

# The Observer

*The Official Publication of the Lehigh Valley Amateur Astronomical Society*

<https://lvaas.org/>

<https://www.facebook.com/lvaas.astro>

August 2020

Volume 60 Issue 08





## ad astra \*\*\*\*\*

As I write this, clouds are continuing a close approach to the Lehigh Valley, on the evening when Comet C/2020 F3 (NEOWISE) is just past its closest approach to Earth. It will be worthwhile to step outside later on, and check if there is a hole in the right spot, just down and to the left of the Big Dipper. I have the good fortune of having access to a nice location to view this comet, just a few steps out onto my deck. I can't complain too much.

I had a great view a few nights ago, when the Moon was new and the skies were clear. I'd pretty much given up on seeing this comet with my unaided, aging eyes, and settled for the view through my binoculars. But after I sat in the dark for half an hour or so, there it was, with maybe 2 degrees of tail, clearly visible if I let my eyes dance around the area a bit and build up an impression with some version of averted vision. Worth the time and the aggravation of a handful of mosquito bites.

I hope I get to see it once or twice more, and I hope a lot of LVAAS members got to see it. I only pestered one or two friends to go out and look for it, ones I was sure would appreciate it. I learned my lesson about that a long time ago.

### A Comedy of Comets

Hale-Bopp was the best comet I've seen, and probably the best I ever will, but my most poignant memories of it are bittersweet. It hung around for such a long time that we started to take it for granted, and to be honest I was not as deep into astronomy then as I am now. I was spending time with a bunch who shared a different, nerdy passion, and the group included an unattached lady that I was interested in. There had been a lot of publicity about Hale-Bopp, but many people still had not seen it. I had; I knew where to find it and what to expect. So when the aforementioned lady brought up the subject and asked if anyone knew where to look for it, I jumped at the opportunity to make an impression. Sure, I said, we can go take a look at it right now, if we just go outside and around the side of the building.

Which about half a dozen of us did. I led the group to a good spot in the shadows and gestured to the sky, and the target of of my attention beheld the great comet, and exclaimed in disappointment: "That's IT??!!!"

I can only guess what she imagined: that it would be glittering in multiple colors like a Swarovski crystal in the afternoon sun, and throwing off sparks, perhaps. Whatever. These days, I rarely bother to try to lead anyone to a comet if they haven't found it on their own, and if I do I'm sure to prepare their expectations.

### Ringside Research

Of course, we all forgot about Comet Hale-Bopp for a bit, while it was still in the sky, to check in with Comet Hyakutake. While the former was a long-running standby that you could catch up with at your leisure, the interloper provided a brief distraction that really boiled down to one night: March 25 of 1996, when it came screaming past Earth like an express train, blowing the litter right off of the platform with its wake.

I was invited to share the view of the comet's core through the eyepiece of a 6-inch Newtonian belonging to Jo-Ann Kamichitis. Jo-Ann was my High School teacher and one of my first mentors in astronomy. She has been instrumental in leading the Lackawanna Astronomical Society for around 4 decades, and has been Director of the Cupillari Observatory, where we conducted this observation, since 2015.

Besides her dedication to education and bringing astronomy to anyone who will accept it, one of my favorite



things about Jo-Ann is her dry sarcasm, which was not absent that night. As I observed the nucleus in her eyepiece, I exclaimed something like, "Wow! You can see it moving relative to the background stars, almost like watching a second hand sweeping across the face of a clock! That's really cool."

Her response was, "That's right, Richard. We're doing science for the thrills."

### **And there will be more...**

There have been other comets. The first one I remember pursuing was Kohoutek, and I believe I obtained a faint image of it on a 35mm negative, using an old viewfinder camera, but I have no idea what became of it.

My memory tells me that I got to see Halley's Comet in 1986, but I don't actually remember what it was like.

When Comet Shoemaker-Levy 9 crashed into Jupiter, I spent an evening on my Dad's deck, to see if we could observe any visual evidence of the collision in his Meade 8" SCT.

I remember taking a ride out in the country, across the mountain from my Mom's house in Scranton, to get a look at 46P/Wirtanen in 2018. It wasn't a great view but it was a fun little adventure, braving the cold and the dark in an unfamiliar countryside, all by myself.

One thing I have to say about comets is that I am sorry we fell into this habit of naming the ones discovered by robots after the robot that discovered them. NEOWISE will keep finding comets after this one, so there will be a confusing list of NEOWISE comets down the road, and we will have been better off coming up with a system to assign some arbitrary names to them, like we do hurricanes. Anything would have been fine. Disney characters, or cats mentioned in great books, or even lakes in Minnesota. Just not Teletubbies or Pokemons. You have to draw the line somewhere.

Ad Astra!

— Rich Hogg

## Minutes from the LVAAS General Meeting – July 11, 2020

The July 2020 LVAAS General Meeting was conducted electronically using an on-line service in an effort to adhere to the social distancing guidelines outlined by the Governor of Pennsylvania with regard to the COVID-19 pandemic. Approximately 35 people were in attendance. Director Rich Hogg opened the meeting at 5:05 p.m.

The evening's presentation was by Tom Field. Tom is a Contributing Editor at Sky & Telescope Magazine. He is the author of the RSpec software which received the S&T "Hot Product" award in 2011. Tom is a popular speaker who has spoken to hundreds of clubs via the web. Tom's presentation was about Spectroscopy and was titled "You Can Almost Touch the Stars."

The most common method to study the stars is called spectroscopy, which is the science of analyzing the colorful rainbow spectrum produced by a prism-like device. Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture or a big budget. With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself.

The presentation, with lots of interesting examples, explained what spectroscopy is all about and provided an understanding of how spectroscopy is used. After the presentation concluded, the meeting moved to LVAAS business.

**Membership:** Gwyn Fowler

### 2nd Readings:

Mike Boyle

Bill Malkames

### 1st Readings:

Tim DeMott

Ben DeMott

**Treasurers Report:** Scott Fowler

2020

General Fund Balance	\$50,152.13 as of June 14th
Income	\$910.24
Expenses	\$(1,081.72)
General Fund Balance	\$49,980.65 as of July 11th

## **General Comments:**

**Facilities:** Rich Hogg

Members are permitted to use LVAAS facilities individually and in small groups subject to recent published guidelines. Members must adhere to the recently published guidelines and strictly follow the recently published cleaning instructions.

**Book Club:** Blaine Easterwood

The book club is currently reading *The Big Picture* by Sean Carroll. Blaine is working on scheduling a discussion meeting as soon as possible.

**UACNJ Representative:** Earl Pursell

UACNJ was to have their first opening, but it was canceled due to the weather. UACNJ has moved back to virtual activities.

## **Next General Meeting:**

Some members have expressed an interest in having the August 2020 General Meeting in person at Pulpit Rock. Other members still prefer that the meetings continue to be conducted electronically. The August 2020 General Meeting will most likely be a hybrid of in person and virtual.

The link to the July general meeting is <https://www.youtube.com/watch?v=6jS9t3lp-uw>

The meeting was adjourned at approximately 6:45 p.m.

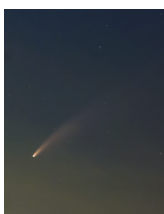
Submitted by Dennis Decker, Secretary

*\*editor* Please read **Eric Loch**'s interview which appeared in the Morning Call at this link:

[https://enewspaper.mcall.com/infinity/article\\_share.aspx?guid=26732430-4151-414b-af24-2abb96c27cfc](https://enewspaper.mcall.com/infinity/article_share.aspx?guid=26732430-4151-414b-af24-2abb96c27cfc)

## **UACNJ Reminder**

LVAAS is a member organization of the **United Astronomy Clubs of New Jersey**, ([uacnj.org](http://uacnj.org)) which means that LVAAS members may acquire observing privileges at the UACNJ observatories at **Jenny Jump State Park**, near Hope, NJ. There is a fee of \$50.00 per year, plus a commitment to assist at UACNJ Public Nights. Normally, this commitment is for five Public Nights during the year, but it has been reduced to four this year, due to the shortened observing season. The 2020 Observer Form can be found on their website: <http://www.uacnj.org/observers/2020ObserverForm.pdf>. LVAAS liaison is Earl Pursell. Also check out the **Meteor Shower Calendar** courtesy of Ken Taylor of UACNJ and thrillist: <https://www.thrillist.com/news/nation/meteor-shower-calendar>



**Cover image:** Comet C/2020 F3 (NEOWISE) imaged from Douglassville, PA (Fancy Hill Observatory) by **Peter Detterline** with a Williams Optic Red Cat 51mm Refractor and a Canon 60Da DSLR camera. One exposure and a 60 second image.

**NOTICE -- A Business Meeting will be convened for Election of the 2021 LVAAS Officers at the October General Meeting**

The LVAAS October General Meeting will be held on its regularly scheduled date, 7:00 p.m, October 11, 2020 at South Mountain, during which a Business Meeting will convene for the purpose of election of our 2021 LVAAS Officers.

LVAAS Full Members in good standing (current dues paid) are entitled to vote and/or be considered for office. **Any society member in good standing may nominate qualified individuals until nominations are closed during the September General Meeting scheduled on September 13, 2020.**

Nominees need to agree to accept a nomination at the time of the nomination in person or in writing and signed by the nominee should the nominee not be able to be present when nominated. **Except as provided for, no nomination shall be accepted by the Nominations Committee, nor shall additional nominations be placed on the ballot after the close of nominations during the September 13, 2020 General Meeting.**

In the event no qualified candidate is listed for one or more of the officer positions on the Election Ballot for any reason at the time of the election during the October 11, 2020 General Meeting, the election shall take place for the remaining offices. After the election results are verified, the Nominations Committee shall open the floor for the nomination of any qualified candidates to all vacant officer positions. Any candidates not elected to office in the just completed election may be nominated for any position except a position that the candidate held for the immediate past two consecutive terms of office.

The newly elected officers' terms begin at midnight November 30, 2020, and continue until midnight on November 30, 2021.

**Please consider taking a leadership role and contribute to LVAAS** – your help is needed to keep this society vital and serve the needs of our membership.

Offices open for election are **director, assistant director, treasurer and secretary**. The election will take place at our October membership meeting and the newly elected board of governors will be installed in December.

Please contact: Bill Dahlenburg -Nominating Committee Chairman: [sm\\_maintenance@lvaas.org](mailto:sm_maintenance@lvaas.org)



# **LVAAS General Meeting**

## **Saturday, August 8 at 8 p.m.**

***Rain date Sunday August 9***

**- Meeting will be held at Pulpit Rock and on-line -**

**Featuring**

**Earl Pursell**

**“Explorer's Guide to the Solar System”**



This presentation's focus is on NASA's exploration of the Solar System using telescopes, robots, and humans. Exploring other worlds in our Solar System stretches our minds and excites our imaginations like nothing else. It's the only way to answer some of our deepest questions. It was originally published on NASA's Night Sky Network, of which LVAAS is a member.

Earl Pursell is a retired R&D microbiologist who worked in the biotech/pharmaceutical industry for thirty years. He has always been interested in visual astronomy and photography and has recently begun exploring astrophotography. As a member of LVAAS, he participates in the club's weekly maintenance at South Mountain and is qualified to run the telescopes there, as well as the planetarium. Earl is also the LVAAS Club Rep to UACNJ, a member of the UACNJ Board of Trustees, and a volunteer Observer.

This meeting will be held outdoors at our Pulpit Rock dark sky site, as well as on-line using Zoom. If the weather is unfavorable on Saturday the meeting will be rescheduled for Sunday. The Pulpit Rock gate will be manned from 6:00 p.m. until 7:00. p.m. New members who do not yet have a key should plan to arrive during that interval.

Members will receive an invitation to the on-line meeting by email. Prospective new members who wish to attend on-line should contact our Membership Director ([membership@lvaas.org](mailto:membership@lvaas.org)) to arrange to receive an invitation.



Comet C/2020 F3 (NEOWISE)

***Peter Detterline***



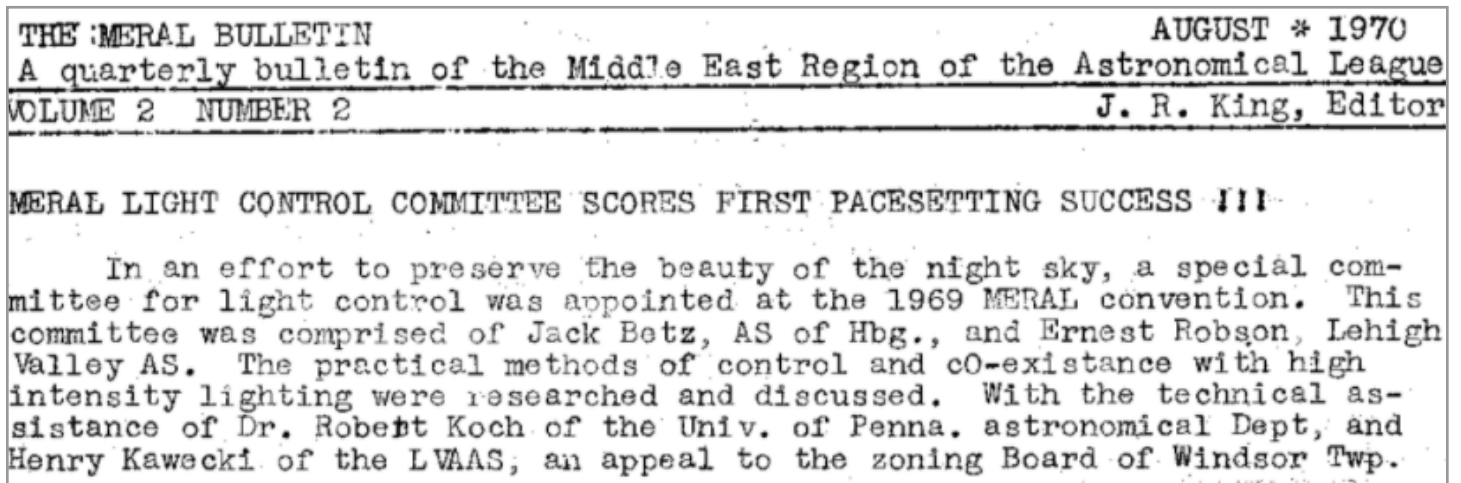


*From the LVAAS Archives:*

## **LVAAS Leads the Fight Against Light Pollution**

**by Sandy Mesics**

Over 50 years ago, LVAAS was in the forefront of combatting light pollution as one of the first astronomy clubs in the United States to address this new problem. Once we had secured the Pulpit Rock site in 1967, we were concerned about encroaching lights from Route 78, long before development around Route 78 & 61 was even a dream. An insert from the MERAL (Mid-East Region of the Astronomical League) bulletin was included in the August 1970 Observer. At that time, LVAAS was a member of the Astronomical League, and very active in participation in the Mid-East Region. It caught my eye because as early as 1969, LVAAS was involved in preserving dark skies.



These efforts to preserve the night sky far preceded the establishment of the International Dark Sky Association, which was not established until 1988. LVAAS was already familiar with encroaching light pollution: in 1958, when the South Mountain facility was built, the night skies were pristine, the only light encroachment coming from the red lights on the WFMZ radio tower. But no sooner had the South Mountain site become established, the AT&T microwave tower facility was built, severely impacting the night skies for “serious” observing. This was, in part, LVAAS’s impetus to seek out a dark sky site, which resulted in the acquisition of Pulpit Rock in 1967.

Ironically, no sooner had LVAAS begun developing Pulpit Rock than encroaching light pollution started jeopardizing that site as well. Thus, LVAAS spearheaded the initial efforts to control light pollution in cooperation with the Astronomical League.

## DARK POLLUTION

During the past several years several articles have appeared concerning DARK POLLUTION caused by the installation of mercury vapor lights. A paper titled "Mercury Vapor Blight" was presented at the 1968 National Convention at Chicago. This problem was presented by the Middle East Region to the 1969 Astronomical League Council in Denver. No action was taken. The Middle East Region had appointed a committee for the problem composed of Mr. Jack Betz of the Harrisburg Astronomical Society and Mr. Ernest Robson of the Lehigh Valley Astronomical Society, which has done considerable work. With some help from Dr. Robert Kock, head of Astronomy for the University of Pennsylvania, an appeal was made to the Zoning Board of Windsor Township of Penn. This Township borders on the new observatory site of the Lehigh Valley A.S. Following is the ordinance passed by the Zoning Board.

**OUTDOOR ILLUMINATION:** Lamps used to illuminate ground areas shall be shielded so that light shines downward. Structures or buildings shall not be illuminated by directing the light upward from the ground, but may be illuminated by mounting lamps along the top edge of the wall with such lamps hooded so as to shine downward.

I believe this to be a step in the right direction. Maybe we can do more with concerted effort. Let us try.

G. R. Wright  
Middle East Region

For the ensuing two decades, however, neither the Observer nor the minutes of the Board of Governors reflect a serious concerted effort to control light pollution. However, nationally, these efforts were still underway, and things started to pick up in 1988, the year the IDA was established.

The next mention of LVAAS's efforts to battle light pollution are found in the June 1988 Board of Governor's minutes. LVAAS attorney Steve Lanshe sent a letter to Adams Outdoor Advertising when we discovered their plans to erect 4 billboards in Windsor Township along Route 78. Another LVAAS attorney, Tom Noonan, reached out to Greenwich and Windsor Townships to make them aware of this situation as well. That summer, LVAAS members visited the Windsor Township Supervisors meeting and felt that the Township was supportive of LVAAS's efforts. In 1988 there were also efforts to reduce encroaching light from the

AT&T tower at South Mountain.

In 1988, the Light Pollution Abatement committee became a formal LVAAS committee when the bylaws were revised that year. The purpose of the committee was to "slow the increase of light pollution at our observing sites, and when possible, to reduce the existing pollution." Rick Hunter became the first chairperson of the committee.

In 1989 LVAAS debated joining the newly formed International Dark Sky Association (IDA). With the assistance of Tom Noonan and Light Pollution Chair Rick Hunter, LVAAS drafted a sample light pollution ordinance that was sent to Windsor, Greenwich, and Tilden Townships. The townships were reportedly receptive to this ordinance. Rick requested that LVAAS members consider attending the township meetings to provide support.



On July 10, 1989, Windsor Township enacted the LVAAS-drafted outdoor lighting ordinance. This limited exterior outdoor lighting to low pressure sodium lighting, properly shielded and filtered as needed. Some lighting, such as searchlights park lighting or the up lighting of billboards was restricted after 10 p.m. However, Windsor Township officials expected LVAAS members to do the policing.

LVAAS subsequently sent this draft ordinance to major astronomy magazines for dissemination to other clubs. Coincidentally, Flagstaff, Arizona also passed a well-known lighting ordinance in March 1989.

By spring 1990, members reported that billboards along Route 78 were not conforming to the new ordinance. Tom Noonan complained to Adams Advertising, and the issue was resolved. But by 1991, the Light Pollution Abatement Committee did not have much to report. In the ensuing years, the the committee has continued, and mainly functions when there is an active threat to our South Mountain site, or when advertisers come out of compliance with the lighting ordinances of the townships near Pulpit Rock.

We should take some pride in the fact that LVAAS led the initial efforts in combating light pollution in the United States and continues to be vigilant to this day.

## **Reference**

Astronomical League, *The Reflector*, Vol. 69, No.4, September 2017 page 4.



Comet C/2020 F3 (NEOWISE)

*Robert Mohr*



Comet C/2020 F3 (NEOWISE)

*Frank Lyter*

# Schlegel Observatory Report

by Rich Hogg – August 2020



We're back to work on the rim support system for the primary mirror, and I think we are looking good. To refresh, after years of debate and tossing numerous ideas around, guessing what would work to provide adequate support for the mirror in the radial direction (i.e., supporting its edge when the telescope is pointed lower in the sky), I decided earlier this year to figure out a way to do a computer simulation of the problem. The details of this were reported in previous columns, and they seemed to indicate that a simple system of "hard pads" would be good enough.

Now I've taken it a step further, but we're still not at a final design. I've done more simulation based on a realistic concept of what the system would look like.

**A Simple Radial Support System** - Basically, what we are looking at is a series of support pads around the edge of the mirror, with some compliance. I call them "hard pads" because in previous concepts we considered, they would be used along with a "soft" system to take most of the mirror's weight off of them, providing more even support. The "back" of the mirror is supported by an "axial" support system consisting of three hard pads, with an air bag filling in between them and taking most of the weight off of them. For the radial support, it looks like we need only the hard pads.

Here's what we want them to do:

- Hold the mirror in position  $\pm 0.025$  inch as the telescope is pointed in various directions.
- Accommodate the difference in thermal expansion between the mirror and the steel structure of the telescope, which could be approximately 0.01 inch over the 20-inch radius of the mirror.
- Maintain contact with the mirror at all times, so that we don't leave a gap that debris can get stuck in.

The thermal expansion requirement is why we need some compliance in the pads, and the positioning tolerance limits how much compliance we can allow. The requirement of maintaining contact means that the compliant elements – springs, or whatever – will need to be "preloaded" so that that, as gravity pulls the mirror away from the pads on one side, the compliant element expands to maintain contact.



This means that the mirror will be "squeezed" or "pinched" a bit at all times, more so at cold temperatures when the steel shrinks. I worked out the effect of this under the following assumptions:

- There are eight pads around the rim, aligned with the geometry of the steel structure.
- Each pad is preloaded by 0.03 inch.
- The mirror is displaced to one side by 0.025 inch by gravitational loading.
- The temperature is at the coldest operating condition, so each pad is further loaded by 0.012 inch.

Given these assumptions, the compliant elements need to have a spring constant of about 4,000 lbs. per inch per pad, in order to generate the right force to support the mirror's weight, and the pressure on the mirror's rim from the pads ranges from about 94 pounds at the top to 260 pounds at the bottom.

The good news is, according to the simulation these forces on the mirror (including the axial support forces) will only contribute about 37nm to the overall wavefront error. This is more than we would like if this were a research-grade telescope to be installed at a mountaintop observatory in the Atacama Desert, but for Pulpit Rock I think it is low enough to be a non-issue. At least, it is likely enough to be a non-issue that we can't justify the time or expense to design and build something more elaborate at this time. If something like that turns out to be needed, it will have to be a future upgrade.

### ***Sanity Check***

While I had this simulation set up, there was another step that was easy to do: vary the pressure in the axial air bag, and determine its effect on the optical performance. The result is shown in the chart.

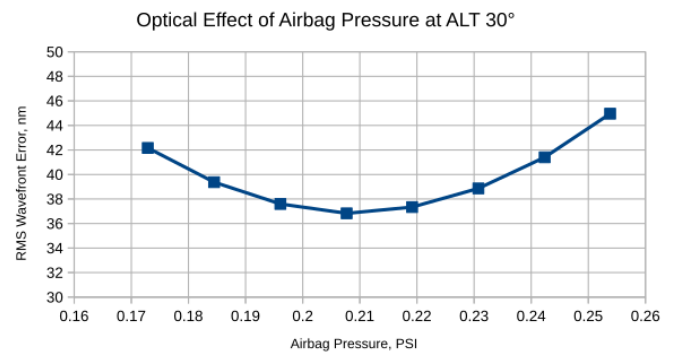
This looks "right" from a number of perspectives.

First, the results vary, but in a smooth and consistent fashion, with no noticeable "noise." Second, there is

an optimum value indicated by the minimum in the curve. Finally, the optimum makes sense: each square inch of the air bag supports almost 5 cubic inches of glass, at a density of about 1.5 ounces per cubic inch. But since the telescope is oriented at an altitude of 30 degrees, only 1/2 this weight (sine of 30°) is supported by the air bag. That works out to about 0.23 psi. The roughly 10% difference may be due to a simulation inaccuracy, or to some effect of the geometry of the air bag and the axial hard pads.

### ***Springy Options***

The next step is to choose something to provide the 4000 pounds/inch compliance for each pad. This will mostly involve revisiting the stuff I looked at when we were considering a central hub support. We want something that is predictable, that is fairly consistent over the temperature range, and that doesn't take a "set" even when it is compressed for long periods at low temperatures.



A solid rubber pad probably won't do. Rubber deforms easily, but it really doesn't compress very well. Something made of rubber would have to have some geometry to give the material some place to go under pressure. I'll come back to that shortly.

I tried to find a foam option, and even ordered a small sample of something that looked like it might work, but it took a really hard set: when compressed, even at room temperature, it didn't spring back for a long time.

A plain metal spring might work, though previously I had trouble finding a small one that was sufficiently stiff. The Belleville spring washers that I was considering for the hub support idea deserve another look.

I discussed this problem with Matt Bailey during the Transit of Mercury event, at Da Vinci Center in November. (It seems like it was 2 or 3 years ago!) Matt suggested O-rings, an idea that I kind of like; it is a geometry in which a wide variety of rubber-like compounds are available, with a lot of options. At the time, we didn't have any luck finding good data on how they would behave.

Well, earlier this week I was falling asleep watching a YouTube video of a machinist in Florida, from four years ago, rebuilding a hydraulically-controlled horizontal mill, and he mentioned a specific brand of O-ring that was recommended to him. I decided to Google it and poke around a little, and it led to a major score: the 2018 Parker O-Ring Handbook! 288 pages of data about all different kinds of O rings, including compression force per linear inch, temperature dependence, and resistance to taking a set. So, I've got some homework to do. I'm going to give Matt's idea another look.

After choosing a compliant element, the next step will be to come up with a candidate design for the overall structure to hold the mirror. This doesn't need to be too fancy; we just need to support the eight pads around the mirror, with protrusions at the top of four of them to keep it from tipping out. They need to allow the mirror to be collimated and need to be somewhat adjustable. Once I have a design I'll work with the members of the team who have more machining and fabrication experience to refine it.

**The Paint Job** - I haven't received any reports on the research into refinishing options. I was thinking of summarizing the submissions on the [Paint the 40](#) web page this month, but I decided to hold off, anticipating that we would have a lot of comet pictures to publish in this issue. Besides, I know of at least one LVAASer who wants to enter a submission, but hasn't gotten around to it yet.

So, the app is still open for business. Don't be afraid of it. It's easy and fun. It will not give you nightmares, or lead to more robo-calls from electric power suppliers, or cause your favorite show to be dropped from Netflix. I will probably close it to new submissions in another month or two, so get in there while you have the chance.



Comet C/2020 F3 (NEOWISE)

*Peter Detterline*



**Exciting, New, Live-Action Game!!!**

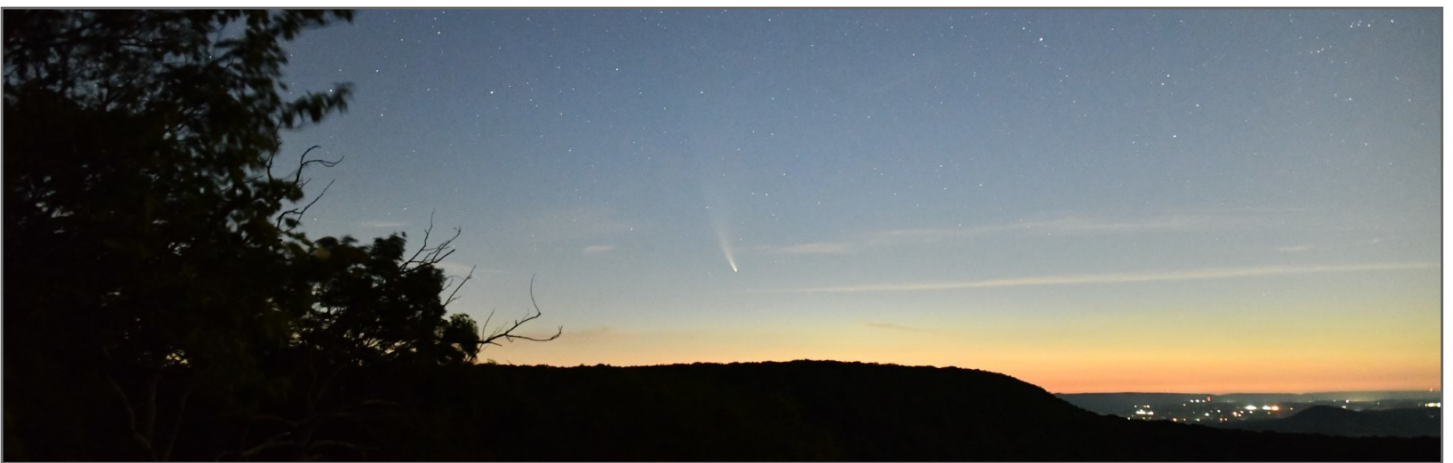
## **RED SHIFT REVENUE**

- **Operate an Astronomy Club Gift Shop!**
- **Optimize product lines!**
- **Purchase inventory!**
- **Manage production!**
- **Complete sales!**
- **Report revenue and expenses to the Board!**
- **Help a great organization do a valuable public service!**

**As our LVAAS Member Services Director, you will enjoy the challenge of operating the Red Shift Gift/Snack Shop at LVAAS Public Star Parties.**

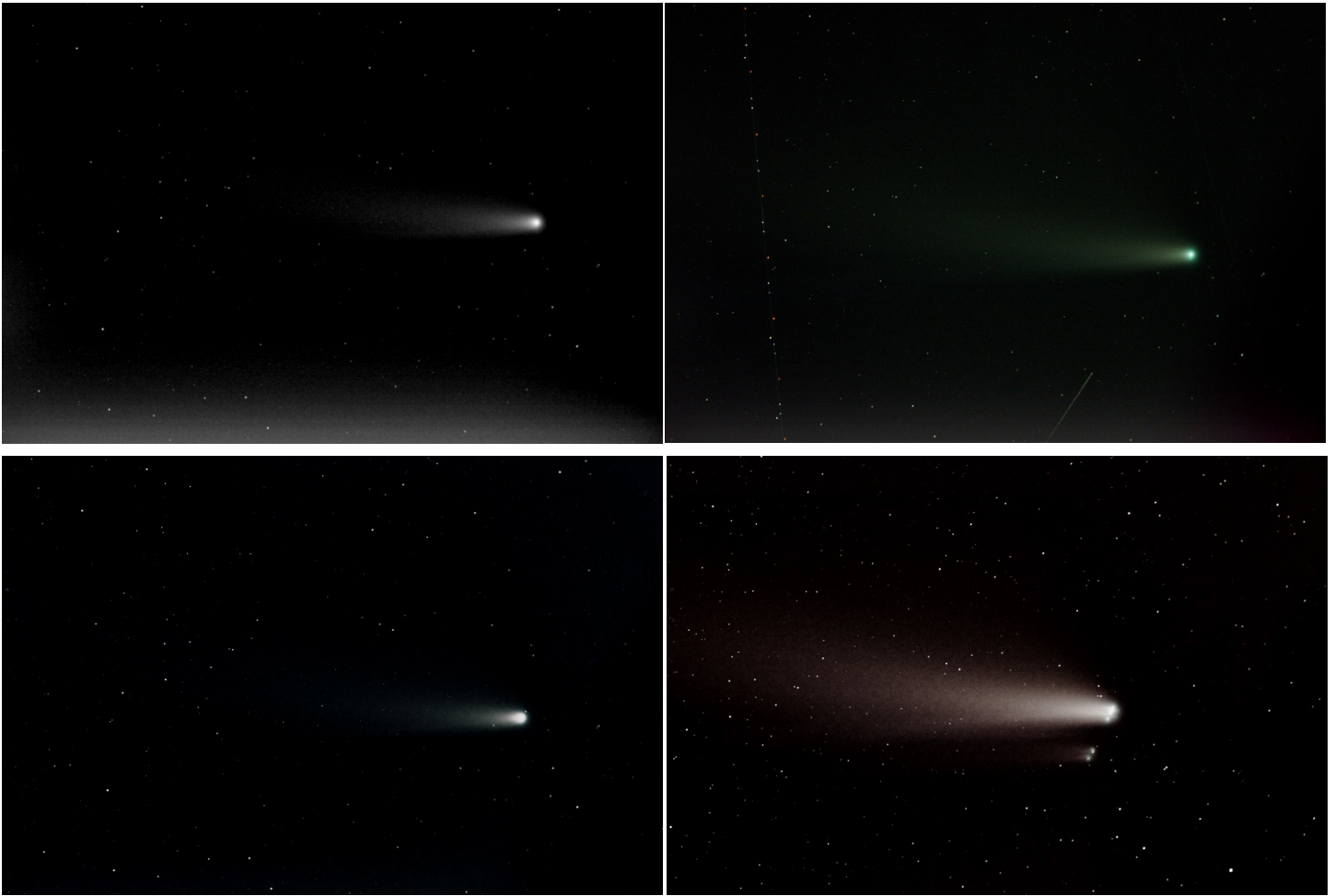
**The only way to lose is to not play!**  
**Contact [director@lvaas.org](mailto:director@lvaas.org) to sign up!**





Comet C/2020 F3 (NEOWISE)

*Frank Lyter*



Comet C/2020 F3 (NEOWISE)

## *Frank Lyter*

(Clock-wise from top left):

1. From iPad 7/20/2020
2. From iPad with airplane and satellite
3. 3-minute exposure
4. Multiple stacked images throughout the evening (color)

Processing assistance by Davi Moll.





Comet C/2020 F3 (NEOWISE)

*Curtis Adams*



Comet C/2020 F3 (NEOWISE)

*Gary A. Becker*



Comet C/2020 F3 (NEOWISE)

*Eric Loch*

by Gary A. Becker

## Perseid Meteors Await



From Tuesday morning, August 11 through Thursday morning, August 13 are the big nights for the 2020 annual Perseid meteor shower. Astronomy enthusiasts call the Perseids the best shooting star event of the year, even though it does not produce the highest meteor counts. The December Geminids rank first here—burr. The temperate observing conditions of the Perseids, combined with a large number of people on summer vacation, have made it extremely popular among casual observers. It was the Perseids that got me into observational astronomy at the age of 14, when my cousin John and I discussed for months how we were going to observe them.

He and his family lived north of Allentown where in the mid-60s the sky was pleasantly dark on a clear evening. Prior to the big night, that sultry summer day was capped off with a strong thunderstorm that rolled through the region during the late afternoon. It seemed for a time as if all was lost, and then it cleared suddenly, rapidly, the clouds of the storm marching away. In their wake the air became drier and the sky turned a vibrant deep turquoise blue, allowing us to view in autumn-like conditions all night long.

To a 14-year-old eager to look up, it was as if a miracle had just occurred. I can still remember one particularly vibrant Perseid that scorched the sky around 3 a.m., leaving in its wake a fading afterglow of its path for about 10 seconds. Man, I was hooked from that moment onward, even to the point where I deferred going to my high school prom because friends and I had planned an observing night long before the date became official. I can't say that it was one of my wisest decisions, but at the time it made perfect sense.

The best advice for Perseid viewing is not to start too early in the evening. That's because the observer is always in the wrong position on the Earth. The analogy is similar to being in a vehicle moving through a downpour. It is the front window that seems to be getting all of the raindrops as you plow through the deluge. The back window only gets a drop here and there because it is shielded by the front of the car. Likewise, in the early evening we are being protected by the Earth because our position is analogous to watching meteors from a car's rear window, reducing meteor activity. As local midnight approaches, the Earth slowly makes its rotational debut into the meteoroids, bringing us to the front window location with a resultant increase in activity. This year it is the morning of Wednesday, August 12 about 2 a.m. which is the focus of peak activity.



That is very good for East Coast observers since by then the Earth will have turned into its front window position. The only negative astronomical detractor during the evening will be the moon, just a day past last quarter. A quarter moon is just under 10 percent the radiance of a full moon. On the morning of the 12th, Luna will be in Taurus the Bull, not that far from Perseus, the region of the sky from which the meteors will seem to be diverging. The idea will be to keep the moon away from your field of view so that your vision remains unaffected by its light.

The highest Perseid rates that I have ever experienced were about one meteor per minute; however, these shooting stars have the tendency to bunch with several events happening within a short interval of time, followed by a period of as long as 10 minutes where no activity occurs. Back in 2016 when I observed the Perseids from Flathead Lake in northwestern Montana, I saw six shower meteors within a 15-second interval. I was actually crashing a wedding with my traveling companion, Pete, who was best man. Pete had fallen asleep. In the commotion that ensued—and it was very exciting, and I'll admit somewhat loud, I woke up the bride, whose room was about 100 feet from where we were observing. She emerged ghostlike with some of her entourage and quickly began admonishing Pete for talking too loudly. It was really a priceless moment. Read about the story here:

<https://www.astronomy.org/StarWatch/September/index-9-16.html#9-11-16>

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Comet C/2020 F3 (NEOWISE)

*Eric Loch*



Comet C/2020 F3 (NEOWISE)

*Kyle Kramm*





# Night Sky Notebook for August

by

Peter Detterline

## Night Sky Notebook

Peter Detterline



### Perseid Meteor Shower

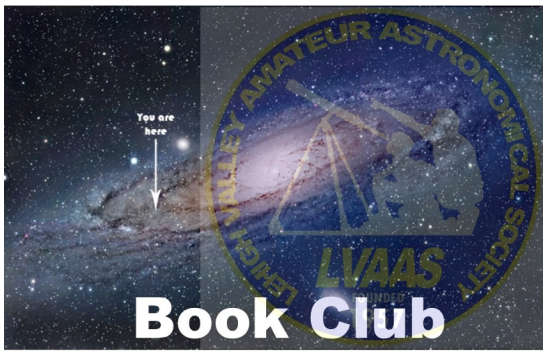
The Perseids typically have 120 meteors an hour!

The Moon will rise after midnight on the 12<sup>th</sup> so moonlight will interfere with the number of meteors that you will see. Keep you back to the Moon!

Arguably The best meteor shower of the year due to its high rate of meteors and warm summer temperatures.

The best time to see the meteors is on **AUGUST 12** around **3-4 AM EDT**.





Looking for something to read?  
Looking to share the experience  
with fellow LVAAS members?  
Join our book club!

## Here's the Plan:

**Step One: Express your interest.** If you are interested, let me know either in person, or via email: [blaine@ieee.org](mailto:blaine@ieee.org). I will add you to our private Facebook group. If you don't have Facebook, let me know, we can setup an email list and communicate that way too.

**Step Two: Choose a book.** We will do this via our private Facebook group and email (if there are any who do not use Facebook.) So far the following are in the running:

1. The Big Picture, by Sean Carroll (\*current choice)
2. Astrophysics for People in a Hurry, by Neil deGrasse Tyson
3. Moonshot: What Landing a Man on the Moon Teaches Us About Collaboration, Creativity, and the Mind-set for Success, by Richard Wiseman
4. The Trouble with Gravity: Solving the Mystery Beneath Our Feet

**Step Three: Set the meeting schedule.** Our plan is to meet in the library, but we can augment that with online conversations.

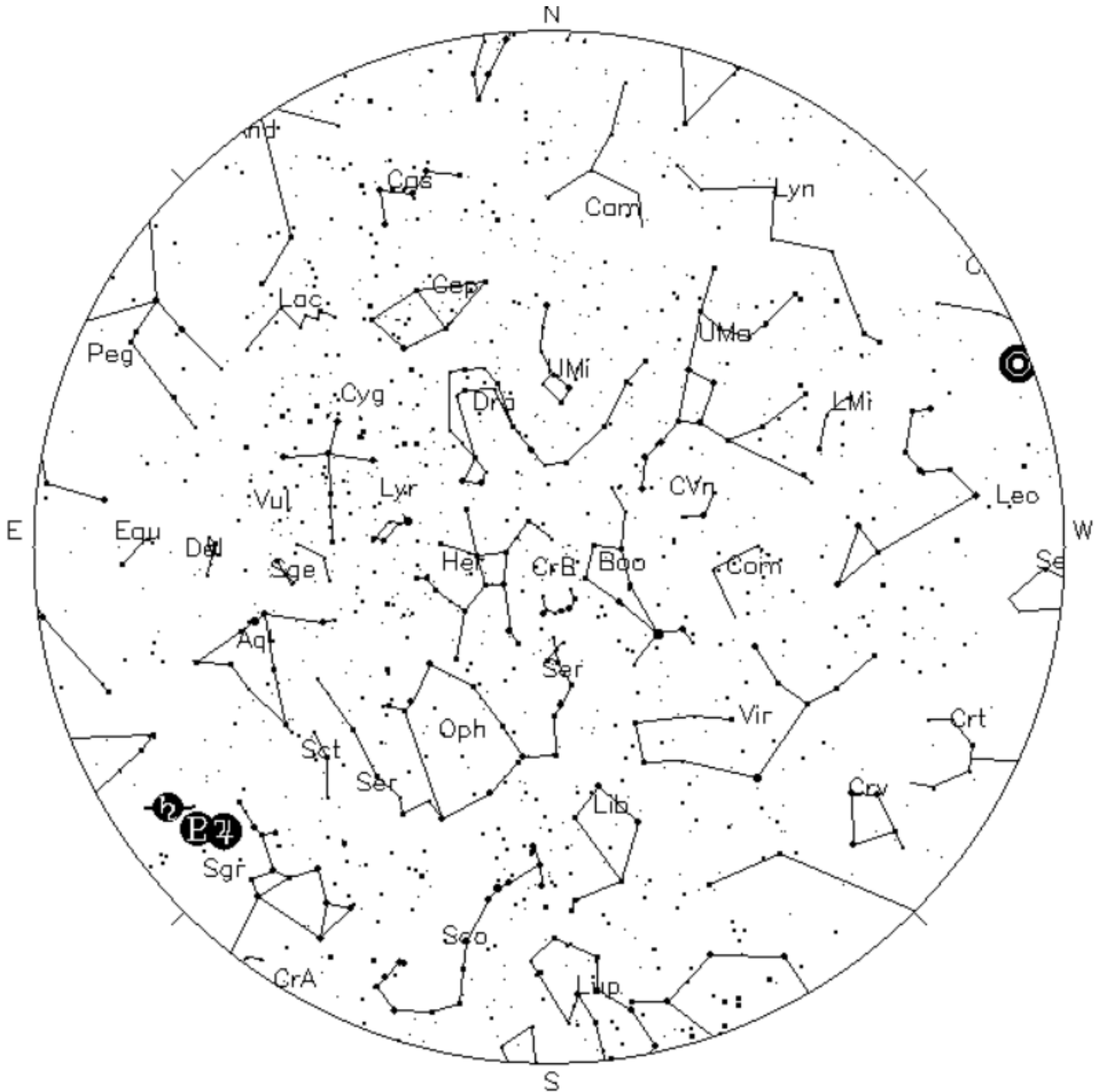
**Step Four: Read, enjoy, discuss, and learn!** We can do this both in-person and through online discussions.

This is the first time we are doing this, so I consider it "experimental." I am completely open to suggestions and changes as we go.

Thank you!

Blaine Easterwood, Education Director

Sky above 40°33'58"N 75°26'5"W Wednesday Aug 05 2020 00:00 UTC



***Your Sky was implemented*** by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows.

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

Copyright © 1989 by Jef Poskanzer.

**Customize Your Sky at <http://www.fourmilab.ch/yoursky/>**

## AUGUST 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						<a href="#">01</a>
<a href="#">02</a>	Full Moon <a href="#">03</a>	<a href="#">04</a>	<a href="#">05</a>	<a href="#">06</a>	<a href="#">07</a>	General Meeting 7:00 PM Pulpit Rock <a href="#">08</a>
<a href="#">09</a>	<a href="#">10</a>	Last Quarter Moon <a href="#">11</a>	<a href="#">12</a>	<a href="#">13</a>	<a href="#">14</a>	Astro Imaging - 7:00 PM <a href="#">15</a>
<a href="#">16</a>	<a href="#">17</a>	New Moon <a href="#">18</a>	<a href="#">19</a>	<a href="#">20</a>	<a href="#">21</a>	Star Party <a href="#">22</a>
Deadline for submissions to the Observer <a href="#">23</a>	<a href="#">24</a>	First Quarter Moon <a href="#">25</a>	<a href="#">26</a>	<a href="#">27</a>	<a href="#">28</a>	<a href="#">29</a>
LVAAS Board of Governors Meeting <a href="#">30</a>	<a href="#">31</a>					

## SEPTEMBER 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		<a href="#">01</a>	Full Moon <a href="#">02</a>	<a href="#">03</a>	<a href="#">04</a>	<a href="#">05</a>
<a href="#">06</a>	<a href="#">07</a>	<a href="#">08</a>	<a href="#">09</a>	Last Quarter Moon <a href="#">10</a>	<a href="#">11</a>	Astro Imaging - 7:00 PM <a href="#">12</a>
General Meeting - South Mountain 7:00 PM <a href="#">13</a>	<a href="#">14</a>	<a href="#">15</a>	<a href="#">16</a>	New Moon <a href="#">17</a>	<a href="#">18</a>	<a href="#">19</a>
Deadline for submissions to the Observer <a href="#">20</a>	<a href="#">21</a>	<a href="#">22</a>	First Quarter Moon <a href="#">23</a>	<a href="#">24</a>	<a href="#">25</a>	Star Party <a href="#">26</a>
LVAAS Board of Governors Meeting <a href="#">27</a>	<a href="#">28</a>	<a href="#">29</a>	<a href="#">30</a>			

# 2020 LVAAS Event Calendar

*\* Due to the COVID pandemic, please see the website for updates on all events*

2020 LVAAS Event Calendar												
	Sundays				Thursday	Saturday	Monday	Multi-Day Weekends	Moon Phase			
	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	12 Muhlenberg	26	19	16	no mtg		no camping	24	2	10	17
February	2:00 PM	9 Muhlenberg	23	16	13	no mtg		no camping	23	1	9	15
March	2:00 PM	8 Muhlenberg	29	22	12	7		6 – 7 – 8	24	2	9	16
April	7:00 PM	5 S.M.	26	19	18	4		10 – 11 -12	22	1 30	7	14
May	7:00 PM	3 S.M.	31	24	16	2		8 – 9 – 10	22	29	7	14
June	7:00 PM	14 S.M.	28	21	13	27		5 – 6 – 7	21	28	5	13
July	5:00 PM	11 S.M.	26	19	18	25		3 – 4 – 5 31	20	27	5	12
August	7:00 PM	8 Pulpit	30	23	15	22		1 – 2	18	25	3	11
September	7:00 PM	13 S.M.	27	20	12	26		4 – 5 – 6	17	23	2	10
October	7:00 PM	11 S.M.	25	18	15	24		2 – 3 – 4 30 – 31	16	23	1 31	9
November	7:00 PM	8 S.M.	29	22	12	21		1	15	21	30	8
December	**	12	27	20	10	no mtg		no camping	14	21	29	7

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 \*\* check website for time

NEAF  
 Cherry Springs S.P.  
 Stellafane  
 Black Forest S.P.  
 MegaMeet

April 4 – 5  
 June 18 – 21  
 Aug 13 – 16  
 Sept 18 – 20 (not confirmed)  
 May 22-24



## Publishing images is a balancing act!

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.

*The Observer* is the official monthly publication of the Lehigh Valley Amateur Astronomical Society, Inc. (LVAAS), 620-B East Rock Road, Allentown, PA, 18103, and as of June 2016 is available for public viewing. Society members who would like to submit articles or images for publication should kindly do so by emailing The Observer editor, Frances Kopy at [editorlvaas@gmail.com](mailto:editorlvaas@gmail.com). Articles submitted prior to the Sunday before the monthly meeting of the board of governors (please see calendar on website) will appear in the upcoming month's issue. PDF format is preferred. Early submissions are greatly appreciated. Articles may be edited for publication. Comments and suggestions are welcome.

LVAAS members please feel free to submit ads for astronomy equipment you have for sale, and additionally you may sponsor a maximum of three ads from non-members per year. Every attempt will be made to include submissions in a timely manner.

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Existing members please update your LVAAS profile information by emailing the membership director at [membership@lvaas.org](mailto:membership@lvaas.org)

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