

The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society

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Earl Dursell



Jason Zicherman



LUNAR ECLIPSE
JANUARY 20-21, 2019

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Images by Mike Waddell; Montage by Jen Waddell

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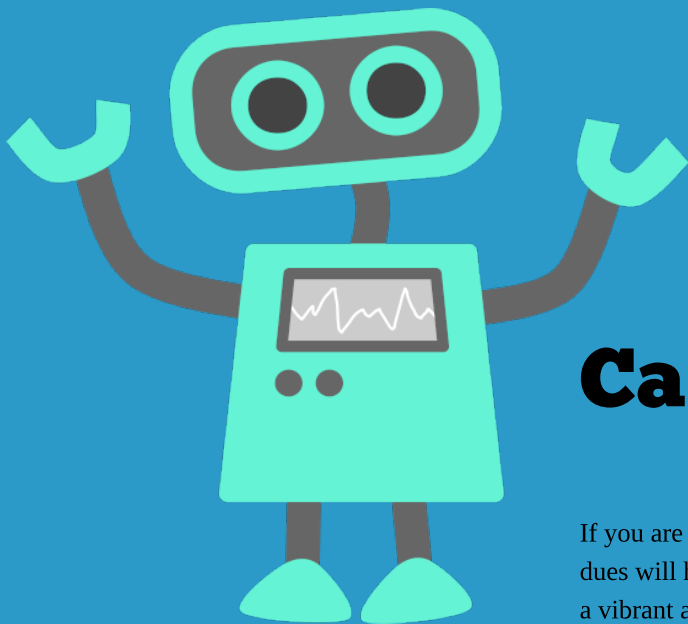
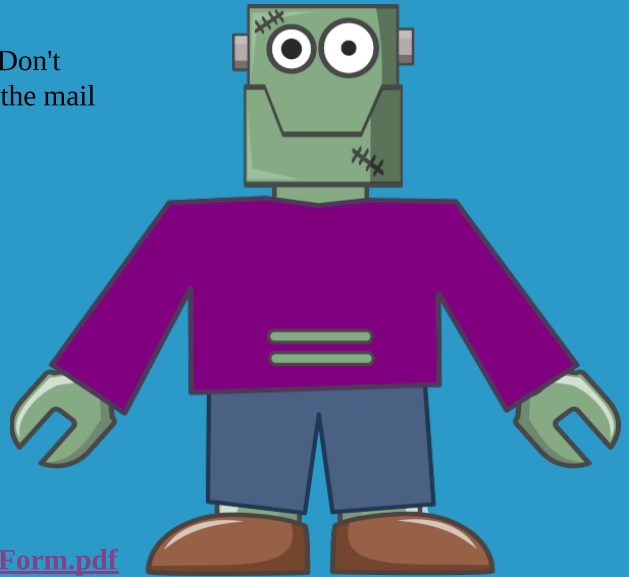
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ad astra*****

In which I offer some observations regarding our favorite mountaintop.

All Roads Lead to Pulpit Rock

There are benefits of the world-wide system of long-distance, controlled-access highways, of which the American prototype is the Pennsylvania Turnpike. But for shorter journeys, I prefer to avoid them when possible. That's why, before one of my first drives to The Rock a few years ago, I got into Google Maps and designed a "cross-country" route that I still use today. Zoomed out far enough, it sort of looks like a straight line from my North Whitehall home to Reservoir Road, but close up it consists of individual segments on 18 different roads. These include Route 309 and Route 100, but for a total of only 1.3 miles.

As I was leaving my house on Thursday, January 17th, I fired up the Waze app on my phone, just to try an experiment. I asked it for the fastest way to Reservoir Road in Hamburg, and it wanted to send me down Route 145 to Route 22, the obvious 4-lane-highway route. I noted that it predicted an ETA about 45 minutes out. Then I kept an eye on it while I "did it my way."

It was fun to watch it revise its directions and predicted arrival time as I drove. For a while it wanted me to make a U-turn and go back to its chosen path, but finally it gave up and started offering new ways to get from wherever I was at the moment, to where I wanted to go, along with new predictions for my arrival time.

(I always smile when I defy its instructions and, watching for the update, see the revised time improve by a few minutes. It thinks it's so smart! I'm kind of surprised that Waze and Google Maps aren't better at always finding what is, based on their own estimates, the quickest route.)

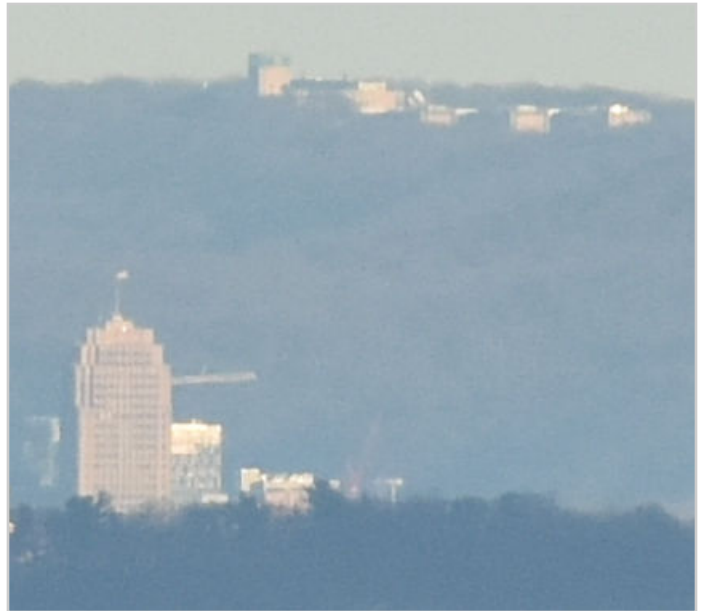
I drove fairly aggressively, but not dangerously, at least by my reckoning. As usual, I slowed down for blind corners and people walking or biking, and drove very conservatively along the picturesque Bausch Road. I don't want to be a risk to any of the critters at Schocharie Ridge Farm, or even be a subject of concern to the owners, who are often outside working with the horses. But I was interested in seeing just how much time my eccentric navigational habits were costing me.

It's hard to give a definitive answer, because there are a lot of variables, and I think Waze is somewhat conservative in its estimates. (On the other hand, maybe Waze just thinks I drive like an absolute maniac.) Anyway, at the end of my twisty-turny drive, with plenty of slow corners and complete stops, I arrived at the gate 6 minutes *earlier* than Waze predicted I would arrive by taking the highways. Go figure.

I think I will keep using my "scenic route" most of the time, maybe testing some variations along the way. I just noticed that Google Maps has a feature called "send route to phone," which I want to try out now. It took me a couple of trips to learn this route, and having the smart phone as a navigational aide would be really helpful, as long as I get to pick the route. Because I really do enjoy the scenery.

On a Clear Day

What you can see (or photograph) from Pulpit Rock on clear night is one of the primary foci of this organization. But what you can see from the lookout on a clear day is worth a little time. On my previous visit, with Observatory Director Frank Lyter on January 6th, the exceptional clarity of the Lehigh Valley air drew our attention to what could be beheld.

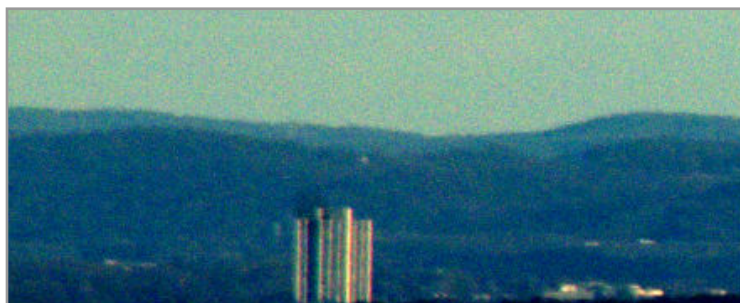


First, we confirmed something I had figured out from looking at a map previously: that you can see Iacocca Hall, where LVAAS held its 60th Anniversary celebration, behind and a little to the right of the PP&L Building. On previous occasions I had looked for it, but in the wrong place, farther left, or eastward; the lay of the land can be deceptive. Anyway, Frank's photo shows the rooftops of the entire Lehigh University Mountaintop Campus (at right.) With my unaided eye, I could make out the tower as a bright speck on the skyline.

Another question I had wondered about was, just how far can you see, directly to the East? Adding some interest to this question is a story that was once told to me by one of our members: allegedly, sometime before 2001, some engineering students from Lehigh set up a telescope at the Pulpit Rock lookout, and they were able to see the tops of the twin towers at the World Trade Center in New York City. If this is true, then it should be possible to see the spire on top of Freedom Tower now. I started digging into this question using another of Frank's photos, which I have cropped and enhanced as shown below.

You can clearly see two distinct ridge lines above and behind Martin Tower in Bethlehem. The question is, how far away are they? I started trying to figure this out using some manual calculations after looking up the heights of various landmarks, but then Dave Moll showed me how to drop a sight line in the Google Earth app, and then plot the elevation profile along the line. I used a line from the Rock to Freedom Tower, which would pass just to the left of Martin Tower (less than the width of the building away from it.) However, this elevation profile does not take into account the curvature of the Earth's surface; it is just a graph of elevation above mean sea level, so it is not useful for determining sight

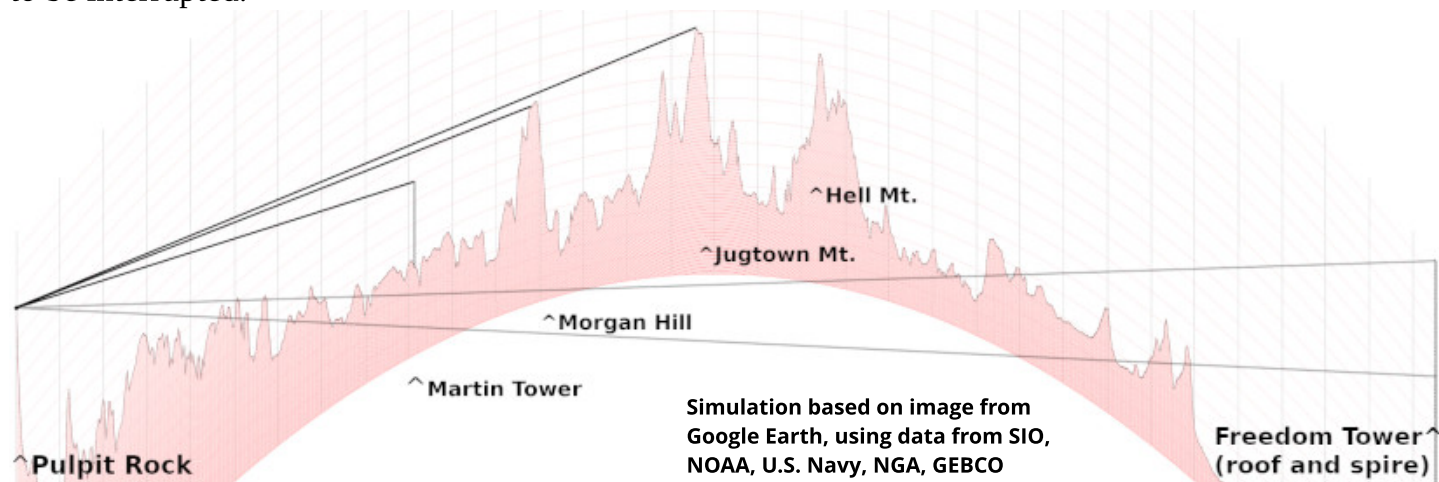
lines over the distances we are interested in.



I wasted a bit of time trying to figure out a way to wrap the image around an appropriately-sized circle in the GIMP, a free image editing program that I use, before I realized that the problem could be easily solved with a little bit of coding.

Before long, I had a short Python program that would read in the elevation profile from Google Earth and produce an image properly wrapped around our non-flat planet. The result is shown below, annotated with the buildings shown to the correct height, along with the names of some landmarks.

Note that this is a tiny window into a much large picture, and it is stretched in the vertical direction, in such a way that the accuracy of the sight lines is not affected. Horizontally, it spans 101 miles, the distance between Pulpit Rock and Freedom Tower, but vertically it is only 1/2 mile. I also added sight lines from the lookout: to Martin Tower, to Morgan Hill in Williams Township south of Easton, and to Jugtown Mountain about ten miles into New Jersey; and two sight lines to Freedom Tower that appear to be interrupted.



Then I discovered a lonely, quiet way to drive myself crazy. Yes, you can go into Google Earth and, with a lot of fussing around, try to position yourself so you can see the shape of these ridges from the correct direction, and see if you can get them to match the photo. I did this for an hour or so, and then gave up. Three times so far. My advice is to avoid trying to do this because it doesn't work very well and it's not very relaxing.

I also looked into atmospheric refraction, which often allows us to see things that are farther away than simple geometry would predict. Is it possible that that farthest line in the photo is not Jugtown Mountain, but Hell Mountain behind it? Is it possible that the tower in New York City could be lost in the mist, maybe visible on a good day, with the right temperature inversion and very clear air? For a while I messed around with the refraction calculator at https://aty.sdsu.edu/explain/atmos_refr/altitudes.html?LapseEntry=890492207165, and this result is also frustrating: there are too many unknowns and too many approximations needed to be really confident in what it is telling me. Setting up the elevations and distances for two sight lines in side-by-side browser windows, one from PR to the tower and one from PR to Jugtown Mountain, I tried different values for the lapse rate, which is the rate at which temperature decreases with height in the atmosphere. At $-53\text{ }^{\circ}\text{C}/\text{km}$, the visual altitudes of both targets match at about -0.3 degrees; the top of the tower would just start to peak over the top of the mountain. But a lapse rate of $-53\text{ }^{\circ}\text{C}/\text{km}$ represents an unrealistically strong temperature inversion. It looks like it is not possible, but in my mind there is still room for doubt, from some mistake in my math or my geometry, or some incorrect assumption or approximation in the refraction model.

For now, let's leave it at this: on a clear day, it looks like you can see Jugtown Mountain in New Jersey from Pulpit Rock, a distance of about 50 miles. It doesn't seem possible to see beyond that, but nature is full of surprises, so who knows. Ad Astra!

— Rich Hogg

LVAAS General Meeting - Open to the Public

Sunday, February 10, 2:00 p.m.

Room 130 Trumbower Hall, Muhlenberg College
2400 Chew St., Allentown PA, 18104

"Mira Variable Stars: A New Rung in the Distance Ladder"



Alex Arnold, Lehigh University

Miras are luminous pulsating variables near the tip of the asymptotic-giant branch. As they pulsate they change brightness by many magnitudes and on timescales of approximately 100 to 1000 days. The period of their pulsations can be related to their luminosity and therefore they have potential to serve as standard candles. Their ability for probing distances to far galaxies could rival that of Cepheid variables as they are more luminous and easier to detect. Before they take the place of Cepheids, particular problems concerning the relation between the period of Miras and their luminosities must be resolved. This will require both the acquisition of more accurate data and refining our models of stellar structure. In this talk I will discuss the potential for Miras as standard candles and the current problems that must be resolved before they can be used in extragalactic distance studies.

Alex Arnold is a 4th year graduate student at Lehigh University. He received his undergraduate degree in Physics from the University of Central Arkansas in 2015. His research interests involve pulsating stars, specifically Mira variables, and he is currently identifying and cataloging Miras in the KELT survey. He has presented talks and posters at various universities and the 30th IAU General Assembly in Vienna.

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Minutes for the LVAAS General Meeting - January 13, 2019

The January 2019 LVAAS General Meeting was held on January 13 in Trumbower Hall at Muhlenburg College in Allentown. The speaker, Marty McGuire, NASA Solar System Ambassador, is a local, residing in Bethlehem, and can be followed on Facebook and other social media as BackyardAstronomyGuy. His presentation was on TESS (Transiting Exoplanet Survey Satellite,) the successor to the Kepler probe's search for exoplanets. While Kepler took an in-depth look at a very narrow fraction of the sky, TESS will look for exoplanets orbiting nearby stars (30-300 light years from Earth: the 200,000 closest stars) and will cover 85% of the sky over the first two years (400x more area than Kepler.) TESS was launched on April 18, 2018 aboard a SpaceX Falcon 9 rocket from Cape Canaveral and used a flyby of the Moon to boost it into a highly elliptical orbit that will allow it to collect data away from the influence of the Sun and Moon, then transmit it to ground stations every 17 days.

TESS will look for exoplanets by the transit method: a planet passing between its star and TESS's cameras will cause the brightness to dip slightly. The depth of the dip depends on the size and brightness of the star and the size of the planet. For comparison, Jupiter passing in front of our Sun would register a transit depth of 1%. TESS's 4 cameras each have an aperture of 105mm with a field of view of 24°x24°, for a combined field of 24°x96°, allowing it to view entire constellations in the field of just one camera. It will image a particular sector for 27 days, then move to another sector, with overlap at the poles (not the celestial poles). Marty showed us two NASA videos on TESS, including one that showed the data collected in the first set of images. It has already identified several exoplanets, in addition to 23 stellar outburst, including six supernovae.

TESS is tasked specifically to look for terrestrial planets (earths and super-earths) of the currently known 3872 exoplanets, only 152 are terrestrial. TESS will locate the planets so that other more sensitive instruments (space- or ground-based) can determine their atmospheres, mass, composition, etc. TESS began collecting data on July 25 and, as of December 2018, all the data is available to the public. For more information on exoplanets, see <https://exoplanets.nasa.gov>. After a Q&A session that ended at 3:05 p.m. there was a 15 minute break.

The General Meeting was opened by Rich Hogg at 3:20 p.m., beginning with an admittedly non-astronomical demonstration of the Mould Effect, where a beaded chain (100 foot long, in this case) when "siphoned" out of a jar, creates a fountain-like effect as it cascades out of the container (search for Mould Effect on YouTube to see videos.)

Membership Director Gwyn Fowler reported Second Readings: Rowan Winch, Jacob Najarian, Curtis Adams and Cindy Kunkel are now full members. First Readings: Claudio Stabile and son, also Claudio; son interested in formation of the Moon; father interested in the solar system and Andromeda; Terry Rozhart, retired physicist, looking to astronomy as his next challenge, found us on the Internet; Mike Damiano, hiking at PR, got a tour from Ron Kunkel and Frank Lyter and was hooked.

40" Telescope Project: Rich showed one of the sections of the mirror cover/shutter that was removed. It is made of aluminum, but they are thinking of changing most of it to plastic to avoid the possibility of corrosion getting on the mirror surface. The aluminum parts may be anodized, but Ron said he wasn't sure it can be done with old aluminum. The truss members were removed (secondary mirror housing also removed) since it was discovered that they were only combined using a slip-fit joint. Frank has made a jig to hold a single truss support straight so that he can braze/weld the joints. When ready to be reassembled, the attachment points on the main mirror housing will be relocated to provide more stability (forming interlocked triangles.) They will also be taking the opportunity to clean all the parts of the telescope prior to painting and mirror installation. Frank thinks they are about six months from being ready for mirror installation. Rich said he will contact Mike Lockwood for a status report on the mirrors.

South Mountain Maintenance - Bill Dahlenburg reported the dome is now fixed, and can be raised and lowered, but the floors and seats need cleaning. He also reminded the new members that he is at SM most Saturdays from 9 a.m. till noon, so anyone needing help with a telescope, training on club scopes, rentals, keys, or wishing to help out with maintenance, can show up then, although they might want to contact him via e-mail (see website) to be sure someone will be there.

Frank reminded everyone that the club now has three mailing list groups (Pulpit Rock, South Mountain, and Astroimaging) to alert people to events, meetings, etc., and anyone interested in any of these areas should sign up for these lists. Instructions are on the website.

Treasurer's Report - Scott Fowler reported:

- YTD Income (from Oct 1, 2018): \$3303.75 (mostly membership renewals and a few donations)
- YTD expenses: \$2090.23 (mostly utilities)

Scott noted that the SM roof replacement is in the budget this year, although we are not sure if it will need to be done this year because the repairs performed by Bill Dahlenburg's crew have been successful in stopping the leaks.

Education Director Blaine Easterwood reminded everyone about Abby's Star Party at the DaVinci Science Center. This year it will be a two day affair: Jan 26 & 27. There is an overnight planned the first night, mainly for Girl Scouts, with about 100 expected participants. It would be nice if we could provide telescopes from 6-10 p.m. (outside if weather permits; inside if not.) Sunday's schedule is from 10 a.m. to 5 p.m. with solar scopes outside (again, weather permitting) and some demonstrations and telescopes inside. They are expecting 700 participants. Blaine has a few volunteers and is looking for additional volunteers.

UACNJ - Earl Pursell reported that they are hosting a Lunar Eclipse viewing event on the night of January 20th. It will be open to the public. If the weather is cloudy, they will show a site that is clear on the computer in the clubhouse.

Ron Kunkel noted that the Appalachian Mountain Club has a night hike scheduled for the January 20 and that they will come back up to the observatories to watch the eclipse. Anyone wishing to join them should contact Ron.

Rich noted that the Bucks-Mont Astronomical Association's next General Club Meeting, open to the public, will feature a panel of representatives from several associations: The American Association of Variable Star Observers, The Astronomical League, The Pennsylvania Outdoor Lighting Council/Intl Dark Sky Association, The International Occultation Timing Association, "Scope Seeing" Historical Observatories, and Spectroscopy. The meeting will be at 7:30 p.m. on Feb 6, 2019 at Upper Dublin Lutheran Church, 411 Susquehanna Road, Ambler, PA. For more info: blog.bma2.org

Director Rich Hogg made a plea for someone to volunteer for the Membership Services position. The main job is to run the Red Shift (gift shop) at the monthly star parties from March through November, and to also help coordinate the summer picnic and holiday party. This volunteer does not need to actually run the Red Shift at each star party, but can simply coordinate other volunteers to run it.

LVAAS Librarian Dave Raker requested anyone with a suggestion for purchases of new materials for the library to contact him.

Fred Bomberger, Planetarium Director, wished to thank Bill Dahlenburg, Pete Brooks, and Earl Pursell for fixing the dome.

The next LVAAS meeting will be Sunday, February 10, at 2:00 p.m. at Muhlenburg College, with a trip to the dining hall afterward. The speaker will be Alex Arnold, graduate student at Lehigh University.

The next Star Party is March 16th at 6:00 p.m.

The meeting was adjourned at 3:53 p.m., at which time all interested parties joined Dr. Judy Parker for dinner in the Muhlenburg dining hall.

Submitted by Earl Pursell, Secretary



From the LVAAS Archives:

Goals for 1969

by Sandy Mesics

In the February 1969 Observer, LVAAS Director Paul Shenkle outlined LVAAS goals for the year:

FROM THE DIRECTOR'S DESK Paul G. Shenkle, Director

We are quite fortunate to have a knowledgeable, experienced, and enthusiastic Board of Governors this year. No less than was the case in 1967 and 1968, important things are in store for us in 1969. Our objectives include the following:

"1. We expect to have public electric power at Pulpit Rock by May."

Metropolitan Edison provided electricity to Pulpit Rock in June, 1969. The July general meeting was held at Pulpit Rock, and the Arthur Fox Memorial Observatory was dedicated in August. However, by October, Metropolitan Edison informed LVAAS that they had raised their rates. Some things never change.

"2. Under the guidance of the astronomy department of the University of Pennsylvania and by our own efforts, we will make a quantitative assessment of the seeing and transparency at the site (this to extend over 12 months)."

Light pollution was threatening Pulpit Rock in 1969. Ex-LVAAS Director Ernie Robson was working with authorities in Hamburg to develop a lighting policy to protect the area. Twenty-five LVAAS members visited the Flower and Cook Observatory of the University of Pennsylvania in March 1969, where light pollution had already taken a toll. LVAAS members did undertake some seeing tests at Pulpit Rock, under the leadership of Director Paul Shenkle. The results were given to Dr. Arne Wyller, professor at the Bartol Research Foundation and the Thomas Jefferson University in Swarthmore, who was compiling information about probable sites for a major observatory that is proposed in Eastern Pennsylvania for the consortium of colleges. As to whether the University of Pennsylvania ever undertook the seeing assessment, the archives are unclear.

"3. We expect to complete the observatory and mounting for our 20-inch Schmidt-Cassegrain, as well as the larger more secure generator building. Understandably, our main administration headquarters must wait until we have money."

Work on the Schlegel-McHugh Observatory continued throughout 1969. The dome raising was in July, and by the end of the year, the building was nearing completion. With the arrival of electric service at Pulpit Rock, the generator was sold off. The Pulpit Rock administration headquarters was never realized, although an area was excavated to accommodate the basement of the proposed building.

“4. Our society is to be host to the 1969 Middle-Eastern Convention of the Astronomical League. The planning committee has already done some of the preliminary arranging.”

The meeting was held at the Hotel Bethlehem from June 13-15, 1969. The featured banquet speaker was Dr. Martin A. Pomerantz, who spoke on “Probing Space with Cosmic Rays.” There was a paper session, and 35 attendees visited Pulpit Rock on a rainy, foggy day.

“5. We shall plan a second annual public field meet, to be held at Pulpit Rock in September (plus as many all-night sessions the weather will allow.)”

It seems that the public field meet at Pulpit Rock wasn’t held in 1969, no doubt to the tremendous effort that went into hosting the Middle-Eastern Convention of the Astronomical League, and the dedication of the Arthur Fox Memorial Observatory. The public fields meets would resume, and eventually become Mega Meet.

“6. This administration shall maintain the educational function of the society, through public planetarium shows, as well as interesting and varied programs at our general meetings and our advanced study group sessions.”

During 1969, LVAAS held a Popular Astronomy course that was designed for the neophyte, and a monthly Astronomy Study Group, that discussed astronomy in more depth. Public Planetarium shows throughout the year drew near-capacity crowds. In addition, several LVAAS members conducted a popular astronomy course at a school in Pottstown. The class included visits to the planetarium and to Pulpit Rock. This type of educational outreach continues to this day.

Sources:

The Observer, various issues throughout 1969.

LVAAS Board of Governors and General Meeting Minutes, 1969.

by Gary A. Becker



Cold, Cold, Cold Lunar Eclipse

That hot shower felt really good after four hours outside in 11-degree temperatures and wind gusts that occasionally flexed my very sturdy mount and telescope! And yes, my house was right next to where I was observing; and yes, I did go inside occasionally, maybe a little more than occasionally near the end of the eclipse to place my gloved hands on a warm radiator to bring some life back into my shivering body. Was it worth it? Yes, is the obvious answer because to experience the “real thing” is a gift not to be wasted. I was surprised, however, that no one in my neighborhood popped their head outside to take a look. On the other hand, I was pleasantly surprised that about a dozen students in my astronomy classes made observations, and a few of them did so for extended periods of time. The semester had not even started yet, so these were free will gestures.

So let's talk about the eclipse. The air was extremely transparent on January 20, and the eclipse took place high in the south. The brilliant super moon made it difficult to see the penumbra until about 10 minutes before the primary shadow of the Earth, the umbra, made first contact. Even with clouds scudding over the moon, I just could not confirm a definitive sighting. A call from former Moravian student, Alex Pena, queried if I had the right times. I certainly did, but I have to agree with Alex that the penumbra was not as easy to see as expected. When the bright moon began to move into the primary shadow of the Earth at 11:41 p.m., the penumbra became much more discernible, especially over the darker seas of the moon. The secondary shadow against the maria looked like tongues of dusk extending over the lunar landscape. I also found the shadow boundary more distinct than expected and was actually able to witness several small craters go into shadow as the moon advanced deeper into the umbra. About halfway to totality, the shadowed portion of the moon appeared brownish red. I mentally clapped because I thought this was going to be a bright eclipse, but as totality approached, I felt my prediction was far too optimistic. The moon appeared darker than expected, and although there was plenty of color recorded in my photographs, visually Luna appeared a grayish red brown to almost black. However, the full disk of the moon was visible throughout the entire eclipse. There was a brighter white rim at the location closest to the penumbra, but I felt that it remained brighter than expected as the moon pressed deeper into the umbra.

My good friend, Adam Jones in Denver, also voiced the same observation a few days later in a phone conversation. Visually, there were no oranges or bright reds, but photographically, vibrant colors came to fore including a bluish region nearest to the shadow boundary. Exposures, however, were much longer than in past eclipses confirming that this was a more subdued event. During mid-eclipse through my telescope, the moon simply appeared gray. Colors were too muted for my observing eye to perceive. As the moon advanced from totality, the shadow boundary was not as distinct, and coloration over the still eclipsed portion of the moon was basically nonexistent. Of course, by that time I felt more like an icicle with brain function probably reduced by 50 percent. Oh, did that warm shower feel wonderful! More about shadows next week. Pictures are online at astronomy.org. When the page loads, click on “this week’s StarWatch” and enjoy the eclipse.



Here are three of my totality images of the January 20-21 total lunar eclipse recorded with a Canon 80D camera and a Canon 70-200 telephoto zoom lens with a Canon 2x extender. All are high quality pieces of optics. The effective focal length was 640 mm at F/5.6.

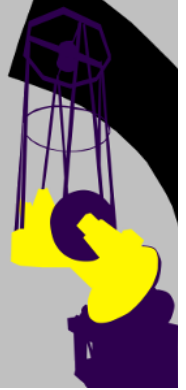
Gary A. Becker images

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Moravian College Astronomy - astronomy.org

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Schlegel Observatory Report

by Rich Hogg – February 2019



I made three visits to Pulpit Rock to work on the 40" since the last column. If you trust that we know what we are doing, we made good progress at a time of year when we might not be able to work at all. But if you just stopped in to take a look, you would be shocked to see the telescope all taken apart, and a lot of the parts removed from the site. It seems like a backward step, but do trust us, because we do know what we are doing.

The first session was on December 27th, with Frank Lyter, Ron Kunkel, and Andy Heilman. This is where we did most of the damage: first, we pointed the telescope more-or-less at the horizon, and secured the primary cell in that position with a chain, because it was about to become severely unbalanced. Then we removed the secondary cell, the spider, the octagonal front frame, and the rest of the truss members.



Ron and Andy cooperating on the disassembly.

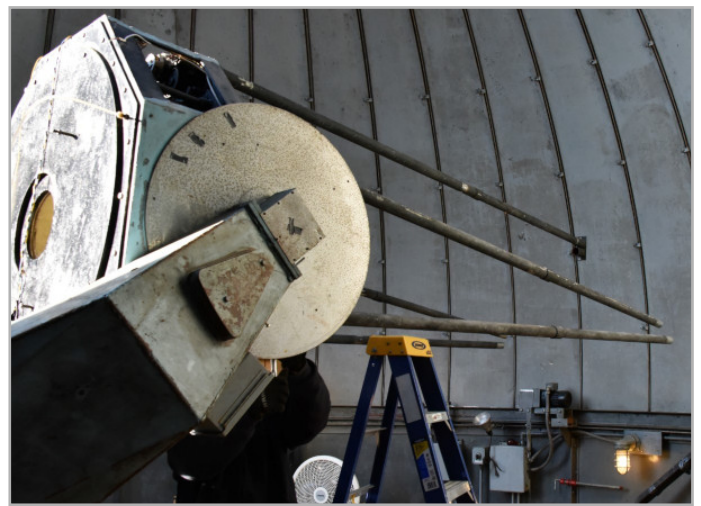


It came apart much easier than we expected. The truss members had been press-fitted into the hardware at the front end, and over the years they had worked loose, and we were able to pull most of them out fairly easy. Then, it was just a matter of unbolting the truss members from the primary cell, which wasn't difficult either.

Frank took the truss members with him, and since then he has further disassembled them, and after cleaning up the unions between the two different tubing sections, brazed them together so they are straight, stiff, and sturdy. Next we plan to alter the fittings slightly to improve the rigidity of the design, and re-assemble it with brazed or welded joints.



Here Andy and Ron appear to be struggling at cross-purposes, but they are actually still working together, cooperating on the disassembly.



Disassembly in progress.



Front view of the instrument with the truss removed, featuring the mirror cover.



(l-r) Andy Heilman, Ron Kunkel, Rich Hogg, Frank Lyter

Protection for the Main Mirror - At the end of this session, Frank noted that it was now much easier to access the mechanized mirror cover, in which eight aluminum "petals" open and close at the touch of a button. It looks like something designed by NASA, except for the oxidation from too many years in the damp climate of the Schlegel Observatory.

This was on our minds as we thought about the next step. Each petal or "leaf" touches its neighbor, and probably rubs a tiny bit, as the cover closes; as presently designed, they rub slightly when fully open, also. In addition, they are not quite the correct shape. I did some engineering work on the final shape of the main baffle, which needs to step down from a diameter of 8.5" to a little over 6", and we would like the leaves to come to rest on the step when the cover is closed. They appear to be long enough to do so, but barely, with little engineering margin.

This got me thinking that we should consider replacing the leaf material with something that is smoother and cleaner, so that it won't generate abrasive dust that would fall onto the primary's delicate surface. I looked into various materials and settled on black ABS plastic, intended for vacuum forming; sort of like the stuff that they make outdoor trash cans out of, only a bit thicker.

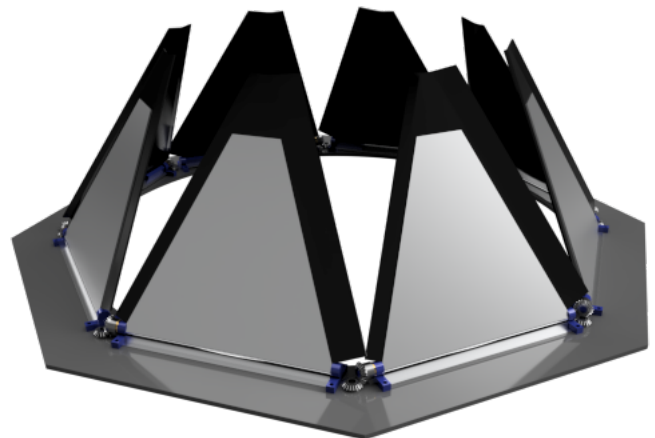
Frank and I agreed to meet again at the site to consider the idea further, and this took place on January 6th. We ended up removing the leaves, with the idea that we would at least clean them and paint them. We discovered that the aluminum leaf material was an integral part of the assembly, making replacing it more work than we anticipated.

Subsequently, we both independently had the same basic idea: we could keep the aluminum, but cut it back so that it could be used as a bracket to hold the plastic. This would be easy to do, and the plastic would be the only thing touching adjacent leaves, and the only thing facing the mirror.

I worked up a 3D CAD design for the system in Autodesk's excellent Fusion 360 software, a process that required one more visit on January 16th, with Ron Kunkel, to make some measurements. If we bend the edges of the panels slightly (which can be done with this material, using a line heater), we should be able to get them to overlap nicely. And if we offset them so that the "top" edge extends farther than the "bottom" edge, they should only touch when the system is in the closed position. It really seems like a worthwhile improvement.

We haven't pulled the trigger on this plan yet. So far, no plastic has been ordered and no aluminum has been cut. But right now, it's Plan A for the mirror cover system.

Until next time...

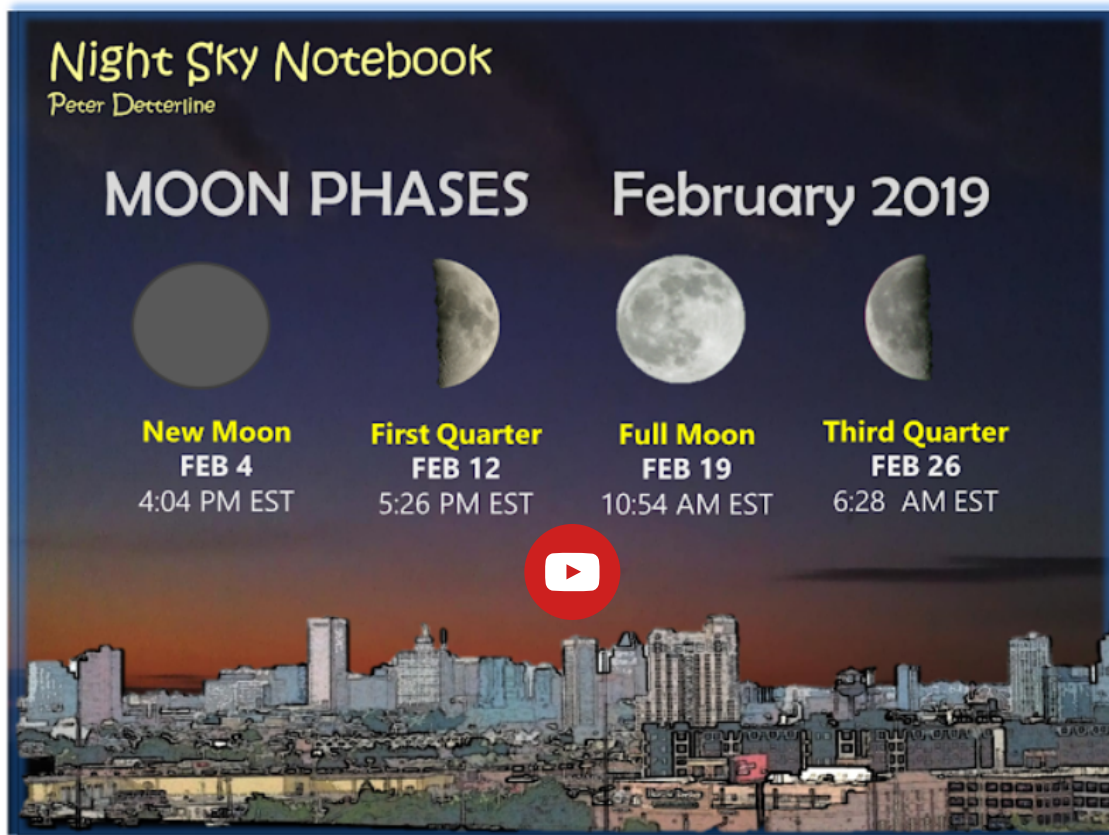


Night Sky Notebook

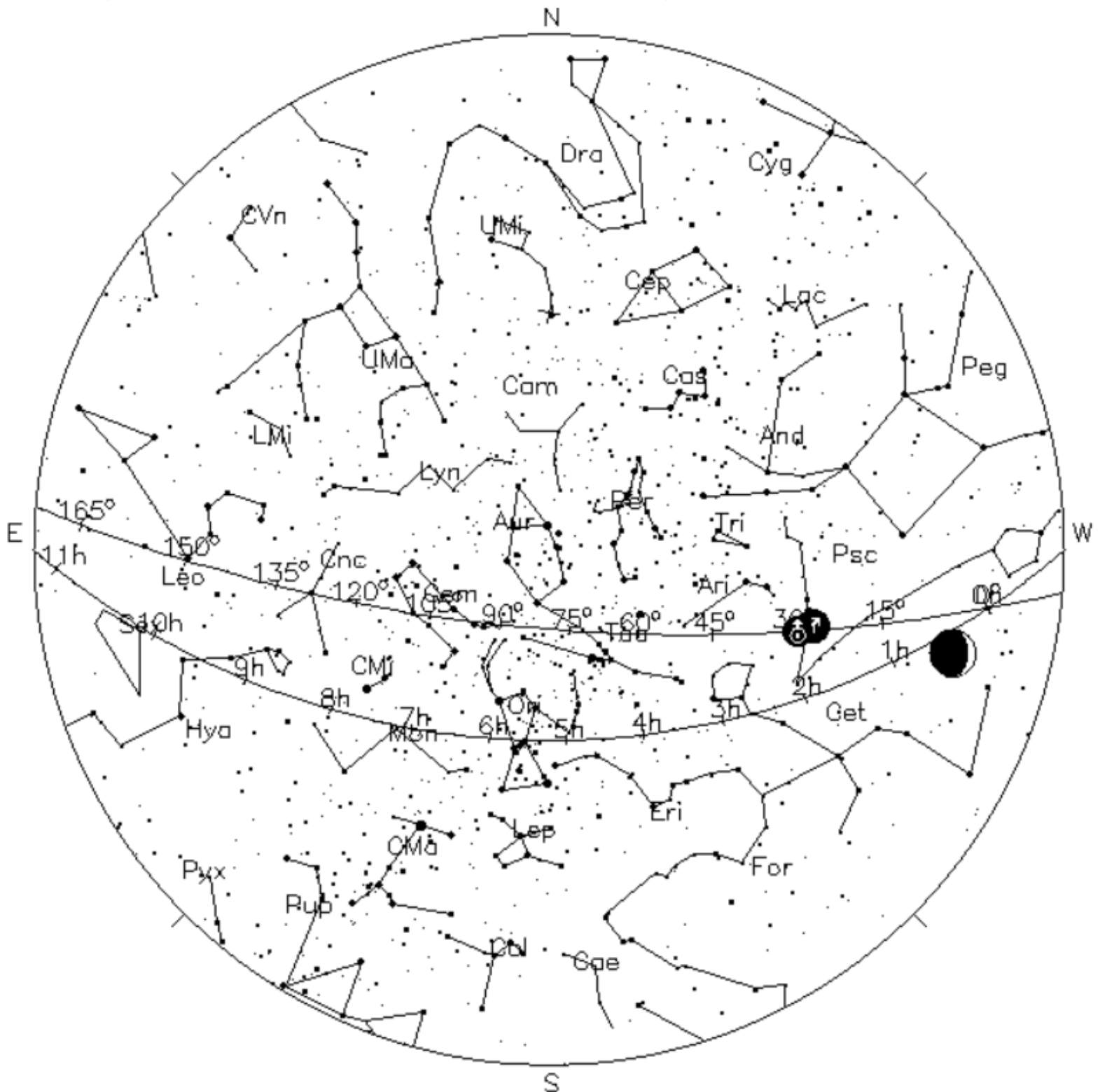
by

Pete Detterline

FEBRUARY MOON PHASES



Sky above 40°33'58"N 75°26'5"W Saturday 2019 Feb 9 1:00:00 UTC



The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

ppmtogif.c - read a portable pixmap and produce a GIF file

Based on GIFENCOD by David Rowley

Lempel-Zim compression based on "compress"

Modified by Marcel Wijkstra

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Customize Your Sky ->

at : <http://www.fourmilab.ch/yoursky/>

FEBRUARY 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01	02
03	04 New Moon	05	06	07	08	09
10 General Meeting - 2:00 PM Muhlenberg	11	12 First Quarter Moon	13	14	15	16
17 Deadline for submissions to the Observer	18 President's Day	19 Full Moon	20	21 Astro Imaging - 7:00 PM	22	23
24 LVAAS Board of Governors Meeting	25	26 Last Quarter Moon	27	28		

MARCH 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01	02
03	04	05 Scout Group - South Mountain	06 New Moon	07	08	09
10 General Meeting - 2:00 PM Muhlenberg	11	12	13	14 First Quarter Moon	15	16 Star Party
17	18	19	20 Full Moon	21 Astro Imaging - 7:00 PM	22 Scouts at Pulpit Rock	23 Scouts at Pulpit Rock
24 Scouts at Pulpit Rock Deadline for submissions to the Observer	25	26	27	28 Last Quarter Moon	29	30
31 LVAAS Board of Governors Meeting						

2019 LVAAS Event Calendar

2019 LVAAS Event Calendar												
	<u>Sundays</u>				<u>Thursday</u>	<u>Saturday</u>	<u>Mondays</u>	<u>Multi-Day Weekends</u>	<u>Moon Phase</u>			
	General Meeting time	Date/location	Board meeting	Observer submission deadline	Astro Imaging	Star Parties	Scouts at S. Mountain	Scouts at Pulpit R.	New	First	Full	Last
January	2:00 PM	13 Muhlenberg	27	20	24	no mtg		no camping	5	14	21	27
February	2:00 PM	10 Muhlenberg	24	17	21	no mtg		no camping	4	12	19	26
March	2:00 PM	10 Muhlenberg	31	24	21	16		22-23-24	6	14	20	28
April	7:00 PM	14 S.M.	28	21	18	13		no camping	5	12	19	26
May	7:00 PM	5 S.M.	19	19	16	11		17-18-19	4	11	18	26
June	7:00 PM	9 S.M.	30	23	no mtg	8		14-15-16	3	10	17	25
July	5:00 PM	13 S.M.	28	21	no mtg	6		19-20-21	2 31	9	16	24
August	7:00 PM	10 Pulpit	25	18	no mtg	3		16-17-18	30	7	15	23
September	7:00 PM	8 S.M.	29	22	12	7		13-14-15	28	5	14	21
October	7:00 PM	13 S.M.	27	20	17	5		11-12-13	27	5	13	21
November	7:00 PM	10 S.M.	24	17	14	2		no camping	26	4	12	19
December	2:00 PM	15	29	22	12	no mtg		no camping	26	4	12	18

July, Aug & Dec are Saturday meetings with rain date on Sunday
 Jan, Feb & March meetings are at Muhlenberg College
 August meeting is at Pulpit Rock
 December meeting / Holiday Party is at

NEAF
 Cherry Springs S.P.
 Stellafane
 Black Forest S.P.
 Mega Meet

April 6 – 7
 May 30-June 2
 Aug 1 – 4
 Sept 27 – 29
 May 4 – 5

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When preparing your images for publication in The Observer, please consider the following guidelines:

Put the quality in:

- ▶ Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- ▶ Use a reasonably good quality for the JPEG compression ratio.

But watch the "waistline"!

- ▶ Don't go too much above 200 pixels/inch max.
- ▶ Use the lowest JPEG quality that still looks good!
- ▶ Shoot for <300KB for a 1/2 page image or <600KB for a full page.

Tip: If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as:

<https://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx>. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

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