in the late afternoon. The sun, still an hour or two above the horizon was a dramatic red orb, viewed directly through a thick atmospheric haze. This was a summer of record forest fires throughout the Northwest, and though I had not encountered any directly along my routes, they had filled the air for weeks with their particulate exhaust. The afternoon light was warmer than usual.

It was late afternoon as I arrived at Crater Lake. The sun, weakened by forest fire haze, had become a red blob hanging in the sky.

I would have liked to find a campsite, but my construction-detained late arrival (pre-sunset doesn't seem late to me) rewarded me the experience of seeing the "Campground Full" sign. There was no time to figure out my overnight accommodations, nor for any extensive reconnaissance, I needed to find my shooting location for that night. I still held out hope that maybe I could catch some late Perseids on film.

I found an overlook for the beautiful lake that gave a nice view to the East, and setup two of my cameras to try and catch meteors. The strategy is to use a fast lens at its full-open aperture, open the shutter and hope a meteor crosses its field before a few minutes elapses, at which point you may as well close the shutter, advance, and try again, because the background sky level will have fogged the film. If a meteor does strike while the shutter is open, close it immediately, and start the next frame. I thought I could manage this procedure on two cameras.

While I was trying to catch meteors, my third camera was exposing a long startrail shot. Crater Lake is famous for its calm blue reflecting waters, and I had been looking forward to this chance to get reflected trails in the scene, a motivation for coming here in the first place. Unfortunately, the famous calm blue reflecting waters were not calm and not blue. The weather conditions that had fanned the flames of the forest fires were still active, and the wind managed to find its way over the normally protective rim of the crater and ruffle the surface of the lake. The haze in the sky lent a yellowish cast, though I could not tell this as I composed the frame.

I spent several hours waiting to catch meteors. I did see a few; the long graceful distinctive trail of a Perseid meteor was a momentary reward for suffering the wind. I could not tell what the film was seeing, but I dutifully advanced frames when it was time. The wind seemed to spill over the crater wall at exactly this overlook, or maybe I'm just easily annoyed by it, but after a few hours it had extracted the warmth from my core, and it just wasn't fun anymore. I was tired again and was coming to realize that I should really plan on burning the evening on a traveling day, because it wouldn't be very successful anyway.

Now, back to that problem of no room at the inn. It was late, and I found an unpopulated picnic area. The rules are always no overnight camping, but I was going to sleep somewhere, and this looked like a secluded place that wouldn't attract picnickers until the next morning. I put my windshield reflector in place (for privacy, not the heat shielding), and made myself as comfortable as a 6-foot human can in a minivan filled with astrophoto equipment. I was skeptical that I would be able to sleep in this contorted position, but just after thinking this was impossible, it was suddenly light out. I must have closed my eyes for a brief moment during the time warp.

Not refreshed, but not dead exhausted anymore, I planned my new day. It was still early, the campground was probably coming to life, led by the segment of our population called early birds, people whose body chemistry prevents them from physical activity if it is dark out. This causes them to miss the glories of the night sky, but also results in a pent-up energy level that must be released as soon as dawn's twilight arrives. These are the people found jogging at five a.m. and who have breakfast cooked, dishes cleaned, camp packed up, and are on the road by six!

As a member of the remainder of the population, the night owls, I usually curse this frenetic early morning activity. Today however, I took advantage of this behavior, scouting the campground for their early vacancies. There! I moved in to an open site, enjoying the experience of claiming a campsite even before the Campground Full sign had been taken down. It is not often I am the first one to check in!

One can always divide the world into two types of people-- distinguishing between early birds and nightowls is just one. My favorite division is between those who divide the world into two types of people, and those who don't. I suspect that anyone declaring themselves as belonging in this latter group would have to acknowledge that they are different from the former, thereby placing them into the group to which they claim not to belong!

During the time I attempted to catch meteors, another camera quietly recorded the stars rising from the east. The fires in the region provided the smoky tint to the sky, and winds to make the lake a frosty reflection of it.

Crater Lake Rim Drive

I made a short agenda for myself:

- set up camp
- catch up on some writing
- find tonight's shooting site
- organize shooting targets, schedule them
- fix the broken connector on the battery holder for the Pentax camera
- prepare, make coffee, organize car
- take nap

This was more than a full day's work. I never got to take the nap, but I did drive all the way around the crater's rim, checking out the various overlooks, trailheads, and picnic areas, evaluating each for their access, orientation, and opportunities for interesting nighttime landscapes.

The wind had died down momentarily, and I could marvel at the now calm, now blue, Crater Lake. The blue color is a reflection of the sky, the smoother the surface, the truer the reflection. It seemed that the smoke in the air had mostly cleared, making today's view of the lake a beautiful sight.

The sky is polarized. Humans can't see this directly but wearing a pair of polarized sunglasses reveals it. Tilting your head while looking at the sky will show it to lighten and darken with your tilt angle. I wondered what happens to the polarization after being reflected by water. I took various pictures of the lake through a polarizing filter I had brought. My results were inconclusive, but attractive, nevertheless. A reflecting surface adds a polarizing effect of its own (polarizing sunglasses are designed to cancel it), and the combination becomes more complicated than I was willing or had time to figure out.

I also enjoyed watching the sightseeing boat that motored around in the lake. Its wake propagated uniformly and unhindered across the glass surface, until eventually encountering the shore, which then reflected back out into the lake crisscrossing itself. Just like the physics wave lab tanks, but on a grand outdoor scale!

A view from Phantom Lookout, testing the effects of a polarizer filter (right). Polarizers are often used to accent the blue of the sky, but in this case, Crater Lake is not really in need of further enhancement.

The famous still blue waters of Crater Lake host tour boats and sustain wave fronts from them that propagate across the entire lake (a view looking down from the rim).

Risky Exposures

Sentinel Point is one of the high spots on the crater rim, providing a commanding vista of nearly the entire caldera of the ancient volcano. I selected this location, a turnout that would mostly avoid oncoming traffic, to setup my equipment that night. I brought out the works, everything I had, telescope, sky tracking camera, and fixed tripods. I planned to take some prime focus deep sky pictures that evening, as well as some wide-angle views of the Milky Way. This meant polar aligning two mounts, which kept me busy until astronomical twilight, some two hours after sunset.

I also placed two fixed tripod cameras for startrail pictures. I spent quite a bit of time trying to find that photogenic angle that included sky, crater, lake, and the star groupings that I wanted to capture; there was just no vantage point that had a clear view. The withered pine trees that grew on the rim surface were just dense enough and sprawling enough, that they always intruded in my viewfinder. If I could just get down to that exposed rocky point on the rim wall, I could get my clear shot. Of course, scrambling down the rim wall is highly discouraged. The barrier at the edge of the turnout is the limit of sanctioned range for tourists and exploring beyond is prohibited.

Yet down there was the perch that I sought. While it was still light out, I ventured out onto the hybrid surface of rocky talus and weathered soil. A few plants held it together, and some tenacious trees had made outposts. I found a suitable location that contained my target view and planted the tripod. I setup the camera in preparation for later when it would be dark, and I could start the exposure.

Yes, later, when it would be dark. I wondered how I was going to find my camera later when it was dark. It was one degree of risk to climb out of bounds in daylight, another to do it in the dark.

I ended up making a mental map of the exact route to the camera. Start precisely here, at the third block in the turnout wall, proceed directly to the squarish rock, go around the tree, and take exactly this many steps down, etc. It was a bit unnerving to do the route to open the shutter for the first exposure, and I recall wondering what was I doing out on the crater wall, at night, in the dark? What brought me to this reckless and desperate condition? After successfully finding my way back, I did not relish the return trip to complete the exposure.

But there were other things to do before then. I had a series of deep sky targets that I wanted to shoot. Finding, composing, focusing, and setting up the guiding kept me busy until nearly midnight, when the shutter finally opened. I could pause for a few minutes now and take in a big view of the night sky. Crater Lake's sky is incredibly dark! The air

was clean and dry and thin at this elevation. I have seen a night sky like this only a few times, where there are so many stars that you cannot find the constellations!

I looked around. There were no light domes on the horizon in any direction. A few lights could be seen at the resort on the south end of the rim, miles away, but they were miniscule and rapidly diminishing as people went to bed. Distant headlights would occasionally peek out as vehicles navigated the rim drive.

Not all the vehicles were distant. Eventually they would reach this azimuth on the rim drive and the headlights would sweep across my little observing station and continue on. But not all continued on. A young couple pulled in to my turnout for the sheer pleasure of gazing up at the sky while in each other's arms. If they were even aware of my presence, they had no interest in me, or my activities.

But they became aware, as yet another car pulled up, a park ranger on his rounds (a bit overdue, I thought). Like the rest of humanity, and as I have mentioned, the officials that stop and question you while observing in the middle of the night can also be divided into two types, those who want to see your permit, and those who want to see Jupiter.

"You all know of the no-camping rules here, right?" This ranger obviously belonged to the first group. We assured him that we did, I provided information about where I actually was camping. I wondered if his beat included that picnic area I had illegally slept in the night before.

Having performed his informational obligations, he drove away. I certainly don't envy the night security officers in national recreation areas; their shifts must be terribly uneventful. Stopping to check on parked cars and stargazers at a turnout probably helps pass the time, if it wasn't the highlight of his watch.

I returned to my telescope, making the next exposure of the targets on my list. The young couple eventually moved on, probably to more intimate settings. I kept busy with my various imaging tasks until it was time to service my camera down the slope.

With trepidation, I went through the choreographed route to find the camera, cursing myself for being such a slave to the picture in my mind. But I had successfully navigated by my localized landmarks to the camera twice now in the dark, and as I closed the shutter, decided that rather than picking it up and returning, I might as well start another shot, I would be several more hours working on my deep sky exposures. So, pushing my luck, I committed to one more return trip down the rim wall.

The night ticked by, the stars moved overhead, their changing positions marking the time. Eventually I ran out of dark. Astronomical twilight having seemingly just ended after sunset, returns again a couple hours before dawn. Summer nights are too short. I retrieved my rim wall camera, living to tell about it.

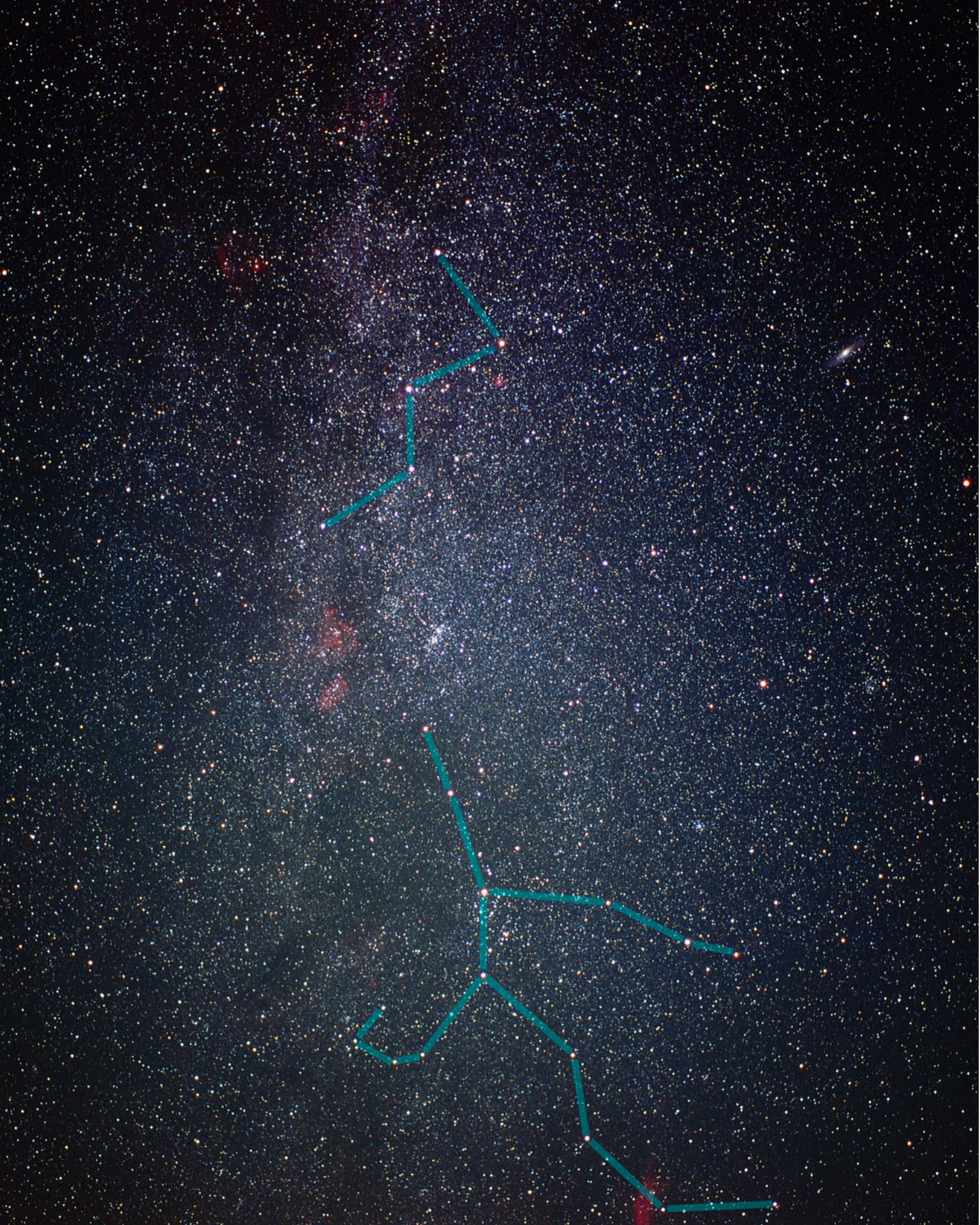
I packed up and headed to my campsite. I'll get a few hours' sleep before "campground checkout time". I momentarily considered whether I had gotten my money's worth from this campsite, having spent only a few hours in it, but that's not the right way to think about it. Campsites are cheap, and you can't sleep at the turnouts.

I would not find out whether the exposures I made that night had turned out until weeks later. This delay in feedback is a serious problem for shooting film (versus digital imaging) and prevents any immediate learning from my mistakes, but it also allows me to enjoy the process of taking the pictures, without all of the value placed on the results.

The night at Sentinel Point at Crater Lake was probably the finest evening of astrophotography I experienced on this trip. It was a nearly ideal location for that activity, dark, arid, high. It was remote but had adequate services to support my style of travel. I don't know when I will be able to return, but I will look forward to the deep dark sky when I do.

The view from the crater wall. I was trying to capture the reflection of the sky, but the rough waters permitted only the brightest stars to spread into a broad sweep. Not an award-winning photograph, and probably not worth the nighttime risks taken to get it.

A collection of images taken at the prime focus of my telescope at Sentinel Point. The red emission nebulas are M16 (Eagle) and M17 (Swan). The brilliant red appears only on the film; the view through the eyepiece shows only the brightest parts of the nebula and almost look like the shapes they are named. The galaxy is M33, the Triangulum Galaxy, another member of our local group of galaxies. The moon rose at 2:00 am and provided an easy target to cap the evening of astrophotography.



A view of the Milky Way above Sentinel Point. The sky was "stark raving dark" meaning that the constellations were hard to identify for all the stars in the way, so two of them are outlined here. Some Milky Way landmarks reveal themselves here: the bright spot at center, between Cassiopeia and Perseus, is the Double Cluster. To the upper right is a smudge that is our sister galaxy, Andromeda. Red clouds are emission nebulas; a prominent one at the very bottom of the frame (in Perseus' foot) is the California Nebula. (Pentax 6x7 55mm, f/3.5, 20 minutes on E200, pushed two stops).

Trail to the Tetons

Idaho Oasis

Most people think of Oregon as being a heavily forested state, because of all of the logging issues and the beautiful coastline with its rainforest edging, but, like Washington, Oregon is mostly... desert. The waters and moist clouds of the western shores are sequestered by the Cascade mountain range. As a result, the eastern two-thirds of the state are arid, though punctuated with areas of high-altitude forest, and irrigated orchards.

Evidently, the forest areas are subject to fire, and with infrequent rains, the fires go unchecked for days and weeks. This summer in particular has been bad, and, consistent with the sunset I enjoyed at Crater Lake, a brilliant red ball drops to the horizon as I drive across this sparsely populated region.

The towns are far between, but offer the services to road-weary travelers, and to road-savvy truckers. I stop at Jake's truck stop in Bend Oregon, an important refueling center. For the first time I see a "truck-wash", a facility designed to efficiently clean the miles of dust and grime from an 18-wheeler. I hadn't ever thought about it before, but of course there must be a way of rejuvenating the chrome and gleam of these giant beasts of burden. A truck wash is the natural explanation for why the trucks you encounter on the interstate are not all dirt-gray, but usually display their billboard-size logos with pride and polish.

I refuel at Jake's. My car takes its usual 17 gallons, and I decide to go for the restaurant. I discover that, unlike some restaurants in the cosmopolitan coast of the state, this one had a smoking section. In fact, it was pretty much *all* smoking section. There was a small side room with some empty tables for nonsmokers, and, discovering that the main room was choking full, the staff struggling to keep up with the clients, I took my place in the smaller room and was handed a menu by an otherwise idle server.

Breakfast is one of those meals that is always good when cross country traveling, no matter the time of day. I ordered the western omelet, deciding that I should have the small one, so I would have an excuse to stop again soon when I became hungry again. It didn't work. All I can say is that I'm glad I didn't order the full-sized portion, because I was unable to eat the giant plate of food presented to me. I'm not sure what creates the huge appetites in truckers, but Jake seemed to understand and cater to it. No wonder the dining room was full.

As I cross the border from Oregon to Idaho, the night is advancing, and I contemplate the fundamental flaw in the traveling astrophotography road show: I can't shoot pictures all night and then drive all day, nor can I drive all day, then shoot all night. As a result, there end up being dead times, where nothing can happen, because... I need to sleep!

The winds have become so fierce that trucks are having trouble staying in their lanes. I think ahead to the miles I must cover to reach my next stop, Idaho Falls, a modest town on the other side of Idaho.

Idaho Falls has become in recent years a focal point for my family, where new roots are gently extending and taking hold. While the Olson clan, with their growing families and extensions have for much of the last century made the metropolitan center of Minnesota their home, my brother struck out in a new direction to set up his pediatric practice. Having spent his medical training in western states and possessing a natural inclination for the big sky experience, he was able to forego the strength and comfort of a local family network and to build his career in a town that needed his expertise.

His success in building his practice, his home, and his life out in the "remote frontier" of Idaho Falls inspired my parents, driven by my mother, to set out and make a second home in this more temperate, frostbite-free, and mosquito-bite-free region of the country. And so now there is a family outpost to the west, a station for me to stop and recharge, replenish, and reconnect, before continuing my travels.

The only problem was one of timing. It was late evening and there was an entire state to traverse. I'd been on the road all day, but it looked like I would not be arriving in Idaho Falls until considerably after normal waking hours. Families are there to be imposed upon, but it would seem a bit inconsiderate to show up and knock on the door at 4 a.m.

I needn't have worried. I didn't last that long. Weary and bleary, I pulled off to a rest stop an hour or two from my destination and decided to “rest my eyes” for a while. When I opened them a moment later, I looked out the window to a beautiful thin crescent moon in a clear dark sky, accompanied by a bright point of light that I could only assume was Venus. I vaguely realized that I should get up and take a picture of this. It would have been very nice, the moon in its crescent phase right next to Venus. I'm not sure what phase Venus was at, but from its brightness, my guess was that it was gibbous; it would have made an interesting composition, but I was just too tired to get up, and I turned over and went back to sleep.

The next time I woke up, the sun was about to rise, making a pale yellow-blue canopy (if such a transition is possible) of the sky. The moon would be up there somewhere, but its delicate crescent could not compete. I lumbered over to the washrooms at the rest stop,

splashed some water in my face, dragged a comb across my head, and headed out to join the 70mph occupants of the freeway. I felt better than when I had stopped, but not much better. Eventually, the daily chemical cycle in my body started up again, helped by a quick stop for some caffeine. I felt an overall lifting of my internal energy levels, improving by the mile as I approached my next destination, Idaho Falls.

I have mentioned my GPS receiver before. It had become a dashboard companion, its electronic trail indicating my progress, and highlighting the names of cities I am about to encounter. As I approached Idaho Falls, it displayed some new markers. Locations with cryptic names, not corresponding to towns or roads. Waypoint identifiers that had been created by someone to mark a past trail of landmarks.

I soon realized that these were *my* markers, waypoints that had been set a few years earlier as I had shown off my new GPS gadget to my dad, marking the corners of his newly acquired homestead property. They had been retained in the memory of my GPS receiver, and now within range, were proudly displaying their prominent positions with the labels I had assigned way back then.

It was a welcoming sign, one that marked the exact location of my destination down to its driveway. I drove the unfamiliar streets of Idaho Falls homing in on the virtual beacon and soon pulled up to a warm greeting from my mother.

Yes, home is where they have to take you in, and I had found it in this western town. I was able to recharge my batteries (I'm talking about the various power sources for my equipment) while getting a real shower. I took my mom and sister-in-law out to lunch where we were joined by a quick visit from my brother, escaping his hospital duties for a few moments to help bring me up to date on the various important events in their lives.

A view from my brother's home. I was unaccustomed to the habits of their horses, taking morning dust baths.

As comfortable as this setting was, I had no intent to fall prey to the various invitations to stay the night. No, this night I was hoping to be taking pictures in the Grand Tetons, a magical place where the mountains loom immediately above the flatlands of the Snake River flood plain.

I managed to extract myself from the familial ties and packed up my various items, including the laundry that my mother had insisted on washing, and headed east to Teton Pass. It had been a brief stop at a valuable oasis, a place where I could refresh my body, but more importantly, could become grounded by the momentary reconnection of family bonds.

One of the pleasures of stopping in Idaho Falls was visiting my nephew Kendal, an active 4-year-old, who will grow up all too soon to deepen the family's roots in the Idaho oasis.

Teton Trails

The route over Teton Pass was the most direct way to Jackson Hole, the tourist and ski town that is a gateway to Grand Teton National Park. The trip over the pass was uneventful, but for the uneasy feeling I get when a train of local vehicles accumulate behind me. I am comfortable driving mountain roads, but evidently not comfortable enough, as I never seem to be able to negotiate the tight turns at a speed to satisfy these other drivers. I blame the handling of my minivan, which is a little bit better than a wooden box on roller skates. Somehow the locals know how to take the turns, as they demonstrated whenever I was able to find an edge of the road to pull over and let them by.

The town of Jackson has become so popular in recent years that it is not much fun anymore. The crush of summer visitors makes for traffic jams and an excessive number of t-shirt shops. An art fair was being held this weekend, an event I would normally explore, but the mass of humanity discouraged me, and I was holding to my mission to take pictures that night by avoiding the distraction.

In spite of the large number of people, the density was actually less than normal for this time of year. My brother had laughed when I told him of my plan to find a room in Jackson, yet because fires to the north, in Yellowstone, had progressed across a major artery to the area, the usual flow of traffic had dropped, and as a result, there were vacancies in Jackson!

I stayed at the Wolf Moon Inn, a tidy and pleasant hotel on the side of town closest to the park. I had arrived early enough to attempt to fit in a nap before my nighttime schedule would begin. As usual, tired though I was, it was an ineffective effort. Why is it that naps don't work for me?

In the late afternoon, I headed into the Snake River valley. Cutbacks in funding resulted in an unattended entrance gate at Grand Teton National Park. I had an all-parks pass, but still, this seemed like a penny-wise but pound-foolish consequence of government policy. I proceeded down the road that skirted the very base of the mountain range, examining each turnout and historical marker until finding the Glacier View trailhead, a central turnout tucked under the dominant Teton peaks. This was sheer luxury for an astrophotographer. Concrete sidewalks, a restroom, a private parking lot, a direct view of the prime peaks, all to the westward (mountain) side of the main road.

I set up my equipment, an easy task with my car right next to a concrete slab on which my telescope mount fit perfectly. I hiked a short distance into the adjacent field and found

places to station my fixed tripod cameras. I was hoping to make a long star trail exposure, maybe an all-night shot.

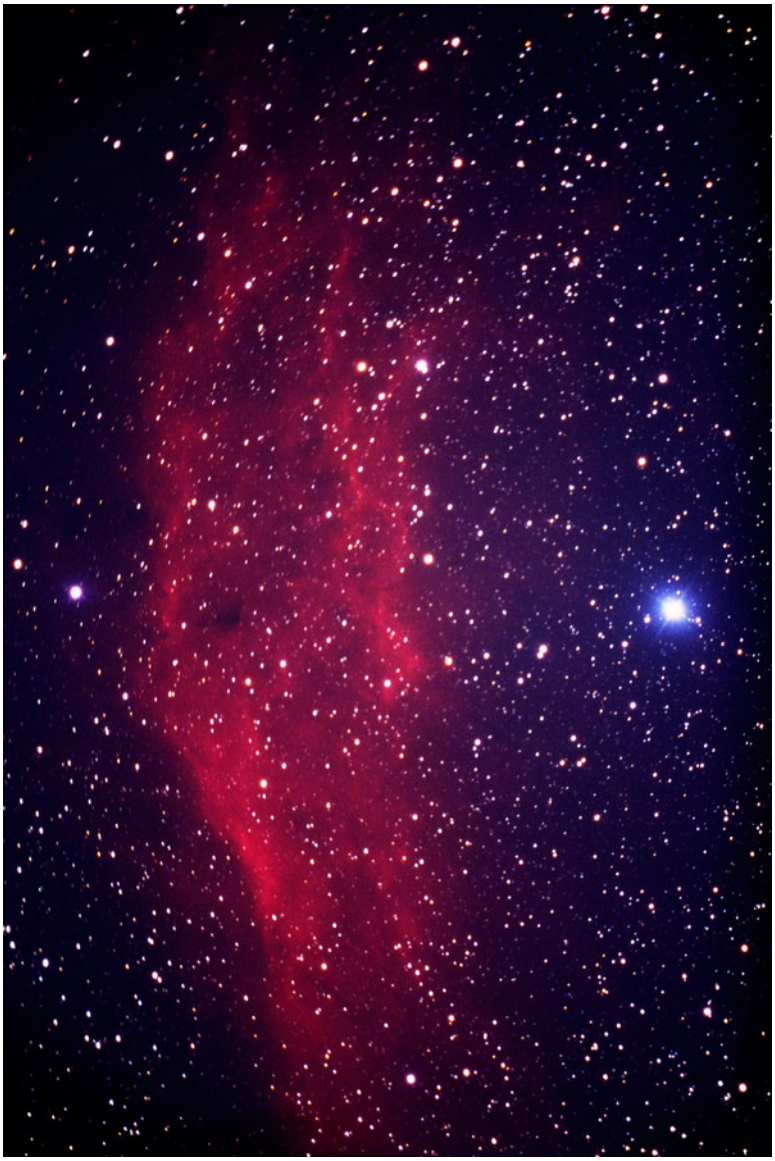
This is always risky. To commit a camera to a single frame of film for the whole night exposes it to an ever-increasing set of things that can go wrong during that time. Lens fogging, battery failure, accidental bumps to the tripod, unexpected light sources flashing into the lens, initial errors of focus or aperture, and a thousand other things can ruin the frame.

The risks can be mitigated by using multiple cameras, and of course by reducing the shutter time to fit more than one shot in the evening, which spreads the risk over more than one frame. But then none of them will be an all-night shot. Life is filled with trade-offs.

I made a couple of short test shots and discovered that, as nice as my turnout location was, there was traffic on the road, each car's headlights sweeping across my field of view and lighting up nearby trees in the scene, and if I was not careful, destroying my night vision after an accidental glimpse into the glare. It was hard to keep a shutter open even for 60 seconds without a pair of headlights showing up. I hoped that the traffic levels would diminish after midnight.

In light of this, I made the tradeoffs for managing my cameras that night. I would make a variety of exposures but dedicate one camera to stay open during the entire dark sky period between astronomical twilight, an interval that is actually quite short in midsummer, only five hours (until moonrise) on this night. I prepared the cameras and opened their shutters.

With the fixed cameras now open and collecting photons, I returned my attention to my telescope and its alignment and focus. I had several deep sky targets for that night, M101, the spiral galaxy that had eluded me earlier, the California Nebula, and M81, M82, a pair of galaxies that can be photographed together on the same frame.



The large red glowing gas cloud shaped like the state of California.

These objects kept my attention through the night. I would spend my time setting up each shot, then when the shutter was open and the auto-guider took over, I could check on the progress of my fixed cameras, occasionally advancing to another exposure and making notes on the details of all of my fragments of film set out to capture little bits of the night sky.

I had moments of time to gaze up to the quiet dark mountains next to me. Even though the only illumination was starlight, I could make out some vague details in their silhouettes. When I looked closely, I could see that there were other lights. Nighttime

hikers on the mountain were making their way up and down the established routes to the peaks. Hiking at night seems like an odd activity, but there seem to be various reasons for it, including being able to position yourself at the right time and place for making a summit attempt. Whatever their purpose, a flashlight or headlamp is required equipment, and as the hikers traverse the trail and navigate the switchbacks their lights bob and sweep the landscape to ensure their footing.

Their lights are far away, and I was surprised that I could detect it, but the dark-adapted eye is remarkably sensitive, and the flashes and glints of light I could see on the side of the mountain were about as bright as some of the stars above. It now made sense that I could see a tiny flashlight from miles away. I wondered if my cameras would.

Even though the road traffic remained high until after 1 a.m., as I watched the hikers make their gradual progress up the mountain, I became aware of a light source that was not present: airplanes. It seemed that this westward view of the Tetons did not include any traffic lanes of air travel! I often find airplane lights making their own trails on my long exposures, intruding on the stellar trails I am trying to capture. It is rare to find such an airplane-free condition and I added it to the list of positive attributes of this site.

It was also a mild evening. Even though the Snake River valley is at 6000 feet elevation and one expects cold at night, something was moderating the local climate. As I found the position for best focus on my telescope, I recorded the temperature at 50-degrees. I expected that the temperature would fall and that I would have to adjust the focus to track it (the dimensions of the telescope change ever so slightly with temperature). But the temperature held steady that night, and the focus held steady as well.

My deep sky targets kept me happily busy all night, but all good things must pass and eventually an old crescent moon rose in the east, just before the beginning of the predawn astronomical twilight. My all-night exposures came to an end.

I packed up my equipment as the sky lightened and headed back to my room in Jackson, satisfied with a good night’s work. I would later find that some of my long exposures had captured the routes of those climbers whose flashlights I had noticed. But even before knowing whether any of my pictures had turned out, I knew that the night's experience at the turnout would leave a fond memory of recording Teton trails.

A long exposure of star trails above the Grand Tetons. An eagle-eyed observer may be able to see the trails of nighttime hikers

Yellowstone

Lions, (no tigers), and Bears

On the map Yellowstone, our country's first national park, is immediately north of Grand Teton National Park, sharing a common border segment. So it is an easy mistake to think that it is but a short drive to go "next door" to Yellowstone from where I was in Jackson, just outside of the Tetons.

In fact, it is a full day's project, at least the way I travel, compelled to stop at large vistas, beautiful waterways, and intriguing natural phenomena like mud pots and fumaroles, not to mention the traffic stoppages from encounters with elk and bison. And such hazards to rapid travel are everywhere in these parks.

I thought about the pictures I might be able to take in Yellowstone. Among them was a nighttime shot of a geyser, its plume of water against a backdrop of stars. It occurred to me that I had carefully arranged to be here when the dark skies would not be intruded upon by the interfering light of the moon. Yet the subject I had in mind, the momentary appearance of an airborne column of water would be un-illuminated. No matter how "white" the steam and water might be, with no light other than starlight, it would be invisible to the film in my camera. Perhaps I would not be able to realize the view from my mind's eye. Well maybe I could get some nice compositions with trees and mountains, or do some more deep sky photography, easier on a moonless night.

With my late start after a few hours' sleep from last night's session at Glacier View, I was able to make it to the enormously popular Grant Village Campground by late afternoon. Even with its zillions of campsites, the popularity of Yellowstone places one at risk of encountering a full campground if not ahead of the pack. I had no reservation (the thought of campground reservations still seems a little contrary to the outdoor carefree and spontaneous living style I associate with camping), but I was able to secure a site as a walk-in.

As I completed the campsite registration, I noticed a leaflet in the handout materials that identified the various wildlife present near the campground. I had seen many of these before, but this time, in addition to the usual admonitions to not approach bison, moose or elk, and to keep your food locked up away from omnivorous bears, there was also a warning about mountain lions. I asked the ranger, "Ranger Bob", assisting me with my paperwork about this.

“Yes, there have been some sightings of a young mountain lion wandering through the campground some weeks back. Not sure if it’s still around. Normally the big cats are pretty secretive, you know. We post this to keep people’s awareness up.”

I thought about this for a moment. I wanted to know more, but I wasn’t sure what. I normally don’t insist on telling people about my odd nighttime plans, but maybe I should explain to this ranger what I had in mind.

“I’m hoping to go out tonight and setup a telescope and take some nighttime pictures. Do you know of some good sites where I can get a good view of the sky? I was thinking somewhere near the top of the pass would be good. Oh, and what do I need to know about mountain lions? I’m familiar with all the advice for bear encounters, what’s different?”

The friendly, customer-processing face of the ranger now showed a mild concern. Suddenly he was no longer processing just another RV-contained road tourist, but someone who had a larger potential for getting into trouble.

“Well, I don’t know if I can really recommend anything, and in fact, I can’t officially recommend that you be out in the wilderness after dark, but if I were you, I’d try to find something not too far off the main routes. It’s a rare occurrence, an encounter with a mountain lion, but there is always a chance.

“And the main thing to realize is that to a bear, you are just something that might be in-between the bear and its food. To a mountain lion, you ARE food. They look for isolated and easy catches, so the more you look like trouble, the more likely they’ll just move on to something easier.”

I realized that a lone man, sitting quietly, or standing motionless at a telescope, in the dark, away from other human activity and traffic, unable to see much around him, would probably qualify as “easy” rather than “troublesome”.

“And if you do have a run-in with a mountain lion, don’t play dead the way you do with a bear, fight back! It’s your only chance. Make the cat think you are much bigger than it, be fierce and fearsome. Do you have anything you can fight it with?”

“Uh, …” This wasn’t something I had thought about.

“Well, I have a tripod.”

“A tripod. Ok.” A pause. “Well, like I say, I can’t recommend that you do this, but if you decide to go ahead, notify someone where you are going to be.”

I thanked him for the lion lesson, and said I wasn’t sure what my plans were exactly, but I would follow his advice. I headed to my assigned campsite to think a little harder about my plans for that night.

Parking Lots in the Wilderness.

I settled into my campsite, which was surprisingly and pleasantly un-crowded, for it being one of over four hundred in this campground. On earlier travels I had had the experience of being assigned a tiny fragment of a steep hillside with neighbors on both sides who were having the same problem I had: finding a patch of ground to pitch a tent so that its sleeping bag-clad occupants weren't gravitationally pulled to the same downhill seam. But either by the luck of the draw, or a changed policy in campsite density, my home for the night was nice enough.

Not that I intended to spend the night there. I expected to find some dark place to do more deep sky photography. One place that intrigued me was Isa Lake, a body of water at the top of Craig Pass between where I was in Grant Village, and the geyser basin containing Old Faithful. The lake straddles the Continental Divide, with one end draining to the Atlantic, the other to the Pacific. Having been trained long ago with the requisite courses in electric field theory, I wondered how the "hydraulic field" within the lake behaved. Was there a drawing force from each end, such that a given water molecule's fate was decided, depending on its position? Does this force grow weaker as one approaches the actual dividing line of these two great drainage basins? Could a molecule on the zero-force equipotential locus go either way, depending on random motion? How was the surveyed line of the Continental Divide established anyway, when the surface of the lake is, almost by definition, level? These conceptual and philosophical issues bothered me, as many such topics do even though the world gets along just fine without them being fully understood by everyone.

The mental image of water molecules being sucked by grand forces toward opposite fates kept me occupied as I drove the route to the top of the pass. When I got there, the lake seemed remarkably calm, given the turmoil that I imagined to be happening beneath its surface, a surface covered largely with lily pads. As attractive as it was, I did not see the photographic potential I was hoping for, or perhaps I convinced myself of this, seeking a reason not to remain here after dark.

I continued to Old Faithful, probably the most popular place in the park. The scale of the civil engineering required to accommodate this popularity seems out of place in this otherwise natural setting. Roads that previously wound quietly through forests and along streams suddenly become multilane freeways with exit and entrance ramps. Parking places for the vehicles carrying the masses must be provided, and so they are, with multiple parking lots, complete with designated areas for busses and RVs, and special purpose lots for hotel guests, and delivery and service access. Some "overflow" lots are carved out of the forest further away, shuttle bus service provided.

I managed to find my own parking slot in the midst of the asphalt field, easing into it as I watched with great *un-ease* as an RV behemoth plowed its way through the lot, looking for a landing strip long enough to accommodate it. The owners of these vehicles must find themselves in a dilemma. Once the length of the recreational vehicle exceeds a certain threshold, it becomes cumbersome to pilot, especially when off the interstate trucking routes. To regain the nimbleness of driving the back roads, or even the city streets, the choice seems to be to abandon the megabus and operate a smaller RV, or to tow a second, smaller vehicle behind, thereby making the overall length and navigational challenge (and surely the operating expense) even greater! Remarkably, it seems that the option of choice is often the latter, so a large segment of the Old Faithful parking lot was dedicated as the momentary resting place for these CVs (composite vehicles).

The vehicles are left in the lot and the people they contained stream toward the attractions of this geyser basin. The attractions include hotels, stores, restaurants, and the Old Faithful visitor center. They also include the geysers themselves, and the associated hot pools and boiling springs scattered across this crusted break in the vegetation of the surrounding forest. The main focus is Old Faithful, a mound of precipitate carrying a wisp of vapor evaporating into the breeze. Every 90 minutes or so, an eruption of water and steam is sent skyward to the delight of hundreds of spectators that line up on a specially constructed boardwalk, that surrounds it just out of harm's way (harm to the geyser).

The ebb and flow of human traffic to the boardwalk mimics the water of the geyser, crowding in as the hot water expels, and wandering away as the spent steam and water trickles back to its source. I follow the human flow, anticipating the next eruption, and start to make plans on how to take pictures of the event later.

I find the crowds wearing on my already sleep-deficient state, and I decide to try to nap in my car while waiting for my night schedule to start. I can almost isolate myself: the sun shade/privacy screen for the front windshield, then road maps covering the driver and passenger sides, crimped into the rolled-up windows. The tint of the other windows provide a nearly one-way view, dark to outsiders, clear to me. I tilt the seat way back and try to sleep.

Of course I've never been good at sleeping on command, and the heat of the day in a closed car makes the boisterous voice commands and demands of the two-way stream of tourists through the parking lot even more offensive. Perhaps I dozed for a while; if so, the passing human traffic intruded into my dreams.

Old Faithful, Even at Night

The sun sets fairly late in the day at this time in summer, and the stores and vendors start to close shop. The tourists, with fewer entertainment options, start to depart, finding their cars and campers in the parking lot, gathering their family members, and negotiating their way out of the lot as if a movie had just ended.

I am now hiking upstream through this traffic with my camera equipment and tripods. It is a lengthy hike, and even though I have refined my methods for lugging this stuff, it still requires an effort that leaves me slightly panting when I can finally drop the camera bags and set down the tripods.

It turns out that I can set my stuff down almost anywhere on the Old Faithful boardwalk, since it is devoid of people and traffic, an eerie condition I've not experienced before. With so much choice, where do I pick?

I have three cameras, three tripods. Redundancy is the antidote to the likelihood that many things can go wrong. I make lots of mistakes, and don't always know how best to take the shot, or what shot to take at all. I have some time to think about it while waiting for the next eruption.

The eruption of a geyser, however, is not an event that can be timed with astronomical precision; it is a random event that has an expected timing, but with large uncertainties. I need to be ready, significantly before the posted average time, and be prepared to wait, vigilantly, for its preamble signs of eruption.

With my cameras set up, all within arm's reach of their shutter releases, I looked around at my environment. I had feared that it would be too dark for anything to show in a nighttime photograph, but I was bathed in light. Even though the stores had closed, their lights did not go out. The hotels catered to guests all night, and even though almost nobody was on the boardwalk with me, there was an unseen surrounding ambience of people.

The parking lots needed lighting (of course), and as the people found their cars and started them up, headlights would beam the horizontal distance between the parking lot and the geyser basin, cutting across anything in its path. Often the headlights would be on, even while the car was still parked, as its occupants organized themselves for the drive to their nighttime destination. All of these sources of light ensured that my cameras would see the geyser's eruption when it happened.

It might even be *too much* light. I wondered what exposure I needed to record the rush of water, but still capture the background stars. Could I get both on the same frame of film? Another reason for multiple cameras: multiple exposure experiments. I waited, as if on call, and during this time could guess and re-guess the exposures, convincing myself of one solution, then re-assessing and convincing myself of another. Such is the hazard of unoccupied time.

Eventually, the guesswork was interrupted by a gurgling spurt from the geyser. A belch of steam. Another. Don't burn your film yet, this is just the warmup act. The spurts get bigger, the belches louder, a recurring pattern seems to be building, and then… quiet. Did I miss it? Was that the actual eruption and I was expecting something more? Do I have to wait another hour and a half? As I was kicking myself for being too smart about these things, the geyser came back to life and started pumping water. Like a fountain, it created a vertical column that stood for a moment then fell on top of itself. It pumped another column, higher than before, and then fell down again. With each jet reaching higher than the previous, steam poured out and up and drifted with the wind, making a white curtain to catch the light.

I started tripping shutters and timing in triplicate, each camera having a slightly different sequence of exposures, hoping that somewhere in the set a successful shot would result. The geyser spewed water for over a minute, but that was hardly enough time to get more than a few exposures with each camera. My hectic moments attending cameras matched the furiousness of the eruption.

As the water column now diminished with each surge, I relaxed a bit and watched the steam drift with the wind down the geyser basin. I looked around and saw a couple, watching with me, but then turning to each other and enjoying the moment. It had been a private showing, just for us. The couple moved on, to be absorbed into the distant human background, leaving me to pack up my equipment and contemplate this event as the geyser returned to its normal mode, waving a small white flag of steam.

In another ninety minutes or so the geyser would spring back to life, raging with hot water and steam. Would there be anybody here on the boardwalk at that time? Maybe, but it must certainly be true that a geyser erupts in the dark, even when there is no one to see it.

Old Faithful erupts 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.

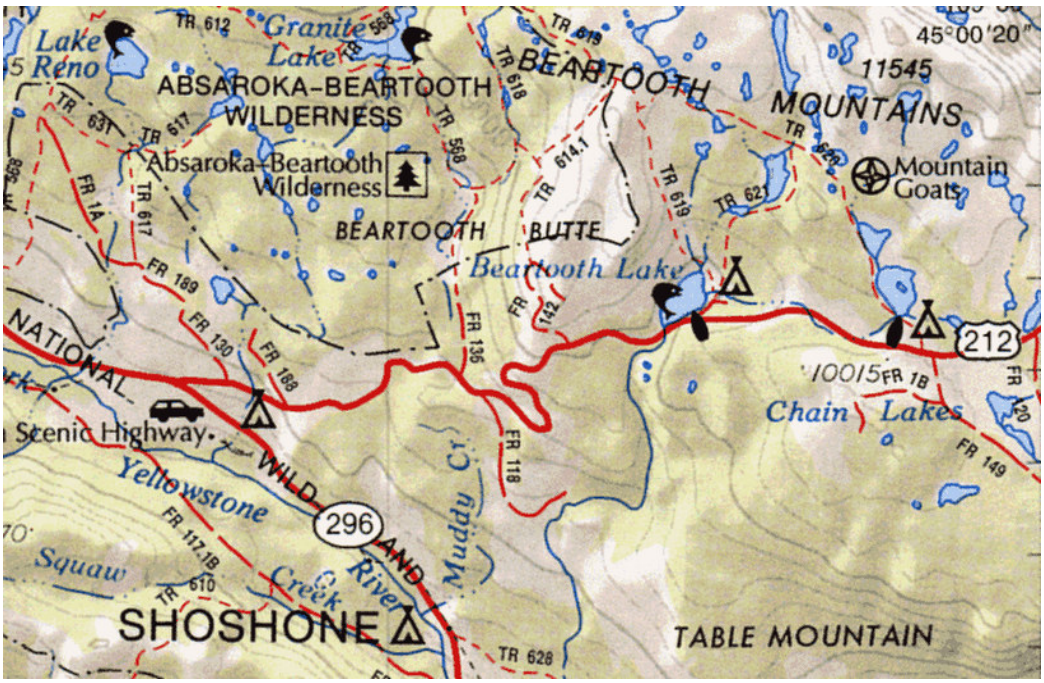
With my camera redundancy, I obtained this stereo pair, presented here for cross-eye viewing (look at your finger, six inches from your nose and centered between the pictures, then relax your gaze to view the superposed central image).

Beartooth Reflections

Lost History

I'm on my way to rediscover a bit of personal history. As a young man I embarked on a road trip with my best friend Rich McMartin. We were college students with little experience and even less money, but Rich owned a functioning car, and we set out one June to see the Rocky Mountains. It was an adventure that left many lasting and wonderful impressions but, like many of my life experiences, the details of where we actually traveled and when and how we got there have been lost to the decay of aging synapses.

But some of the memories are so permanently etched that there are valuable clues to follow. One in particular has held a certain fascination for me, as it is the motivating inspiration for many of my startrail compositions: I am trying to capture the feeling Rich and I shared after we drove up a mountain pass one night, stopped at the top, and looked out at a sky that was so dark and deep and star-filled that we couldn't find our favorite constellations! The dome of jewels that filled our eyes extended even beneath us as we momentarily lost our balance at the invisible shores of an alpine lake that mirrored the sky.



Did one of these lakes cast a spell on me that night long ago?

In the years since that powerful experience I have often wondered where we were that night, and now whenever I summit a mountain road, I look around to see if a familiar lake is nearby. On this day, leaving Yellowstone and its road construction behind, I realize that there is a famous pass on a road that would not be on any of my usual homeward routes, but it is not very far from here. Beartooth Pass! I've not been over it for many years; maybe this is the location of our nighttime trance. Even if it isn't, it may hold a place for me to setup my equipment and take pictures in a remote alpine setting.

The forecast is for winds, and the clouds are intermittent at medium height. They aren't the puffy cumulus blobs that evaporate at night; this is a troubling indicator. But I'm here, I should keep going. It may not turn out in my favor, but if I'm not there to try, there's no chance at all. My task is to place myself at the right place and time, the weather is beyond my control.

The Lure of Astrofishing

Beartooth Café in Cooke City Montana, just over the border as the road wanders north out of Wyoming, has good food, good music, and an outdoor porch. Have I been here before? The owners tell me that the lakes shown on my map really are near the top of the pass, Island Lake is a bit higher, more open than the others. Expect it to be cold and windy. I'd like to linger at this cozy and quaint oasis, but I'm also eager to reconnoiter my nighttime possibilities while there's still daylight.

As I drive along the road through the rich forests, the traffic is sparse, but what there is of it is likely to be hauling a boat. Of course! There are lakes up this road, probably lakes stocked with fish! Yes, there are other reasons to find alpine lakes other than to take nighttime pictures of them.

I think about how this hobby of mine, taking pictures of the night sky and the treasures it contains, is considered by some to be rather odd, esoteric, even arcane perhaps. And after hearing about some of the requirements to pursue it, the complex equipment, the late-night outings, the uncontrolled consequences of weather, those opinions are sometimes revised to deem the hobby "extreme".

Yet taking astrophotos of deep sky objects is really a lot like fishing! At least so I am told, I don't do very much fishing-- no, I don't do *any* fishing. But I understand the sport of fishing involves much equipment, sometimes big equipment: boats, motors, trailers and hitches. And also very specialized pieces of gear: rods, reels, line, nets, bait, lures, and dozens of other gadgets only an avid fisherman could identify. A fisherman's tackle box is an intricate collection of hooks, leaders, sinkers, bobbers, patented lures, secret bait recipes, and artificial delicacies designed to appeal to Piscean palates. And for some, the additional provisions for human sustenance during the fishing trip are more important than the fishing itself.

And there are a corresponding array of activities involved: traveling to a remote location, getting a boat loaded and launched, finding the right spot, that perfect fishing hole, preparing your line and bait, and when you finally get it all together and the fishhook is actually in the water, maybe there's a period of time when you're sitting around waiting for a bite.

This is essentially identical with the features of astrophotography. The large equipment: mounts, tripods, telescopes, power supplies, and the specialized gear of eyepieces, filters, camera backs, guiding mechanisms, all has to be transported to a remote location and set up, balanced, polar aligned, aimed, focused. When the shutter is actually opened, there is a moment of calm, a brief rest after the busy preparations for taking the picture.

Both activities are outdoors, just at different positions with respect to the sun. Both require clothing and preparations for weather and sometimes harsh conditions. Both are subject to big setbacks, and "the one that got away" (I can't *believe* there wasn't film in that camera!) Yes, astrophotography is fishing, but we are catching photons, not fish.

My 8-inch telescope, equipped with guidescope and equatorial mount is silhouetted near a prime fishing spot. Specialized equipment is a hallmark of both sports.

The Top of the World

These are the thoughts that occupy my head as I drive up the road to Beartooth Pass, the sensory salve of driving a beautiful mountain road through forests and meadows providing the background music to my mind's meanderings.

I encounter the turnoff to the first of two vehicle-accessible lakes. It instantly tests the mettle of would-be sportsmen by becoming a gravel washboard. The intrepid are rewarded with a boat-launch into a beautiful lake protected by rocky hills. I have frequently sought such ramps into quiet waters as convenient locations to set up my own photon-catching equipment. The lake offers an open view to the sky, the ramp is unused after dark, a solid base to place a tripod. In this case however, the lake is a bit too protected, the bluffs on the far side of the lake are too high, cutting off the lake's reflected view of the sky. Clearly this is not the lake Rich and I encountered, but I mark it on my map as a candidate for future deep sky work, if not reflections of startrails.

Keep climbing. The trees diminish in size, thin out, then become merely an occasional twisted shrub as I reach higher elevations. The terrain is now rocky tundra, with rugged patches of grass tenaciously gripping the stony soil. The road is not really climbing anymore, just rolling with the topography. I pass an outpost of civilization, a store, its sign declaring it to be “The Top of the World Store".

The summit of this pass extends a great distance. It seems that I've been rolling at the top of this road forever, but in a few miles, another turnoff. This time the lake and its associated campground are right off the road. Maybe this is it! I explore the small net of gravel roads that penetrate this area. It includes a boat launch and trailer parking area. This lake seems a bit larger than the previous, its far shore less consuming of the sky, and there is a picturesque island, complete with trees, giving this lake its descriptive if unimaginative name, Island Lake.

Whether it is the exact lake I am looking for or not, it is perfect for my photography plans: take prime focus pictures of deep sky targets and set up my fixed tripod cameras to record startrails over the lake. And there is a campground right here too! Ah, but that would be too easy. It is late in the afternoon on a weekend, every campsite is spoken for, and probably were occupied even days before.

I consider my options. I could just stay out all night making pictures and when dawn's twilight arrives, try to get some sleep in my car. I've done it before, but I also know that this is not a very good solution. Sleeping in my car is a challenge, and I would not be very rested when the activities at the boat launch started up. (Avid fishermen like to get out on the lake at dawn).

Instead, I returned to the Top of the World Store, where there was a sign advertising camping. To most of the world these days, camping means parking. If you have a few spots where someone can park their recreational vehicle overnight, you have a campground! I don't have an RV; I must pitch a tent to provide protection for my bedroll and so my demands on a campground are more excessive than average. The campground at the Top of the World was actually rather nicer than most commercial campgrounds. It comprised a short gravel road that faded into the tundra after a hundred yards. No designated parking pads, just open space, enough for maybe half a dozen campers, and me, a tent pitched at the end of the path.

This was working out very well! A site to take pictures, and a home base only a mile away to return to. And it was still afternoon. I decided to let down for a while, I fixed a gin-and-tonic from my cloudy night contingency provisions, opened my notebook to make a few recordings for this day, and then napped, resting up for the evening.

The Top of the World Store, on the road to Beartooth Pass
photo courtesy Dean W. Gehnert, http://linux.tpi.com/~deang/Pics/Montana/

Sharing the Soul of the Night

At the boat launch, the sunset displayed clouds lacing the horizon, but everywhere else was pure sky. The transformation of colors from daylight blue to twilight teal induces a Pavlovian response in me. The clear skies are being dressed up in preparation for a nighttime romance. I am excited to assemble my telescope, eager to see the first stars and get it aligned and start making exposures. I know there will be some lengthy steps as I fine-tune the motorized axis to be truly polar, and then find the exact position where the light gets focused on the film, but I know these steps, I've practiced them and sometimes gotten them correct. Being at the top of a mountain in skies still pure and unpolluted gives me an invigorating thrill but also a sense of obligation. These opportunities are rare for me; I must take full advantage of them when they happen.

My activities at the boat launch do not go unnoticed. A common hazard of setting up a telescope is that there are many people who are intrigued by the night sky and have some internal personal connection with the stars, but the focus of their lives has not included a close study of it. We all have open sections of our soul that we cannot fill because of the circumstances of our lives, and for many, this hole of missing passion is for the night sky. Perhaps there is a primal yearning to know the skies as our species knew them for millennia, seeing the night, reading it, and using it as guidance to survive. Our evolutionary success has brought us to a place where we no longer need or notice the night sky.

Whatever the reasons, I frequently meet people whose curiosity brings them to my telescope. On this night it was Holly, and her school age daughter Lisa, staying at the (full) campground. My activities at the boat launch were visible from their campsite, and Holly, finding the need to fill her personal curiosity, and using her daughter's education as her purpose, came over to find out what I was doing.

This is the kind of interaction I love to hate. I get to share my own passion and acquired knowledge of the skies with other people who are genuinely interested, but I then feel obligated to give them a tour of the sky. This is okay but it interferes with an already lengthy setup before I can open the shutter for the first time. It's like being able to tell stories about "the one that got away" but in so doing, I don't get to bait my hook for the next big one.

But Holly's enthusiasm and appreciation is the reward, and I get to show her the nebula treasures in Sagittarius, the Ring Nebula in Lyra, and a few other showpieces in the sky. She melts with each view and then recovers enough to translate my descriptions into the vocabulary of a ten-year old while her daughter looks into the eyepiece at what to her must be just some fuzzy patch of sky.

Yet getting up on the stepstool to peer into a porthole of a large instrument is an unusual experience for nearly all of us, certainly for Lisa. Inside that eyepiece is a view of distant jewels, pinpoints of stars in an inky black background. Stars that we can't otherwise see. And maybe the experience of seeing the unseen with the tools of an unknown man at the boat launch at the top of the world will make a connection later, in some science class, when the young girl is subjected to a more formal presentation of astronomy. Maybe it will inspire a curiosity that might not otherwise be there, the questions and answers filling the gap in her soul that, like her mom, wants to know more.

My own curiosity was nurtured by encouraging parents and so I will always make the time to fill the cups of curiosity brought by visitors. One can never repay the debt to parents; one can only pass the debt along. Holly is effusive in her appreciative thanks, and with the night now dark, and cooling rapidly, she retreats with her daughter to the warmth of their campfire, perhaps to share the experience with other family and friends. I turn my attention to the work at hand.

The Helix Nebula. This image was recorded later in the evening. I showed a similar but more easily seen object, the Ring Nebula, to Holly and her daughter while waiting for the night to get dark.

Point of View

I have cameras to load with film, attach to tripods and then find compositionally interesting locations to place them. The winds are dying, and the lake is approaching that mirror finish that will show stars beneath the depths of its reflecting surface. The conditions are right, but there is yet one more requirement: I need to be able to find a patch of dry land to plant the feet of a tripod that still allows me to compose a view that contains the sky, the horizon, and enough of the reflecting lake to capture the spirit of this place, the recollection of a distant experience. I find that in spite of my wide-angle lenses and film formats, I cannot get enough of the scene in the viewfinder to satisfy me. I make some guesses about how the stars will move over the next few hours and arrange the cameras at the edge of the lake.

There is an interesting tradeoff in making this exacting picture. The height of the camera above the lake's surface is very important. Imagine if it were at the actual level of the water. The view of the mirror would be very oblique. This is good for the reflected light from a faint star in reaching the film- a glancing reflection from any polished surface is nearly 100 percent, but the perspective would foreshorten the lake to nearly nothing, and if there was any view at all, it would be a reflection of the sky at the horizon, usually a murky soup of air and distant lights.

To get a larger view of the reflection, the camera must be above the lake's surface. As one increases the height, the area of reflected sky increases, showing the stars that are higher and higher above the horizon. But as the angle increases, the reflected energy decreases, until a point where only the brightest stars can make any impression on the film that is recording it. There is perhaps an optimal camera height for obtaining a pleasing composition that contains startrail reflections. I do not know what it is, but I will be able to perform another experiment tonight in my ongoing efforts to find it!

Dusk at the Island Lake boat launch. My tripods are being prepared for their night's work.

Sharing the Night, Part 2

Having placed my cameras and committing them to their posts for the night, I returned to my telescope at the upper end of the boat launch. The tasks of drift-aligning the mount and finding the exact film plane focus occupy me for the next hour. During this time, another visitor arrives from the campground, a man in his late twenties, early thirties perhaps--it's harder to assess the character of my visitors after dark. Mike, a laid-off telecommunications worker, was a victim of the industry's own productivity during the boom of internet and telephone excess. He was a "fiber-puller" and now that the country had connected every hub to every other hub with more bandwidth than could be fully used, there was no more work for him. I wondered if there was a similar moment when the major cities had finally been connected by railroad. Did we then have a surplus of steel men, unaware that the tracks they had just laid would serve for the next century?

Mike was content to talk and ask questions as I was performing my setup, and also content to look through the eyepiece at the nondescript target star I was using to do my alignment, without pressuring me to see anything more significant. I think he had the same desire as Holly to connect with the sky; he had found his way to my circle of equipment, but his interest was more diffuse. Like most who make an effort to be outdoors in remote places, he enjoyed the grandeur of the night sky, and wanted in some way to share his feeling with someone he suspected would be sympathetic.

Mike's stories of camping out with his brother, of the locations he'd been while installing fiber lines, and other topics kept me company during the otherwise unexciting wait periods while drift-aligning. He didn't mind that from time to time I would divert my attention to the faint target in the eyepiece's crosshairs and make slight adjustments to the azimuth and elevation of the mount. Eventually I could reward him with a view of the Pleides, rising in the east, taking the opportunity myself to drink in this cluster of bright stars before beginning the next phase of the night’s session.

The Milky Way contains the deep sky targets I focused on at the Island Lake boat launch. As I prepared for taking their pictures, I aimed the telescope at the Pleides star cluster, also known as the Seven Sisters, the prominent grouping at the bottom center of this photo.

A close-up of the Seven Sisters. The wispy blue glow is from dust reflecting the light of these nearby stars.

An Astrophotographer in the Dark

Mike eventually left me to the finicky procedure of finding the focus. It took another thirty minutes by the time I was satisfied. I had several targets I wanted to shoot this night, and the first one was M80 and M81, a pair of galaxies that could fit in a single view, faint swirls of light framed by the foreground stars of the Big Dipper. I attached the camera back, connected the cable release, started my timer, held my breath, and tripped the shutter. It was midnight, and I was catching my first photons!

I now had a moment to break from my equipment-demanded trance. From my position at the top of the boat ramp, I had a great view of the lake, its island silhouetted in the surround of the mirrored sky. At the shore I could make out my fixed camera tripods, a small indicator light showing the nearby battery packs powering the dew heaters that kept the lens clear from condensation. All of my film was now open to the sky, each exposed frame collecting the faint trickle of photons gathered by lenses and mirrors.

There was nothing for me to do! I gazed across the lake in a state of unexpected idleness. I wondered what my cameras at the lake were recording. I had intended to leave them open all night, but now that the lake surface was so calm, should I start over? I started to mentally compose other shots. I could reposition the cameras. Should I? Or should I do something else, like change the lens aperture? Or should I just re-shoot the scene with the exact same settings, trying to build insurance that one of the frames will turn out?

The lake was now at last a mirror, but I noticed that it was not so everywhere. Even though there was no moon, I could see rough spots in the glass that could not reflect the pinpoint stars, but did reflect the general starlight averaged from everywhere overhead. These patches would grow and shrink and drift across the lake as tiny breaths of air would tickle the surface into wavelets. I wondered what this effect was having on my long exposures of this scene. I worried that the air motions would get larger, maybe engulfing the entire lake with the frosted appearance.

A mind left to wander can go down many paths. Mine was pulled back from this road of worry by the raspy, digitally feminine voice of my talking timer, announcing that I had "five minutes… remaining". The film at my telescope's prime focus was nearing the end of its exposure time. The talking timer is a gadget I had first learned about from a seasoned member of my astronomy club. In one of our meetings, he described some of the things that he found helpful in taking astrophotos. And indeed, as soon as he mentioned it, I knew that this would be a great improvement over the visual inspection of my watch, or some other timekeeping device.

The problem is that at the end of an exposure your hands are busy with several things: specifically a large cardboard "shutter" that will get positioned over the front of the telescope to block more light from entering, and the camera cable release, to close the shutter immediately in front of the film. Without touching the telescope, the cardboard is used to block its entrance, then the camera shutter is closed. All this, just to avoid any slight vibration that could jiggle the stream of photons and mar the exposure. The maneuver is called the "hat trick" and yes, it is often done with an actual hat. The delicacy of this end-movement is threatened if, in addition to hat and cable, I try to also juggle a flashlight and stopwatch to initiate the sequence on schedule. A countdown timer that could announce to me from anywhere in the dark that the moment had come was the perfect answer.

This is just one more of those curious items that confirm the behavior of an astrophotographer as being almost bizarre to innocent observers. Even other amateur astronomers, engaged in the visual pursuit of the sky, when setup within hearing distance, will wonder what is going on. The benefits of this gadget are so important to me however, that I am willing to put up with the odd comments of bystanders. In fact, over time I have come to enjoy the synthetic company of its voice as it marks the minutes in the dark.

On this night, my first deep sky exposure lasted thirty minutes. I made another to try to increase the likelihood that one of them would turn out, and then changed the aim of my telescope. The night was cool, the calm air preventing it from being labeled as cold. As long as the conditions held, there was no reason for me to stop; I found my next target, the Helix Nebula, and went through the effort of focusing again. The film back was reattached, and another pair of exposures ensued. The procedure was becoming familiar. The timer announced the ending minutes of each; I finished the shot and then started the next. For me, this was becoming a highly productive evening. I could not know of course whether any of them were successful, but just completing the mechanics was noteworthy.

The delicate spiral of M81 and the irregular blob of M82 sometimes called "the cigar galaxy". Also captured in this frame near the top is a third galaxy, NGC3077. They are faint smudges in this picture, but represent billions of stars like the foreground stars we are looking through from our own galaxy.

Note from the future: *with the availability of modern digital astrophoto cameras operated by talented astrophotographers, there are much nicer photographs available of this galaxy group. See for example, https://www.skyatnightmagazine.com/news/m81m82-ngc3077/ and https://skyandtelescope.org/online-gallery/interacting-galaxies-in-ursa-major-m81-m82-ngc-3077/*

In the meantime, my cameras at the shoreline continued their task of gathering the night's starlight. The wind patches on the lake would build and shrink, but this was beyond any control I could exert. Mine was to simply record what was there to record.

In addition to my all-night startrail exposures, I tried a series of pictures at lakeside that were intended to be static night shots. I wanted the feeling of point-like stars and their reflections (rather than startrail arcs), and to this end I loaded a high-speed color negative film in one of my cameras. I intended to push-process its speed even further. A wide-angle shot could tolerate 15 to 30 second exposures without the stars turning into sausage-like smears, and so I tried various compositions. I would later find that these film frames were entirely empty, with no apparent image content, a disappointing lesson in

selecting not only the proper film speed, but also a film type that did not suffer from ineffective time exposure characteristics (reciprocity law failure).

Eventually the tiny puffs of air became a tiny but steady flow, and I watched the glass of the lake become frosted everywhere. The breeze, however light, also registered on my skin the distinct temperature drop that had occurred while I was busy tending cameras and telescopes through the night. The core of the Milky Way had set, with new replacement stars arriving from the east. I was seeing a future season of stargazing above me, and it was now time to pack up and go home. When the telescopes were placed in their travel containers, the tripods collapsed, and the last of my cameras put away, I started my car and eased away from the boat ramp. With the defroster desperately clearing the windshield, I glanced in my mirror to the reflections of the sky in the lake behind me, then quietly headed out to the empty road. It was still hours before actual dawn, but the depths of the sky's faintest stars were becoming lost as I pulled in next to my tent. Regardless of whether I had captured on film the emotions from my long past experience at Beartooth Pass, I had a new set of memories formed that night, of the pleasures of communing with the deep sky at the Top of the World.

A bare hint of reflected trails are visible in this picture. The lake surface was calm only for short periods during this 5-1/2 hour exposure.

Traversing Wyoming

Chief Joseph's Revenge

It had been a very satisfying night at the top of Beartooth Pass. I had enjoyed the company of nearby curious campers, seen stars reflected in clear calm water, and I had even made some exposures of the deep sky. The new day came sooner than I wanted and the other occupants of the makeshift campground behind the "Top of the World" store made their early starts as I struggled to stay asleep amid the noise of their departures. When I finally climbed out of the tent onto the rock-strewn alpine tundra, I no longer had any company. The half-dozen brave RVs that had bedded down here among the rocks with me were gone. I packed up my stuff and followed suit.

The drive back down the pass was pleasant, the weather nice, traffic light. My backtracking had not gone very far before I encountered the branch off this scenic route to Yellowstone onto the road across Wyoming. On the map it looked easy enough, but I was aware that it went over a pass by the name of Chief Joseph, the famous Nez Perce leader. The road was well designed, well paved, and I drove many casual miles before any hints of elevation gain. The road was so well conditioned, that it took me a bit by surprise when it seemed that my trusty old minivan was making a little more effort to keep the pace. The straight stretches of road became shorter, the curves more frequent, then suddenly they became continuous and steep, walls of rock preventing a view to the road ahead. Traffic backed up behind me as my engine gasped for air and my hands clenched the wheel. The shoulders on the road had vanished, replaced by tight guardrails on one side and a narrow rock-adorned gully on the other. Scenic pullouts were impossible, there *were* no wide spots in this road.

Perhaps because of the limited view and my previous oblivion to what I was about to drive over, I had no sense of how far or how long it would be until I reached the top. Each new set of curves and climbs seemed like it should be the last, but it was always immediately followed by another turn, and another set of switchbacks. I could do nothing but keep climbing and try to enter that mental state of zen driving, mountain road style.

Eventually of course I did reach the top. It was not an obvious single point in the road, because I continued to climb, but now there were occasional downhill curves to complement the uphill ones. The uphills became less frequent, and now I was clearly on the other side. Ah, the other side. The other side, and riding the brake! I switched into lower gears to avoid overheating the brakes and the poor minivan whined with the rpm. Maybe I should use the brakes a little more and give the engine and transmission a rest.

I was relieved when the road pitch evened out and I could see it entering the great basin ahead. The blood returned to my knuckles as I commanded my fingers to release their death-grip on the wheel. I coasted a little to celebrate the successful maneuver through Chief Joseph Pass. I'm not sure I would agree that he "will fight no more forever".

The morning had been spent in intense concentration on driving. The road was again wide and smooth and easy. The town of Cody was just ahead and I looked forward to stopping for lunch, perhaps at the famous, but aging Irma Hotel, a stopping place I remembered from family road trips. I rolled into town, passing familiar landmarks: the Plains Museum, which I knew included a section containing more guns than even a couple of 12-year old boys could take in, the rock shop, now closed, where my son had spent his allowance on prize specimens. And the Irma, Wild Bill's business interest in the early days of Cody.

I located a parking place across the street and eagerly found my way into the restaurant. The food was unremarkable, and the service awful, but I'm not particular, this is just a refueling stop. Besides, the furnishings are always intriguing- huge stuffed wild animal heads guarding over the massive cherrywood bar and the other artifacts on display from an earlier rustic era. I take the moment to examine my roadmap and make some notes. Eventually I run out of reasons to stay, the bill is paid, and I prepare myself for returning to what looks like a long dry road ahead.

I start up the car. It runs rough for a moment and then dies. I start it again, dance with the gas pedal, put it in gear to enter the traffic on main street, and the engine kills again. What's going on? Ok, I'll take all possible load off of it. I turn off the AC, the fan, the radio. This time I manage to get into the lane and start driving, but something is seriously wrong. The engine threatens to die unless I pump the gas pedal. The car lurches down the street and it's obvious I'm not going to get very far, but I managed to turn off of Main Street onto a side street and into a parking lot. I got out and discovered a blood trail behind the car, showing in a wide wet stripe on the road exactly how I had gotten to this point. Under the hood it was a mess, with fluorescent green coolant everywhere.

I looked around. I was in a bank parking lot. (I think "how convenient, I was hoping to find a cash machine anyway.") There is another bank nearby, and across the street, a building marked "Law Enforcement Center". I'm not quite sure what this means, but it sounds like it might be a police station, and maybe someone there could help me figure out how to get my car repaired on a Sunday afternoon in a small town in the middle of Wyoming.

The Cody Law Enforcement Center

The Law Enforcement Center was the equivalent of a police station, fire station, sheriff's office, dispatch center and local jail, all combined and conveniently located in this single large and fairly new building, kind of a "Police Central". I found the entrance, but there was a security airlock. I was in a small glass vestibule with two items in it: a phone and a bench. Sitting on the bench was a twenty-something woman, pregnant to within days if not hours of someone's new birthday. The inner door was locked, and I would need to call someone to let me in. I lifted the phone and dialed 0, wondering why this apartment-building style security was needed at a police station. The voice at the other end responded in what seemed a rather urgent tone. I wasn't sure how to answer, so I started to blurt out my story, but I hadn't really assembled it properly in my mind yet, and so only scrambled pieces of it came out my mouth. Nevertheless, a buzzer sounded, and I opened the inner door. The woman grabbed her things and slipped in behind me.

There was no front desk or reception area, but I found a person behind a security window. I started to explain my story again, but was immediately waved off and directed to wait. Outside, there seemed to be sirens sounding, and I caught a glimpse of a firetruck driving past. Inside, there was a nice waiting area where I found that the woman had already settled in. I became curious about this attractive near-mom, and to make small-talk for an uncertain wait, sympathized with her for being so pregnant at this hot time of year, how much longer did she have?

"My due-date is in six days."

Her calm voice, tinted with the gentle accent of this western region confirmed my estimate of her condition. Having heard me attempt to explain my situation twice now, she offered some advice.

"My car overheats all the time. I turn the heat on full blast. That way the engine doesn't keep all the heat."

"But doesn't it get too hot for *you*?"

"Oh, yeah", she laughed, "you gotta roll the windows down! But in the summer, they're down anyway- I don't have any air conditioning."

I imagined a car even older than mine, possibly equipped with air conditioning originally, but long since rendered inoperative. An unglamorous rust-splotched car that provided basic transportation at the expense of gas and oil consumed, and noisily exhaled, by a strapped-on replacement muffler. Yes, I had owned a car like this in earlier times. As another siren-equipped vehicle drove by outside, I wondered why this woman, owner of the ancient car in my mind, was in the same waiting room with me, waiting in the Law Enforcement Center.

"So why are you here today?"

"Oh, my boyfriend is in the jail here, but he's being transferred to a jail in his home state, and I need to talk to him."

The lyrical accent expressed this in such a calm matter-of-fact way that it took me a moment for all of it to sink in. A woman, nine-months pregnant, not officially admitted into the Law Enforcement Center, who wants to speak with her presumably-the-father boyfriend, who is currently in jail and scheduled to be taken under law enforcement security to another state.

I'm not practiced in this particular social situation, so all I could do was ask "Where *is* his home state?"

"Missouri."

Not that this was meaningful to me, but my preconception of Missouri law enforcement didn't improve the image that was forming of her situation.

"Yeah, he's being taken there tomorrow, and I need to talk to him about…," a momentary hesitation, "stuff. Y' know?"

I didn't know, but I could imagine there would be plenty of stuff for her to figure out. My predicament suddenly seemed like a minor annoyance, unimportant on a true life-scale of problems to solve.

The dispatcher behind the window called me over with a big friendly voice. "Ok guy, how can I help you? Just had to take care of a fire over at North Creek, kept me busy for a while, but it's under control now-- at least the call traffic is down."

Fire, another problem way up there on the importance magnitude scale. I felt like I was in the wrong place with my inappropriate silly situation. Mine wasn't a 911-type of

problem, it should be a call to AAA. But there I was, so I explained my situation and asked if he knew whether there was a service station open on a Sunday afternoon.

In spite of getting a few more calls related to the combat of the fire somewhere in Cody, the dispatcher looked up a service station that was open on Sundays, and even had a mechanic on duty. He called to confirm it and advised them I would be coming, and then drew a map for me. It was a dozen blocks away, I wondered if my car could limp that far, but as I left the building, I felt like this uncertainty was nothing, in view of what the other occupants of the Law Enforcement Center were facing that afternoon.

Now You're Talkin'

Enough time had elapsed that my engine could cope with the short drive to the service station, even with a disabled cooling system. It continued to hemorrhage green fluid however, even as I parked in the garage's driveway. I walked into the noisy shop, avoiding the hoses running across the floor that powered various air tools and welding equipment. At a break in the sound level, I caught the attention of a mechanic, a young man in a jumpsuit, his hands wrapped around a troublesome oil filter. He stopped his project and came over to hear me.

Knowing I am not fluent in the language of cars and their ailments (a specialized branch of linguistics similar to health-care and medicine), I did my best to explain my situation.

"Well my car is barely running and there's green fluid everywhere. It was working fine until I started out after lunch, and—"

He interrupted my auto-illiterate description of symptoms and sequence, "Hold on a minute. Is your car *here*?"

"Yes, it's out front."

"Ok, so what led up to this? Did the car overheat?" He walked with me out to the driveway.

"No, not that I know of. Everything was fine when I stopped for lunch at the Irma; I'd been driving fine for miles before then. I've been traveling over the last few weeks and today I came into town from the west, over Chief Joseph Pass— "

"*Now* you're talkin'!" An apparent understanding of the situation interrupted my story. "Let's see what we have here."

His reassuring manner and friendly encouragement accompanied us as we got to my car and inspected the confusing condition under the hood. He rapidly diagnosed the broken radiator hose and showed me where it had burst.

"So why would it burst *after* lunch instead of before?" This didn't make sense to me.

He explained that when I shut off the car, the cooling system stops circulating, and without a way for the heat to get out, the engine temperature builds up. When restarted a short time later, the sudden excess load on the cooling system caused the hose to burst.

This sounded plausible to my uninformed logic, and I turned my attention to how it could be repaired. Would I be back on the road today, or later this week?

I left it with him after he explained he would need to identify the part and see if they had a replacement. I should check back in 20 or 30 minutes. I looked around to see how I could kill half an hour, which I did at the neighboring hotel and gift shop, returning to find the car in its same spot! Did anything happen? I checked with the garage office (the convenience store) and was informed, "Oh yes, it's all done. The bill is thirty dollars, here's the key."

I was stunned. Full and immediate recovery from an automotive disaster for the cost-equivalent of a tank of gas? I found the mechanic and tipped him in appreciation for interrupting his work to attend to my cause. Because of the hospitality and kindness of the people in Cody Wyoming, I'm on my way to the next town, Greybull. And from there to the Bighorns, and if I get to stay in the Bighorns tonight, it will be because of the western courtesy given to strangers in distress.

On Beyond Greybull

I was on the road again, an unlikely happening after the lunchtime setback in Cody. But the road through the open range had taken me to Greybull and beyond, and my car was functioning once again in what passes for its normal performance.

The weather was becoming murky. Clouds were building up, the haze keeping me from seeing across the valleys. I can see there's a mountain range or hills coming up, but they're very faint through the translucent air. And the sky is gradually shifting whiter from its normal deep blue. My luck in keeping within the territory of clear skies is about to change.

And maybe my radiator and cooling problems aren't solved after all. For the second time in this day, I find myself climbing up steep mountain roads, in this case Shell Canyon. My temperature gauge is going crazy, pushing way up to the redline hot end of the range, and the power in my car is diminishing, so I've turned off the air conditioner and turned on the heater, following the advice of the woman at the Cody jail. I thought back to her now and wondered what other stories her young life had. I'm sure they were fascinating, but whatever new stories her life would hold, I wished her the best. Funny, the impact of a momentary encounter with a stranger.

I pull over to the side hoping that this will let the engine cool down a bit (I do NOT turn the engine off, with my new knowledge that I gotta keep pumping coolant). And I wonder what it means when the heater is turned on full-blast, but the air coming out of the vents is not very warm? The temperature gauge runs hot and cold as I maneuver up the canyon, stopping and starting, pausing and proceeding, always up, up into the Bighorn Mountains.

Devils Tower

Return to the Prairie

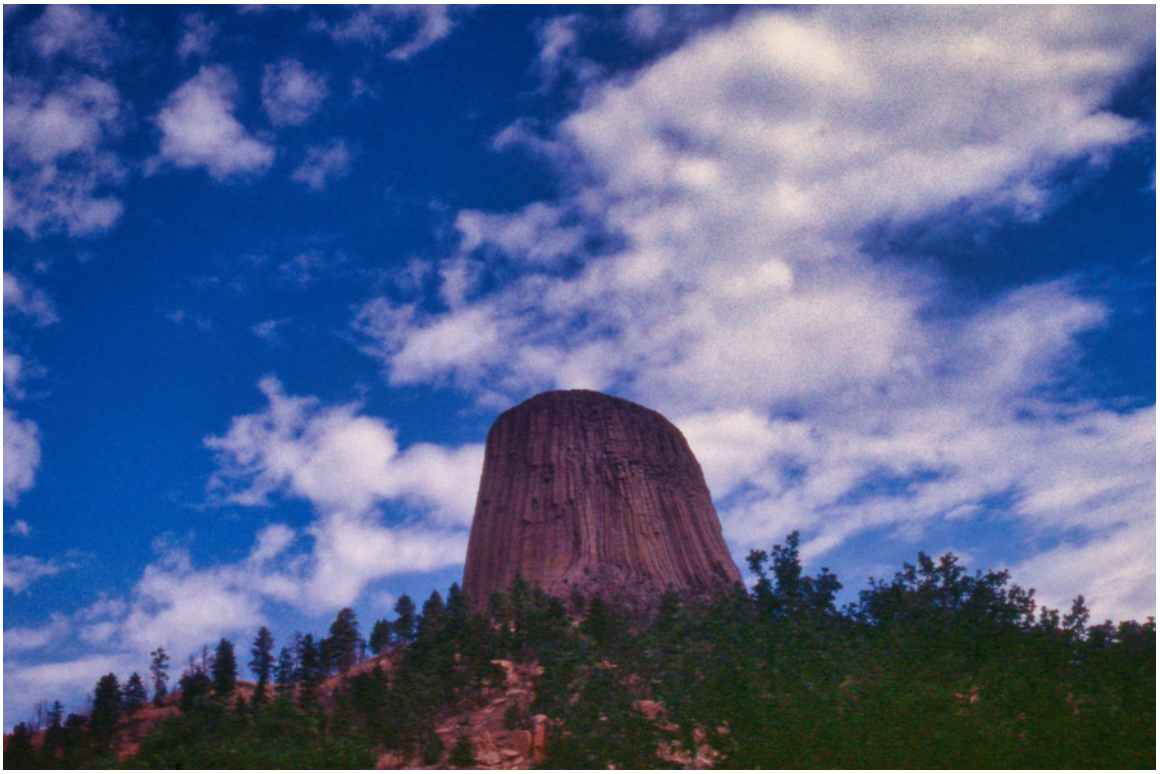
After summitting the Shelley Canyon route into the Bighorns, my long-suffering Dodge Caravan had an easier time negotiating the route through the high alpine forest. It had an even easier time descending the thousands of feet back to the prairie, the long sweeping switchbacks delivering an expansive view of the plains.

The ruptured aneurysm of the radiator hose had forced a change in plans and I had to spend the night in a hotel in Sheridan. I was now on my way to Devils Tower, a favorite destination of bikers and aliens. My radiator was full, I was rested and clean, but the sky was filling with clouds of the type that don't dissipate after sunset.

Devils Tower is an anomaly in the prairie landscape of eastern Wyoming, a hard igneous intrusion into the otherwise soft ancient ocean bed. It refuses to erode away, like the surrounding sedimentary shale, leaving a defiant finger of columnar basalt. The obstinate feature was an obvious choice to become the country's first national monument.

By the time I arrived the sky had nearly filled with clouds. It looked like I would get another full night of sleep, but I did my reconnaissance, finding the due-south line from the monument so that I could position it in my imagined composition. It crossed a service road, prohibited to public traffic, but otherwise a great viewpoint. Trying to pre-empt the afterhours security check, I found the park official in charge and requested permission to shoot pictures after dark. It was granted, but it looked like the permit would be unused, the sky was completely overcast. After making camp, it looked like I would have some time on my hands.

So far, I've been too busy to become lonely. Now, with nothing pressing to attend to, I am left alone with my thoughts, which eventually become thoughts of how it would be nice to have some company. But what companion would tolerate the stuff I do while trying to get a picture? Napping in the car in parking lots, driving down every nook and cranny of a back road trying to find "the place", putting off food and sleep, having no arrangements for the night's accommodations, changing my plans on each new piece of information or state of mind, no itinerary, just some vague notion of photogenic destinations and staying under clear skies. These are the things that a traveling companion would have to deal with. Who would possibly want to, along with other challenges, not listed? This hobby, or at least my version of it, seems destined to be a solo activity.



My map-reading and reconnaissance led me to this viewpoint. The clouds are building up; I am not optimistic for the night.

By dusk, the clouds were still dominating the sky, but an occasional hole in them has encouraged me to prepare for the possibility of clearing. Not being sleep-deprived re-enabled my optimism. Returning to the service road and piecing together the star clues revealed through the cloud openings, I finally identified Polaris, the focal point of my planned shots. I setup my tripods and cameras and waited for the sky to fully clear.

Eventually, it did! I opened the shutters and hoped for it to remain clear. I am a slave to the capricious skies. The clearing lasted a little more than an hour; I hoped it was long enough to get a satisfying star trail image.

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.

An hour in the shadow of Devils Tower, and an hour at an incongruous photo lab.

Monumental Lockout

Well, it finally happened. I locked myself out of the car.

Fortunately, it happened near civilization, at the Devils Tower visitor center.

Unfortunately, they couldn't help me.

Fortunately, the "road unit" ranger could. This happens periodically and the park rangers deal with it.

Unfortunately, the road unit ranger was unavailable, in a meeting. They were short-handed—other units had been called out for forest fire work.

Fortunately, the meeting would be over in about an hour. I took the opportunity to hike around the tower.

Unfortunately, when the ranger arrived, he didn't have the lockout toolkit.

Fortunately, he knew who had it.

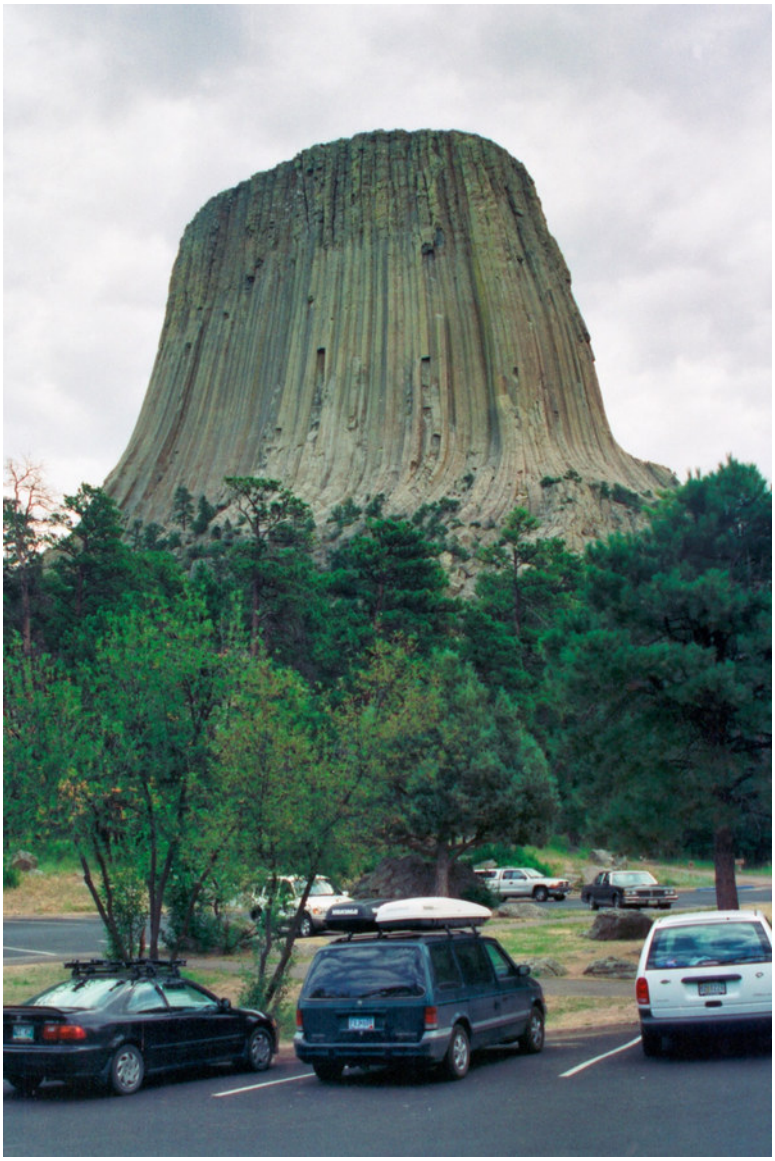
Unfortunately, there would be a delay while his partner arrived. I watched parties of climbers ascending the tower.

Fortunately, the other ranger arrived in fifteen minutes and had the tools.

Fortunately, they worked!

I was embarrassed by this episode. I once was unsympathetic to such stories, but I will never make condescending remarks about these things again. I felt like the Norwegian who had locked his keys in the car. It took him nearly half a day to get his family out.

A half day had passed for me and now, through the help of park rangers and their preparation for this semi-rare event, I could continue my travels.

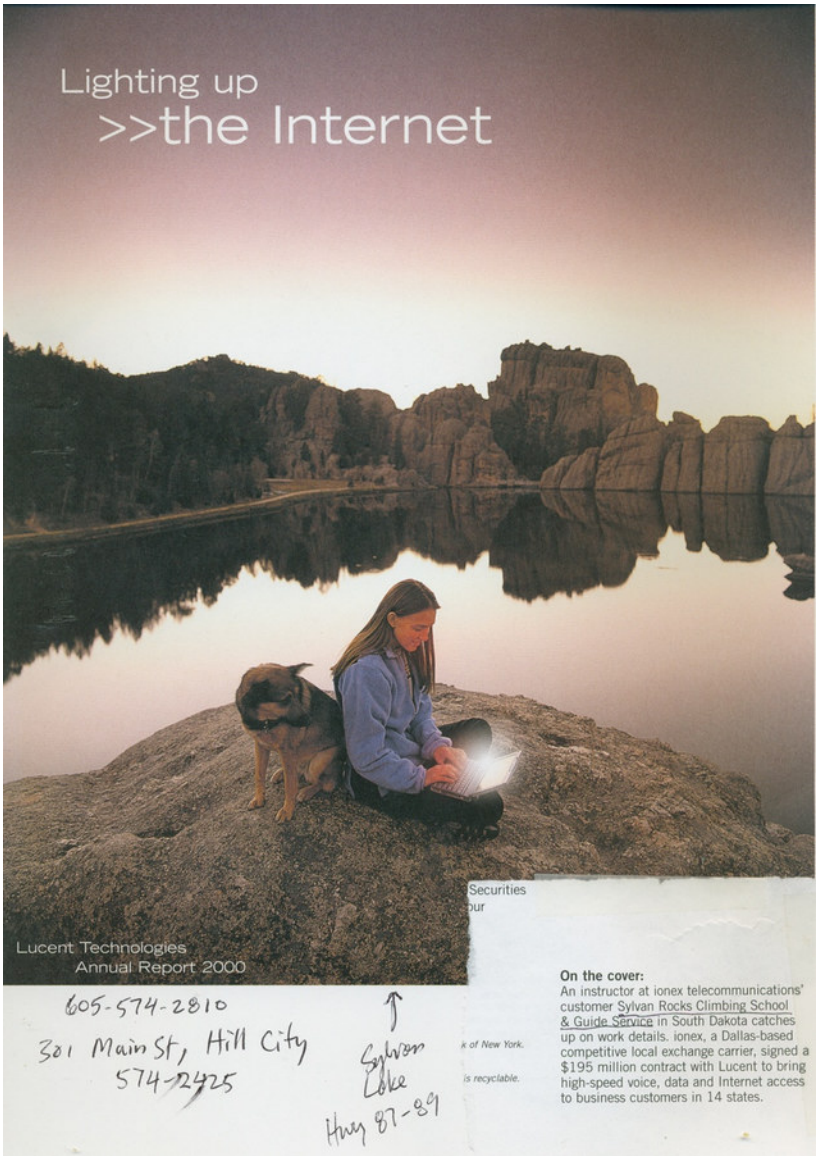


My minivan, with its two rooftop cargo carriers spends an extra few hours at the Devils Tower visitor center, a consequence of its absent-minded owner.

The Long Way Home

Sylvan Lake Secret

Maybe it's not a secret, but I had no knowledge of where it could be. All I had was a picture on a corporate report recently published in our new millennium of internet services, depicting a person in an idyllic setting, casually working on a laptop, connected with the world, but in the isolation and beauty of a pristine lake cradled by a smooth rock palisade.



The corporate report cover depicting a scene I wanted to find. I carried it with me, showed it to strangers, and gathered notes trying to identify it.

Where was this? A clue from the report came from its cover description, identifying the subject as a member of a climbing school in South Dakota. I made a guess that it was in the Black Hills and when I found myself in the area once again, I decided to make some inquiries. Maybe I could find the climbing school and ask where the photo was shot. Like the detective showing a picture of the victim to every store clerk and bartender, I asked if anyone knew the climbing school or recognized the scene from my report cover.

I never located the climbing school, but it was unnecessary since it wasn't long until I encountered someone who recognized the scene. In fact, it was the first person I showed it to, because everyone in the area was familiar with it: a resort and retreat tucked away in the Black Hills at Sylvan Lake.

I drove the "Needles Highway", aptly named for the vertical fingers of rock surrounding the delicately winding road. It led me to my subject, which I found to be just as it was portrayed in the photo: a beautiful lake surrounded by photogenic rocks and trees. A hotel/lodge nestles in the scene, its Frank Lloyd Wright-inspired stylings a perfect match for the setting. The accommodations, even if available, would exceed my budget. Fortunately, there was a campground also embedded in the forest; I think I got the last site.

There had been a big rainstorm and the ground was soaked, but the clouds seemed to be clearing, so I set up camp and "napped" for a few hours. It was still cloudy when I gave up napping, but I could reconnoiter the lake and look for potential sky and lake photo opportunities. A footpath circumscribed the lake. I was unable to identify exactly the location of the report cover photo, but there were numerous possible arrangements of boulders and backdrops that could have been the original scene.

By the time it was dark, the sky had mostly cleared, a few high cirrus clouds remaining. I would not be doing any telescope work tonight, but I set up my cameras hoping for a nice startrail composition. A sodium lamp at the south end of the lake prohibited that north-viewing position, but I was able to find another location that provided both a west and a north view. But this lake is too close to civilization; there are light domes from nearby towns, traffic on the roads, nighttime hikers, and even another party of midnight swimmers! Although there was more human activity than I would like, it was nice to be back at a location where the predators are not larger than I am.

As I waited for the human activity to decline while the camera shutters were open, I thought back to someone I'd met on my hike earlier that day. Phillip, a young man from Montreal, an out of work actor, had taken a bus here and was bicycling the South Dakota-Wyoming area. He was researching Native American history for a play he is writing (so that he can have work again by acting in it). It was a brief and enjoyable encounter

between two individuals taking inspiration from outdoor experiences, our paths crossing at this formerly secret location.

Nighttime activities on Sylvan Lake illuminate its northern shore.

Pre-Prairie Portrait

I can feel the end of this trip coming on. As I prepare to leave the Black Hills and return to the prairie, I am eager to see the results of my various photographic efforts. I think about all of the exposures I have made, each of them an experiment whose results won't be known until I return home. I hope my notes, made in the dark, are adequate and will match up with the film images to let me know what worked and what didn't. As my biologist grandfather explained to me in my student years, "there is no such thing as a failed experiment, except one that you don't learn from."

I've enjoyed the chance encounters with the people I have met everywhere along my route. This morning it was a scoutmaster at the campground water source, monitoring a group of tenderfoots practicing shaving skills with empty razors. I don't remember a grooming merit badge, but it made perfect sense here in this wilderness setting to give these boys an excuse to use the tools they will eventually need to avoid a hirsute future.

I have had some great experiences. In the last weeks I have gotten quite close to the ideal of an astrophoto safari—traveling to new sites, shooting the sky and moving on. If my schedule were open-ended, I'd stay at each place until I had a night of perfect weather. Instead, I must move on to my next destination, content to capture whatever happens to be there when I am there.

But I can't complain about the weather; I've had a great run of clear nights. I also now have a list of places to return to and explore some more. Sylvan Lake in particular would be a great destination for a different style of outing that would take advantage of the lodge, trails, beautiful trees and scenery.

Contemplating the end of the journey, and before leaving the beautiful pine forest, I thought it might be appropriate to make a self-portrait. It's an awkward undertaking for me, a violation of my Scandinavian values of maintaining a sense of modesty, and against acts of hubris, so I am hesitant. (How can you tell an extroverted engineer? He's the one looking at *your* shoes).

So to do this, I must find an isolated location off the trail to set up a camera, use its self-timer, then pose in front of it. Perhaps to avoid being the center of attention, and to give credit to all the supporting actors in a production, I arrange my other cameras and tripods around me. They have been trusty accomplices in this adventure and accompany me in this self-portrait. In the harsh late morning light, it's not a great shot, but I don't claim any skill as a portrait photographer.

From left to right: Nikomat FTn with 20mm f/4 on Manfrotto 3443 CarbonOne, Pentax 6x7 with 55mm f/3.5 on Bogen/Manfrotto (unmarked model, but my first truly solid tripod), the author (a biped), Olympus OM2 with 24mm, f/2.8 on Manfrotto Junior 3405.

Windmill Whiteout

Ah, South Dakota. A transition state between the lush prairies and farmlands to the east, and the arid mountains to the west. A bit of both co-reside in this state, and tonight I find myself in a stretch of farmland where the grass has been harvested into giant tootsie-rolls of hay and left at random locations in the field. The mosquitos are fierce, a sure sign of nearby water sources that feed these fields. I do not have my mosquito suit, having left it at home, the land of ten thousand lakes, certain it would not be needed elsewhere.

But I have found another windmill artifact, this one apparently still serving its original purpose, pumping water from the aquifer below to the surface where it can be put directly to agricultural use. Perhaps the catch trough is the source of some of these mosquitos!

There is no wind to make the carnivores work for their blood meal, they land with impunity on any moist skin, and all of my skin is moist tonight. The temperature is 65 degrees, and the dewpoint is the same!

The windmill is about a quarter mile in from the road. I pull off to the side at the field access, an open gate and a vehicle bridge over the gulley. I don't dare drive into the field, this is not my domain, but I am willing to lug my equipment into place, taking several trips for the tripods, cameras and batteries (to allow the dew heaters to prevent the lenses fogging).

There was not a whisper of breeze, but whatever wind had previously been blowing had left the windmill blades facing south, a fortuitous placement for my composition. I had long wanted to make a direct superposition of the windmill on the North Star, to have the startrails perfectly circumscribe the fan of blades, and here was my chance! I set up the cameras and was surprised where they had to be placed. After a moment I realized that this was exactly right. At this latitude, Polaris was at 45^0 elevation, the cameras needed to be very low and aimed high to get the composition and angles to work. Even with my wide-angle lenses, the cameras hugged the ground to get the view I wanted.

On my knees to set the tripods, aim the cameras, set the dew heaters, focus and aperture, I finally opened the shutters. I could relax for a while. The exposure time was going to be 80 minutes, exactly one-eighteenth of a day. I had determined this time by counting the number of blades on the windmill, 18. It was a detail that only a mathematician could appreciate, but I have long had suspicions that there are underlying mathematical principles to the esthetic response. I could indulge my intuition in this farmer's hayfield.

I looked around at the hayfield and realized that I was now surrounded by a thick fog. I could not see more than a few yards in any direction. So this is what happens when the air temperature falls below the dewpoint! I was well aware of the condensation that happens when a lens, radiating heat into space, drops its temperature: it fogs! And so here was an example of the air itself, not just a glass or metallic object, dropping below the dewpoint. Fog!

I experienced a moment of fear. I was out in the middle of some field, I could not see, and I was not sure where my car, or even the road was. Worse, this would ruin the pictures I was taking. But looking up, the sky above was clear. I was in a circular container of fog with the top still open. I could not see any farmhouse lights, my innate sense of direction is poor, but I had the stars to guide me!

If I was not familiar with the sky I would have remained a little frightened, cocooned by a featureless mist with no pointer back to my home base, the car. Instead, I felt somewhat protected. I couldn't see the traffic on the road, but then again, they couldn't see me. Their headlights couldn't penetrate to my camera setup, and no one would wonder what I was doing in the middle of this field. The sky above was open, and my pictures were progressing just fine.

Knowing that I had been traveling north on the road, with the field on the right, I took the steps west, leaving my cameras behind in the fog, until I encountered the road, then north until I found my parked car. I was back at my base camp. I now had a problem. How do I get back to the cameras when their exposure time was up?

My GPS tracker was the answer. I set a waypoint at my car's location, and then headed back into the fog with the navigation device to find my cameras, this time by "dead reckoning". I had only a sense of their direction relative to the car and so I set off hoping to see the silhouette of the windmill in a reasonable range. If I didn't find it, I could always return to the car by aiming for its waypoint, and try again. The GPS signals have no trouble penetrating fog. Fortunately, I found the cameras on my first foray. In a truly worst case, I would have had to wait til morning for the fog to burn off in order to find them. The exposures would have been long ruined, but I would have recovered my equipment.

With markers at both ends of my route, I could now make my way back and forth through the night, each time wandering a slightly different route, but always ending up on target.

Eventually however, the sky covered up completely and even my guiding stars could not be seen. I'm glad this didn't happen earlier in the evening, before I had my GPS markers set. I would not have been able to find the car so easily. As silly as it sounds to be lost in

a hayfield, it would have been a frightening experience. As I packed up and ferried my gear back to the car, following the GPS breadcrumbs, I contemplated the situation I had encountered. My windmill whiteout was a personal lesson in the loss of orientation that explorers experience when they meet more dangerous whiteout conditions. I would advise modern explorers to bring their GPS units!

"Polar Windmill", a remarkable confluence of opportunity, weather, and technology. This was the last night sky photograph I took on my Nightscape Odyssey, coming full circle to the first.

The End of the Journey

The further east I travel in my homeward direction, the more difficult the nighttime photography becomes. The humidity, insects, and intermittent clouds are a deterrent, while the growing familiarity and attraction of the landscape call me like a siren song toward home.

I have traveled 8000 miles in the last six weeks under mostly accommodating skies. I have shot 40 rolls of film. I have been able to sneak preview some images, but most of my film is packed securely, guarding their latent images until I can bring them to some trustworthy lab to be developed. Regardless of their content, I will always be able to describe what I did during this windfall gift of time. These stories complete that goal.

I know that I am at the end of this astrophoto odyssey because today the sky is clear and beautiful and dry. It will be a marvelous observing night. I know that my travels are done because even though the sky is clear, I want to be in my home tonight.

Thor Olson
23 August 2001

Epilogue (from the future, 2020)

The kitchen table holding rolls of film of various types and sizes, some already developed and sleeved, others containing latent images awaiting their delivery to a film lab. Also shown are my observing notebook and journal.

It has been a wonderful time-trip to go back and review my journal entries, voice memo transcriptions, collected travel brochures, and observing notebooks to recreate these stories. Some of the material was outlined and posted on an early web site, but the impact of 9/11 a few weeks after my return from this trip, combined with the urgencies of daily life with my active family, derailed the project. My notes and artifacts have been hibernating these years since in an ignominious cardboard box.

The film that I brought home was processed by a professional photo lab and carefully organized into sleeves and folders and correlated with my observing notes. The images that stood out became popular prints that I presented at art fairs and exhibits the following year. The others kept silently in their folders in my file cabinet until I looked for supporting images for these stories. I have enjoyed scanning them and discovering pictures that deserve more attention.

My notes from immediately after my return offer some advice. Though today I do not recall it this way, my last night in the field with the windmill was recorded as a miserable experience, a disappointment of trying to reach a closure by recreating the first pictures from the outset of my trip. Maybe seeing a successful film image a few days later, erased that negative emotion. Today I enjoy reciting the story of being lost in the hayfield; at the time, it was just too frustrating.

In my notes I wrote that I took too much stuff and my plans were too ambitious. Today, I'm not so sure. My internalized boy scout motto, "be prepared", provided the tools and materials when I ran into trouble in the wilderness-- situations that could not be solved by a quick trip to the mall for repair items. There were many times that I was glad to have the resources that I had brought.

As to the ambitious plans, they might have been a setup for disappointment, but I no longer see it that way. I am appreciative for all of the experiences and opportunities that presented themselves. Maybe this is just a way of life for me; there is far more to learn than I can possibly take in. In the years since, I have learned to live with this limitation.

The road trip format- travelling every day- was not particularly good for deep sky work. Because of the high overhead for setup and alignment and focus, it would have been better to stay in one location for several days. I made the error that first-time travelers to Europe often make: trying to fit everything into a whirlwind tour.

In the end, because I couldn't do everything, I had to prioritize. I favored shots that couldn't be made from near home—so the startrails with unique foregrounds took priority and the deep sky shots that could, in principle, be made from anywhere on a clear night, were secondary.

Today, GPS is ubiquitous. At the time, before cell phones, specialized receivers were required. I had an early model, a gift from my mother-in-law who rolled her eyes about the whole concept but took pleasure in my delight at receiving it. The GPS receivers were quite primitive by today's standards of localized maps that show you the nearest coffee shops and the route to get to them; instead, they displayed your numerical latitude and longitude and could record markers (waypoints). They could also show a trail of breadcrumbs of your recent route on a blank background. If a major city was nearby, the display would show a mark and a label for it. Still, as limited as it was at the time, GPS was a terrific aid to my efforts.

In the days before smart phones, there were "personal digital assistants", PDAs, and I owned a Pilot, that hosted helper programs before they became known as "apps". One such program, Sol-2, told me the local sunset, twilight, moonrise, and moonset times

based on my location, which I could enter by reading it from the GPS unit. This was extremely beneficial for my nighttime photo planning. Today of course, all of this is available from your pocket computer/smart phone.

I have often referred in these stories to the difficulty of getting enough sleep. With the demands of cross country travelling, and nighttime photo shooting, sleep is postponed until it can't. I learned that an hour or two nap is extremely beneficial. Even if not fully sleeping, the momentary metabolism slowdown of just resting seems to help.

The solo time on the road was a contemplative opportunity. My mind wandered over many topics as the miles rolled by. Most of those idle thoughts went unrecorded, with no subsequent loss to society; others I made notes of and have tried to convey in these essays.

The opportunity to undertake projects like this do not occur often. When they do, they are not always apparent. I am indebted to my wife Vicki, who recognized the moment for what it was and encouraged me to embark on this adventure. She saw that this was exactly the right thing for me; I encourage everyone to support the dreams of their partner.

And for those of you reluctant to embark on something that is outside of your usual style, I encourage you to push past the discomfort and seize the moment.

Consider the lesson I learned from the visit with my old classmate (*Tillamook Friends…*). That story was the result of wondering if I should take a tangent trip to Tillamook to meet him. The easier choice would have been to not go, to stay in my introvert's comfort zone and get back to my solo photography. But had I not taken that normally untaken option during that summer trip long ago, I would not have renewed a friendship that then lasted until he passed away last year, and I would now be regretting the missed opportunities to have shared in part of his fascinating life.

It's another reminder that life is short. When risky or expensive or uncertain opportunities come up, take them. Most people regret the trip *not* taken.

And when you find yourself under a clear night sky, take a few moments to look up at the stars and contemplate our place in this corner of the universe. We are blessed to be here, to have a life to fill with experiences and activities, and to share them with the people we love.

Thor Olson
October 2020

In the summer of 2001 I had a remarkable opportunity... a six-week period spent traveling to the western states for the purpose of taking pictures of the night sky.

In any trip one has little adventures that come to define it. This is the collection that happened to me and some pictures to go along with them.