SkyWAAtch

The Benefit of Waiting

While waiting for the Venus-Jupiter conjunction in the predawn hours of August 18th, Larry Faltz captured this fine image of a waning crescent moon. Larry used a Stellarvue SVR-105 refractor (an apochromatic triplet) and Canon T3i camera (at 1/640, ISO 800). This is a single exposure, no manipulation other than cropping. In the center of the image the peaks of the Apennine Mountains are illuminated on the night side of the terminator, near the crater Eratosthenes.

In This Issue . . .

Events for October 2014

WAA October Lecture

"Galileo Jupiter Probe Mission"
Friday October 10th, 7:30pm
Lienhard Lecture Hall, Pace University
Pleasantville, NY

Victor Miller, an engineer who worked on the Galileo spacecraft, will discuss this highly successful mission to Jupiter, which was launched in 1989 and orbited the planet from 1995 to 2003, transmitting a trove of images and scientific data back to Earth.

Mr. Miller is a senior systems engineer at BAE Systems. Currently, he is the System Engineering (SE) Function Lead for the BAE Systems Geo-Location function. He has a BSEE and MSEE from the Massachusetts Institute of Technology. Free and open to the public. Directions and Map.

WAA November Lecture

"The Copernicus Complex"

Friday November 7th, 7:30pm

Lienhard Lecture Hall,
Pace University Pleasantville, NY

Our November speaker is Dr. Caleb Scharf. In his lecture Dr. Scharf asks: Are we special or are we unexceptional? For the first time in human history we stand poised to begin to truly answer this question. Extraordinary discoveries in astronomy and biology have revealed a universe filled with dynamic and endlessly diverse planetary systems, and a picture of life as a phenomenon intimately linked with the most fundamental aspects of physics. But where this really leads us is not yet clear. It's possible that we need to find a way to see past the mediocre status that Copernicus assigned to us 500 years ago, and to do that we need to come to grips with the latest scientific research from the microscopic to the cosmic.

Caleb Scharf is Director of Astrobiology at Columbia University in New York, and the author and co-author of more than 100 scientific research articles in astronomy and astrophysics. His work and writing has been featured in publications such as New Scientist, Scientific American, WIRED, The New Yorker, The New York Times, Aeon, Nautilus Magazine, Science News, Cosmos Magazine, Physics Today, and National Geographic, as well as online at sites like Space.com and Physorg.com. His textbook for undergraduate and graduate students, *Extrasolar Planets and Astrobiology*, won the 2011 Chambliss Prize of the American Astronomical Society, and *Gravity's Engines*, his new popular science book was one of New Scientist's "10 books to read in 2012" and was the basis of the BBC/Science Channel documentary, "Swallowed by a Black Hole". Free and open to the public. Directions and Map.

Starway to Heaven

Saturday October 18th, 7:00 pm.
Meadow Picnic Area,
Ward Pound Ridge Reservation,
Cross River, NY

This is our scheduled Starway to Heaven observing date for October, weather permitting. Free and open to the public. The rain/cloud date is October 25th. **Note**: By attending our star parties you are subject to our rules and expectations as described here. Directions.

New Members. . .

George & Susan Lewis - Mamaroneck
John Mullins - Bronx
Matt Thomas - Rye Brook
Christopher Ward - Rye
Mayan Moudgill - Chappaqua
Sharon Nolan - Goldens Bridge

Renewing Members. . .

Michael Lomsky - Wilton
Joseph Esposito - New York
Erik Esposito - Bronxville
Michael Rinaldi - Scarsdale
Josh & Mary Ann Knight - Mohegan Lake

WAA APPAREL

Charlie Gibson will be bringing WAA apparel for sale to WAA meetings. Items include:

- Caps and Tee Shirts ($10)
- Short Sleeve Polos ($12)
- Hoodies ($20)
- Outerwear ($30)

Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website.

Almanac
For October 2014 by Bob Kelly


Oct 1 Oct 8 Oct 15 Oct 23

Let's get right to the two major Moon/Sun interactions for October! On the 8th is the "commuters' eclipse" in the pre-dawn sky. The totally eclipsed Moon will disappear into the western horizon as the Sun is rising in the east. Early morning commuters will be able to follow the Moon into the Earth's shadow starting at 5:14am, only 19 degrees above the horizon. The Moon will be eclipsed totally by 6:25am, as twilight fills the sky. The bright sky will make the Moon harder to find as it sinks lower, setting about 7:03am. But investing in an early rise will have large dividends of beauty for the beholder. Also, Uranus will be less than two degrees to the upper left of the Moon, making the tiny, but steady, light easier to find in binoculars. The only question is when Uranus will be easiest to find, before twilight when the sky is still dark but the Moon full and bright, or in a lighter sky, but with a darker Moon. Extra credit: Will you see the Moon and the Sun at the same time on opposite sides of the sky, as a visual explanation of the term 'opposition'? (Of course, that means Uranus is also near opposition this month, as well.)

The other Moon/Sun lineup occurs at sunset on the 23rd when the partial eclipse of the Sun begins just moments before the Sun sets from our vantage point. Any obstruction on the horizon (especially the Palisades) will prevent us from seeing the glancing pass by the Moon as the eclipse will start with the participants only a few degrees above the horizon. Both eclipses are easier to see further west of our area.

After the 8th, the Moon and the Sun will be easy to find in the morning sky at the same time, just not next to each other, with the Moon highest in the waning gibbous phase around the 13th.

Venus will dive deep into the Sun's glare in October and into the SOHO C3 telescope's field all month. Mercury joins Venus in the C3's view from the 13th through the 20th. They are closest on the 18th. Then, Mercury scoots into the morning sky, getting high enough to rise at morning twilight by the end of the month for the best chance to see it all year.

High in the predawn sky, Jupiter is well worth a good look, rising 4½ to 6 hours before sunrise. Back in the evening sky, how low can you go and still see Saturn's rings? Saturn sets during the middle of evening twilight by the end of the month. Mars craftily avoids the solar glare, sneaking past the Scorpion and hiding in the Teapot of Sagittarius. Can you see Comet Siding Spring near Mars, passing closest on the 19th? Will magnitude +0.9 Mars wash out the much fainter comet, which will be passing 84,000 miles from Mars' surface? What will be the view from Mars; will the comet's coma be so spread out it will fade into the background?

The Great Square of Pegasus rises high in the evening Prime Time sky, dragging M31, the Andromeda Galaxy, with it. The Milky Way stretches from the northeast to southwest, passing north of overhead. Someday, a couple of billion years from now, Andromeda will be close enough to look like a second Milky Way in our skies.

The Pleiades lead the Hyades into the morning sky, followed by Orion, which rises well before dawn, warning us of the coming of winter. The Orionid meteor shower peaks on the 21st. It doesn't have much Moonshine to contend with, but it's a small shower, adding a few meteors to the morning sky on the 21st.

The International Space Station gives us an alternative bright object to see in the evening twilight sky from the 4th through the 29th. Plan ahead by checking websites for over-flight times.

CaK-to-Visible Color Conversion Eyepiece

John Paladini

I enjoy looking at the sun. I have both H-alpha and CaK solar telescopes. The reality is that I use the H-alpha scope about ten times more often that the CaK scope. That is up until now,

Convenience is one of the reasons my H-alpha scope is preferred. You cannot just pop in an eyepiece and expect to see much in a CaK instrument. The CaK spectral wavelength is approximately 393 nm, in the near-ultraviolet. This wavelength is at the limit of detection by the human eye since the cone cells in the retina are not very sensitive below about 420nm and the lens filters out UV light. The situation only gets worse as the lens ages. I'm 60 and I can see a purple ball and a sharp edge of the sun when it's focused, and that's it. I can't see any surface features.

The most common way to get around this problem is to use a CaK scope with a video or CCD type camera and a video screen or computer monitor. This approach is fine for seeing or recording the images but it is not convenient since it requires additional equipment and power. I took this limitation as a challenge and I believe I have come up with a viable real-time solution.

I take a fiber optic bundle (a.k.a fiber optic plate), coat one side with a thin layer of UV-sensitive phosphorescent paint and look at the image generated on the other side of the bundle with an eye inspection loupe. The physics allow an image to be visible because the eyepiece is converting a higher energy (shorter) wavelength into a lower energy (longer) wavelength. This shorter wavelength is in the visible part of the spectrum and is easier to see. In fact, it is in the green color to which the eye is most sensitive. There are no electronics needed to use this eyepiece. It makes a "chemically enhanced" image.

These are items I used to make my CaK eyepiece:

1) 1.25 inch long 1.25 diameter copper tube for the eyepiece body.
2) An eyepiece loupe that can be adjusted for focus. I used a surplus shed (L2085) 12-power triplet magnifier.
3) A fiber optic bundle (fiber optic plate). In my case I used a fiber optic bundle from an old burned-out MX9916 image intensifier unit. I purchased mine from Wilcox Engineering Company in California. I chose this because the diameter was exactly 1.25 inch and made attaching the unit to the copper tube body very easy. [The MX9916 fiber optic unit comes from an image intensifier, which is an ITAR, export controlled item. Non-US purchasers may have to look for other similar items that are sold locally.]
4) Florescent Acrylic paint. I picked 2 colors, "scorching yellow" and "Electric blue," which I picked up at the local arts and craft store. The yellow version is easier to see. The blue version gives a more natural CaK view.
5) A small bush, some glue and some water to complete the project.

The fiber optic unit must be cleaned of any coatings and must be kept free of any dust. Any dust that remains would be visible when using the eyepiece.

The most difficult (and important) part of this project is applying the coat of paint to the bottom of the fiber optic glass. The coating has to be so thin

that it is semi-transparent and uniform; otherwise, the image won't be acceptable. This took a bit of art to get just the right painted surface. I took me about 5 tries before I got it right. I found the best way is to lay the fiberoptic bundle with the bottom up. Then I applied 1 drop of paint, then wet the brush with a bit of water and swirled the paint until it was uniform. Then I left it to dry. It takes about a day for the water to dry. Once this is done the rest is easy.

I attached the loupe to one end of the copper tube and the fiber optic bundle to the other end. The painted surface points outward and is the surface where image of the sun is focused.

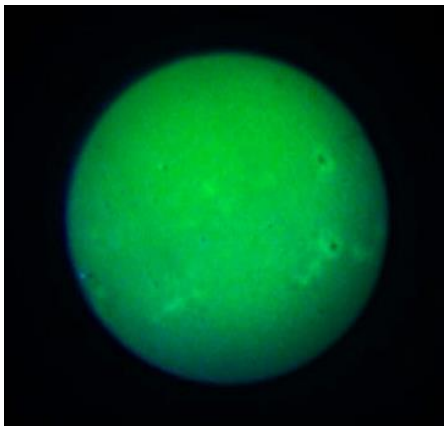
To use this eyepiece, I drop it into the 1.25 eyepiece holder in a CaK scope. Focusing is a two-step process. First focus the scope using its focuser until the image is a sharp as possible.

Then focus the eyepiece loupe until the image comes to maximum sharpness.

Resolution and image sharpness are dependent on the quality of the applied coating and limiting resolution of fiber optic bundle.

The MX9916 has about 30 lp (line pairs) per millimeter. It's decent but not great. Bundle made from smaller fibers would have more resolution, as you would expect. However, with the 30 lp/mm device I can see sunspots, CaK patches and other disk features. Prominences are not visible as they are just too dim.

I am pleased with the results of this project. I now have 2 "chemically enhanced" CaK eyepieces and I can use my CaK scope just like any other scope.



Custer Institute and Observatory

Claudia Parrington

Kevin and I recently went camping at Eastern Long Island Kampgrounds in Greenport. We took our niece Mia and a friend's little-one named Patience. They are both six years old and had never been camping. So instead of doing the nearby Greenport Maritime Festival we stayed around the campground. Friday night was so clear that you could see the Milky Way; Kevin wished he had brought a telescope. We had picked this campground because it was near the Custer Institute in Southold. Being from Long Island, we had always heard about the Institute. So we decided to take the kids and see what it was all about.

Patience at the Observatory

When we first got to the Institute, we actually passed it on the road because it looked more like someone's house. Once we pulled into the small parking lot, we were able to see the AOS (Amateur Observers Society of New York) and ASLI (Astronomical Society of Long Island) domes. We had arrived around 8pm and they typically start viewing around 9pm. When you enter the building, you walk into the kitchen. The main area is where you see old telescopes, maps and are able to see more about the Institute. While I was carrying Mia, Kevin and Patience were able to go and look through the telescope. The telescope was about two steep flights up so I had a little bit trouble getting up while holding Mia but I managed. Before viewing started, the volunteers had given everyone a brief history of the Institute. I was downstairs for that but when we got up to the scope, we were watching the dome move into place. It was really cool to just be standing there while the ceiling around you moves. Kevin and Pae were able to look through the scope and we saw a cluster. Pae had trouble seeing but didn't mind because she liked that she was could look through a telescope. The volunteers were also setting up another scope in front of the larger one but we had to leave before it was set up. Kevin and I plan to go back next year.

Mission Unaccomplished

Larry Faltz

We amateur astronomers are merely supplicants before the altar of the Weather Gods. More often than not, we beseech the Good Weather God (I call him Rao) to grant us stable, transparent skies for our viewing events but the Evil Weather God (I call him Roker) usurps control of our observing fate. Because we have to plan our sessions in advance, Roker tempts us with optimistic long-term forecasts, only to roll in clouds at the last moment. I hear him cackle and utter Milton's lines "Heaven is for thee too high…Dream not of other worlds." How often have we seen predictions of clearing *just* around the time of our scheduled observing events, or a front moving in *just* after we're supposed to be finished. Given the weather's vagaries we don't really know until we're up at Ward Pound whether one's coming late or the other early, and they often do. It's the meteorological equivalent of Lucy pulling the football out from under Charlie Brown.

Roker can be even more dastardly when you plan a long-term trip around a major observing event. I was all excited to take Elyse, a solar eclipse newbie, to the July 11, 1991 event. We opted for the Big Island of Hawaii. The studied prediction was for a 97% chance of cloudless skies on July mornings along the Kona coast. Arriving at the hotel 4 days ahead of the event, we practiced walking each morning at 5 am in the crisp, clear pre-dawn darkness to our observing position on a golf course. Stepping outside the morning of the eclipse, I sensed it was humid, and said to Elyse "Something's wrong." Roker had placed a storm 300 miles to the north, reversing the island's wind direction. The normally windward west side of Hawaii was now the leeward side, causing thick clouds to form above the "saddle" between Mauna Kea and Mauna Loa, right in front of the sun. We watched haplessly as the eclipse shadow darkened the clouds, not seeing the sun until about half an hour after the event when it was an interesting, if hardly soul-shaking, crescent. As disappointing as it was for everyone, and the post-eclipse mood was indeed grievous, we were in Hawaii and our disappointment was bookended by two weeks of fabulous sightseeing. In October 2012, we spent 4 days in Iceland just to see the aurora borealis (our hotel, the Ranga, 100 km east of Reykjavík, wakes you if the aurora appears in the wee hours). We had 4 continuous days of rain and never even saw the sky.

It isn't always terrible, of course. Sometimes Rao is in the ascendancy. Our 12-day trip to Arizona in April 2011 (see my articles in the June through October 2011 SkyWAAtch, available on the newsletter archive page) featured clear skies throughout, allowing observing in and around Flagstaff and Tucson every night we wanted to do it. It was a beautiful clear night on August 27, 2003 for the close approach of Mars. I observed the Red Planet with a 10" scope from eastern Long Island. Weather in Hawaii for the Transit of Venus could not have been better. The conditions for our recent outreach event in Mamaroneck on May 7th were, in a word, perfect.

So when I planned a trip to Colorado for the last 10 days of July this year, I figured that within that span I ought to catch at least a few clear Rocky Mountain summer nights in spite of the advance of monsoon season. We think of western summers as hot and dry, but as the season goes on unsettled weather is more frequent, usually in the form of afternoon thunderstorms, followed fortunately by clearing on many nights. I figured in 10 days I ought to have at least 4 decent nights. Roker, however, had other plans.

Clearing Afternoon Thunderstorm, Canyonlands National Park, August 1994 (photo by the author. Scanned from a medium format negative on Fuji Velvia film.)

The monsoon often brings torrential downpours with flash floods, lightning and hail. Forest fires start easily in the parched pine forests, a risk made worse by the death of millions of trees infested over the past decade with the pine bark beetle, an epidemic ascribed to warmer-than-usual mountain winters). On the good side, the rain brings much-needed water to the arid

Colorado basin (not really enough, especially since the snow pack has been below average for a number of years) and the pleasure of afternoon rainbows. Mornings and evenings are often clear and so hiking, bicycling, golf and stargazing still beckon vacationers.

This year, the famous El Nino was more active than usual. This vast area of warm water in the eastern Pacific contributes moisture and energy to the atmosphere. The moisture flows northward into the warm desert southwest and some of it makes its way into the Rockies. The summer of 2014 was one of the wettest on record in Colorado and New Mexico. My various cell phone weather apps showed little clouds with thunderbolts emerging beneath them hour after hour, day after day, night after night.

My original plan was simple: get to the dark skies at Camp Hale (9,200 feet elevation), about half an hour south of the ski town of Vail where we were staying, don some warm clothes, break out some comfortable chairs and set up the astronomy equipment. Naked eye viewing there is spectacular. Binoculars show literally thousands of objects and a telescope sees with far greater clarity, brightness and contrast than in Westchester. I keep a 6" Orion Starblast reflector at a friend's condo. In our checked baggage we brought a lightweight aluminum tripod and a small Universal Astronomics BinoLight parallelogram mount for my Oberwerk 9x60 binoculars. For a first attempt at wide-field astrophotography, I bought an iOptron SkyTracker on which to mount my Canon T3i DSLR. They and the binoculars traveled as carry-on luggage.

Universal Astronomics BinoLight mount

The weather prediction for our first evening was for clearing skies. We drove to Camp Hale only to encounter strong winds and flashes of lightning on the other side of Tennessee Pass to the south. Although the sky was clear, we recalled the old saying "If you don't like the weather in Colorado, just wait 5 minutes." I knew that was true from our many years of skiing there. The wind was too much for the telescope, and the lightning was intimidating, so we packed up and drove north on US 24 to I-70 and then west for a few miles to a mountain road a mile north of the town of Avon, Colorado, where we found a turn-out at 8100 feet elevation that had decent full-sky exposure. The town 700 feet below added more light pollution than we would have liked. In spite of that, the Milky Way was prominent if not the spectacular torrent of stars that it can be at Camp Hale. (See my article in the August 2010 newsletter). The Sky Quality Meter showed a green-zone reading of 21.35, way above Ward Pound's rare best orange-zone 20.45.We still saw lightning flashes far off to the south, but the sky overhead remained clear and we could see down to the southern reaches of Sagittarius and Scorpio.

Most of our viewing that night was with binoculars, and we had a fine time in spite of the wind, suboptimal transparency in the humid air and lights from Avon. Elyse and I viewed many Messier objects, and some NGC's, mostly in the Milky Way to the south and overhead in the Summer Triangle. We looked only at Saturn through the telescope figuring we'd save that device for another night. Sadly, that was not to be.

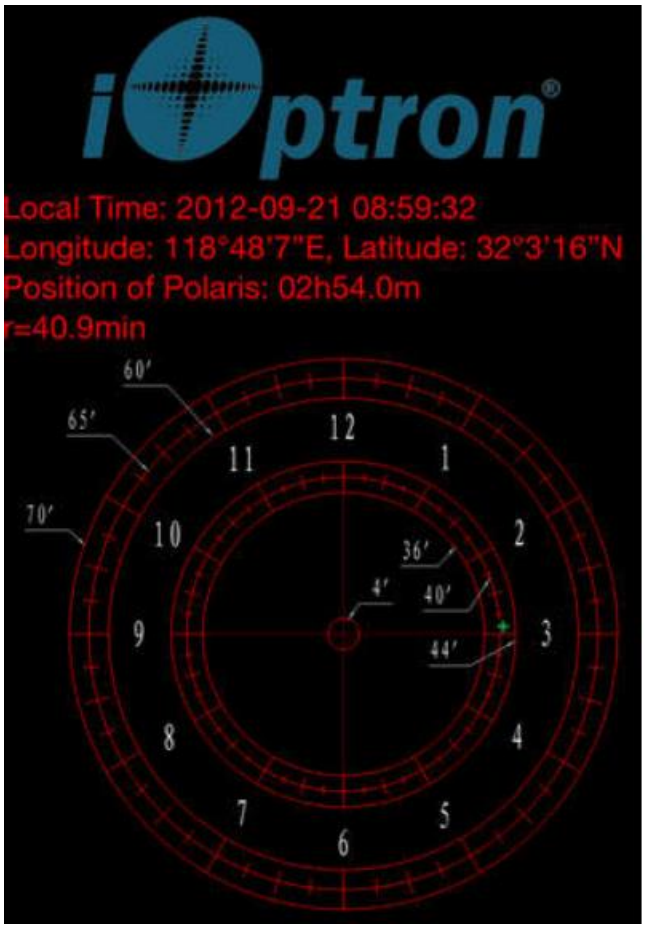
Astrotrac TT320 camera mount

We observed the following night, also from Avon, since we had gotten a late start after a dinner with friends and we thought twice about the somewhat daunting route to and from Camp Hale. It's only half an hour, but much of it is tense driving on twisty US 24 along the side of a mountain and over Battle Mountain Pass, not a lot of fun when you're tired. I also wanted to devote time to trying out the SkyTracker. I was impressed by David Parmet's Milky Way shot from Cherry Springs (on page 12 of the July 2014 newsletter), taken with his DSLR on an Astrotrac. This device is essentially a "barn-door" motorized sidereal tangent arm drive for a camera, complete with polar alignment scope. It's somewhat large and ungainly, but it works well, as David's excellent shot shows. Unfortunately, it is no longer made.

iOptron's SkyTracker, released this year to excellent reviews, is far more compact and easier to manage, as well as being less expensive. It's the size of a small book. The drive uses a worm gear that's powered by just 4 AA batteries.

iOptron SkyTracker (mine is black)

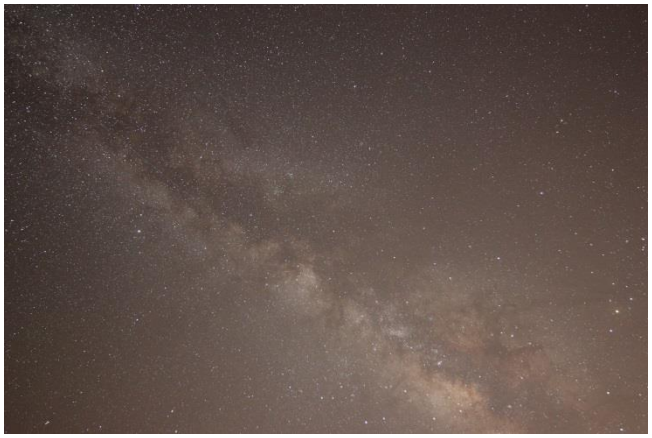
You need to supply a ball head to position the camera to point in any direction. To set up the SkyTracker, you level the tripod and then point the device north. There's a small compass in a fluid-filled chamber on the top of the device. Mine didn't work properly. However, an amateur astronomer ought to have no problem finding north on a clear night and indeed I never needed the compass. You tilt the drive it to your latitude (there's a scale on the mounting) and lock it into place. There's a small hole in the case through which you sight Polaris, adjusting altitude and azimuth knobs to center it. That brings it into the field of the polar scope, which has an excellent reticle illuminated by a red LED. A $1.99 iOptron smartphone app shows the exact position of Polaris on the reticle for your time and location, so all you have to do is reproduce the view by fine adjustments of the knobs as you would with any equatorial mount.



Screen shot of the iOptron smartphone app. Polaris is the green dot near 3 o'clock. Make the view in the polar scope identical, and you're aligned.

After getting familiar with the alignment process, I took some 60, 90 and 120 second exposures of the Milky Way. I set the camera at ISO 1600, figuring that would be a reasonable compromise between speed and noise. Manual focusing and a remote shutter release are essential. The Canon's EF-S 18-135 mm f/3.5-5.6 zoom lens (35 mm equivalent is 28.8-

216 mm) is hardly professional glass, but it was adequate for initial testing. I also used a ProOptic (Adorama's house brand) 14 mm f/2.8 (35 mm equivalent 22.4 mm) for wider angle shots. Both lenses show edge distortion when wide open and had I more time I might have tried some shots at f/8, extending the time by a factor of 3, to get a flatter image.

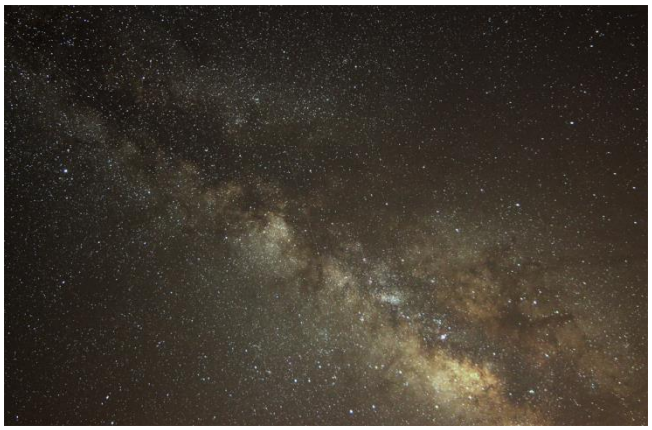


Unprocessed 90-second image

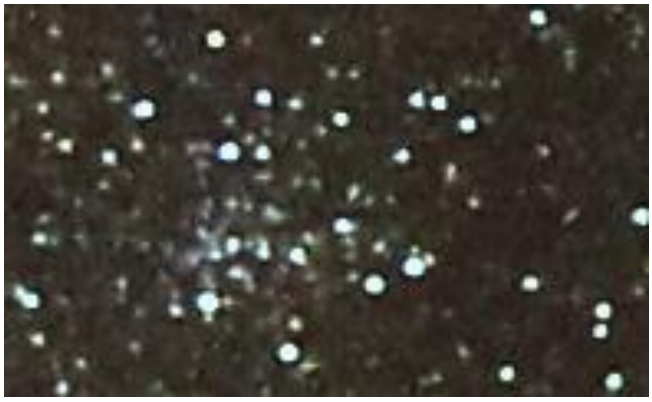
Detail of the above image showing a satellite track

The light pollution from Avon made 120 seconds the longest reasonable exposure before skyglow became overwhelming. I imagine I could have done 5-10 minutes had I been able to shoot from Camp Hale, where the nearest outdoor light bulb is 9 miles away. Avon is a resort town and is sacrificing its night sky to upscale glitz. Another problem is that there are quite a few air routes in the area, so many exposures caught the blinking lights of airplanes in spite of my attempts at naked-eye vigilance prior to the shot. Also, since we were shooting within a couple of hours of sunset, a few satellite tracks appeared on the images. The top image above is an unprocessed 90 second exposure of the southern Milky Way with the 14 mm lens, showing the effect of the light pollution (an overall red cast) and the presence of two satellites, one tracking along the dust lane in the left-hand side of the photo and another near the middle heading from top to bottom at a slight angle. Enlarge the page for a better view.

Some defects can be ameliorated with processing. Some but not all of the red color cast due to light pollution can be eliminated and the contrast enhanced by adjusting color channel levels with Photoshop or a similar program. I manipulated the RGB channel in the image to achieve greater contrast and then lowered the intensity of just the red channel slightly. A little cropping never hurts either. The result is more impressive, if perhaps a little less realistic (hey, this is art!). The M24, the Great Sagittarius Star Cloud, is quite prominent to the lower right of center. Masking and other advanced techniques are still beyond my abilities (not to mention those of the cheap, old version of Photoshop that I use). It's clear that the better the starting image, the better the final image. The adage "you can't make a silk purse out of a sow's ear" certainly applies to astrophotography.



One of many ways to manipulate the previous image to bring out detail



Detail showing round stars, proof of excellent tracking

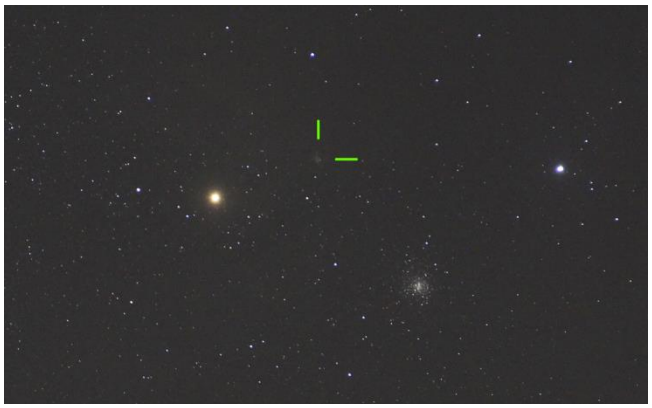
The 14 mm lens was used to make a 90-second image of the Milky Way around the Summer Triangle. A meteor fortuitously adorned the panorama while airplanes thankfully stayed away. This shot headed my article about viewing in the Summer Triangle in the September 2014 newsletter.

Summer Triangle, with meteor

Elyse and I are fascinated with the southern Milky Way in Sagittarius and Scorpio, since we don't see that area of the sky well from Ward Pound what with the light dome of New York City competing with photons from that part of the sky. Setting the zoom at 53 mm, I obtained a 120-second image of area around the Lagoon and Trifid nebulas. The camera's 18-megapixel sensor yields 5184x3456 pixel images, more than enough to enlarge parts of each frame while still retaining fidelity and detail.

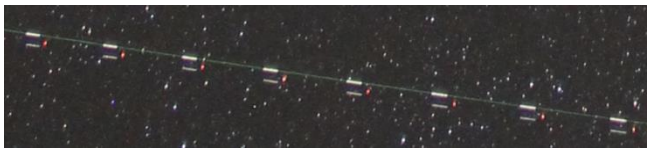
The bright nebulas in the center are M8 (Lagoon) and M20 (Trifid) above it. Detail from larger image.

The image of Antares and M4, a 90 seconds exposure with the zoom fully extended to 135 mm, shows that the tracking is excellent even at long focal lengths. The faint globular cluster NGC 6144 (magnitude 9.6) is visible just above and to the right of Antares.



Antares and M4 at maximum zoom. NGC 6144 identified with tick marks. The star to the right is Alniyat, σ Scorpii.

The airplane tracks I encountered on some of the images are much too extensive to clean up with the various Photoshop tools. They are kind of funky.

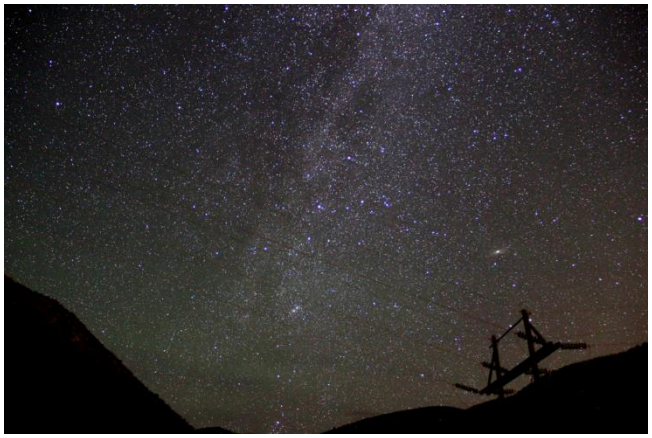


Detail of an image showing an airplane

A shot with at least some foreground elements gives a sense of dimension.

Some lights from homes across the valley were visible from our observing site. Zoom at 18 mm, f/3.5, 81 seconds.

I then turned the camera to the north, where a cleft in the hills welcomed the rising Cassiopeia. There was an electrical tower and wires in the camera's field, but I didn't want to relocate the drive and anyway the artifacts added to the drama of the image. The Double Cluster is quite visible, as is M31, rising just above the tower.



The Milky Way in Cassiopeia, with the double cluster below and M31 just above the tower

Finally, I turned the camera to the setting Big Dipper and centered it on Alcor and Mizar, hoping to catch M101. Indeed, a 120-second exposure showed the galaxy, as seen in this detail from the image.

Detail of an unprocessed 120-second exposure showing the tail of the Big Dipper. Alkaid is on the left, Alcor and Mizar on the right, and M101 is between the tick marks.

I would have stayed later and made longer-duration images of the area around Cassiopeia and M31, as well as trying more long-focal length shots, but three things happened. First, since we had hiked up Shrine Mountain that morning, starting at over 11,000 feet and gaining 800 feet of altitude (and we had gotten caught in a thunderstorm with hail on the way down), we both tired as the evening wore on. The second was that a few clouds started coming in from the west and north and the likelihood of continued clarity was questionable (you can see some thin clouds at the lower edge of the Cassiopeia image). The third reason was the most interesting, mysterious and unsettling. As I was working the SkyTracker for the last few images, I heard a loud snort. It sounded like it was within 20 feet of me. A quick search with my flashlight didn't show any of the deer that we frequently saw while driving. The snorting continued intermittently for a few minutes, each time sounding as if it was just a few feet away. I couldn't see anything on the road or in the bushes no matter how quickly I pointed my light in the direction of the sound. Then it occurred to me that it could be a clever and perhaps hungry bear, many of whom frequent the Vail valley in every season. On our ski trips we used to stay with a family in East Vail whose house was on Kal-Gar Lane (named after the area's developers), until frequent bear garbage bin invasions prompted a name change to Black Bear Lane. Discretion being the better part of valor, I felt it was time to pack up and head back to town.

For the next 12 days we had nothing but clouds and rain in the evenings. We went to Santa Fe for a few days, with a side trip to Los Alamos and the fascinating Bradbury Science Museum, which details the history of the Manhattan Project and highlights Los Alamos' current research and technology. We attended a wonderful performance at the Santa Fe Opera, pairing Mozart's comic tidbit *The Impresario* with Stravinsky's otherworldly *Le Rossignol*. On our last day we took in Albuquerque's excellent Natural History Museum, whose planetarium offering was none other than *Dark Universe*, the show currently at the Hayden (reviewed in the June 2014 newsletter). We passed, opting instead to enjoy a well-curated exhibit on the development of the personal computer, much of which actually happened in Albuquerque.

We'll try for dark skies again next year, going a bit earlier in the season to try to avoid the monsoon totally, Roker permitting. Under the dark skies, the accurate and easy to use SkyTracker should help produce some really excellent wide-field images.

Monsoon thunderstorm over the Rio Grande Gorge Bridge and US 64, 10 miles WNW of Taos, NM (LF)

Members' Presentation Night, September 12th

The first meeting of the new academic year is always dedicated to presentations by members.

The evening started with John Paladini showing his unique eyepiece for viewing the sun's Ca K-line. John has a Lunt CaK scope, which passes the calcium K line at 393.4 nanometers in the ultraviolet. This wavelength is at the edge of the normal spectral range of the human eye and most observers can't make out detail. CaK telescopes require using a UV-sensitive camera on the telescope to capture images of the solar surface. The ever-inventive Paladini constructed an eyepiece that would allow direct visual observing using the property of fluorescence. He used a fiberoptic plate to which he applied a thin coat of paint that would absorb the UV light from the sun and re-radiate it in at a wavelength to which the human is most sensitive. No power is required. Although the resolution is limited by the finite size of the glass fibers in the plate, the ability to see this wavelength without a camera is unique. John gives more detail in his article in this issue of the newsletter.

Larry Faltz showed an iOptron SkyTracker sidereal camera drive and explained how he used it to obtain wide-field images of the Milky Way from Colorado in July. A more detailed discussion is in his article in this issue of the newsletter.

He then passed out anaglyph glasses to everyone in the audience and presented a slide show of space images in 3D. The images included scenes of Apollo landings, a large number of Mars images from both landers and orbiters, images from the Cassini, Dawn and Rosetta missions, some deep space objects photos made into 3D using computer techniques, and even one of the Starship Enterprise.

DeDe Raver gave an enthusiastic report on the Medomak Astronomy Retreat and Symposium, held in Washington, Maine. Medowmak is a "family camp" that offers a variety of activities throughout the summer, hosting a highly organized astronomy event in late August. Unlike most summer star parties, where you need to bring a tent or an RV, Medowmak houses attendees in cabins with showers. There were talks by a number of astronomers, including J. Kelly Beatty of Sky & Telescope, and there was a lot of teaching and coaching about telescope use and observing techniques during observing sessions. Attendees skills ranged from rank beginner to expert. The event was small but extremely comfortable and well organized and DeDe encouraged WAA members to consider attending next year.

The final presentation was by new WAA member Roman Tytla. The founder of Big Bang Prints, Roman has a background in the printing industry and had the idea of making large-format images of many of the newer high-resolution astrophotographs using a sophistcated 12-color printer. The images are printed on a special fabric that can be rolled up for mailing. They have an adhesive backing that permits mounting directly on a surface without buckling, or they can be framed. Sizes range from 2x2 feet to 7x3.5 feet. He can also print your own images. Roman raffled off two beautiful prints at the meeting.

The audience of about 35 attendees enjoyed the presentations as well as delicious cookies baked by Eva Andersen. These have become somewhat of a staple at recent club meetings. WAA meetings can be "out of this world" in more ways than one.