

# The Observer

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

<https://lvaas.org/>

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**M13 ( NGC 6205) the Great Hercules Cluster:** A globular cluster in the constellation of Hercules. Taken from the moonlit skies of black bear infested Highland Lakes NJ, 08-25-2015 Celestron CGE110 @ F7.5 QSI583wsg LRGB 26 each binned 2x2. 08-26-2015 Celestron C8 @ F7.5 LRGB 18 each binned 2x2. Acquired in Astroart, stacked in Deep Sky Stacker, aligned in Registar and processed in Adobe Photoshop. Imaged by Michael I. Morgan.

**Cover image** by Michael L Morgan: **NGC 7000**, The North America and Pelican Nebulae. Taken at Cherry Springs State Park 6-28 & 6-29-2011. (L, Ha) RGB Luminance 16 x 4 minutes unbinned Ha 12 x 10 minutes unbinned RGB 3 x 5 minutes each binned 2x2. Total exposure 3 hours 49 minutes. William Optics 66SD w/WO 0.8 x reducer II, QSI 583wsg.





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

I received an email with a thought-provoking newspaper clipping from one of our fellow LVAAS members this month. So, I decided to share with you some of what it provoked, in my too-easily-provoked faculties for thought. But first, I want to go off on a couple of quick tangents.

### Help Wanted

As you may know, the position of LVAAS Member Service Director has been vacant for over six months, and I have been filling the position on an acting basis.

This means that I am doing the shopping for inventory for the Red Shift and supplies for our events, such as the July picnic, as well as operating the Red Shift during Star Parties. I kind of have it down to a system, so it's not too bad, but to be honest I could be doing a better job. For example, we are starting to run low on LVAAS apparel for sale, and I should start working on getting an order together, but I've had trouble finding the time.

There are a few members who are helping out, and I gratefully acknowledge them and thank them. And I will gladly keep helping out also; I don't mind manning the counter during Star Parties and pitching in in other ways. But it would be great for LVAAS if we could get somebody new to join the Board in this position, to take charge of this facet of our operations and add another voice to our overall management team. Please think about if this person could be you, and get in touch with me if you are interested.

### Pure Fiction?

I also want to take a quick detour to mention a favorite science-fiction author, Vernor Vinge. He isn't the main point of this article, but I could not help think of him as I did my research. There are several of his books that I would gladly go back and read a second or third time, given the luxury of nothing better to do, and two of these are called [A Fire Upon the Deep](#) and [A Deepness in the Sky](#). They both won the Hugo award, and they both deserved it since they are great stories with aliens and space travel and human drama, and if you keep reading you will understand why I thought of them, but really they have almost nothing to do with my main topic.

### Mind-blowing Facts

As amateur astronomers and space enthusiasts, we are used to thinking about things that are so "far out" that it can be difficult to distinguish between the facts and the fiction. But here is something that we really ought to consider a scientific fact: unless somebody does something, a massive asteroid or comet will eventually collide with our planet that is big enough to wipe us out.

It seems like fiction because we are not used to thinking about the time scales involved. In truth, we have no idea how to make plans any further into the future than, say, January of 2021. And even if we look thousands of years ahead, the chances of this asteroid happening within that time frame are vanishingly small. You need to believe that humanity's future on Earth is, or ought to be, longer than our past, historic as well as pre-historic, to really care about this.

On shorter time scales we are likely to see proportionately smaller and less destructive impacts, such as a Tunguska or a Chelyabinsk once every century, more or less. But if we think in terms of millions of years, and we care to contemplate how we might survive that long, then we can't avoid the "big one." The laws of probability practically guarantee that the bullet with our name on it is already in flight, somewhere out there.



## Introducing Gordon L. Dillow

The email that kicked this off was from Gary Campbell, and it contained a scan of this [Wall Street Journal article](#). I can't reproduce the entire article, and the link leads to a paywall, but I found [another recent piece by Mr. Dillow](#) that you can read. It's an excerpt from, and a promotion for, his new book [A Fire in the Sky](#).

I haven't had time to read the book, but from the excerpts I've seen it looks like it might be worthwhile. It seems to be a combination of reporting on how we are taking the asteroid threat seriously, and an effort to convince us that we should. In this respect, I think most LVAAS members are already on his side. We have all seen pictures of [Meteor Crater](#), we all know [what killed the dinosaurs](#), and we are all in favor of more telescopes and more satellites to look for space rocks that are headed our way. We would mostly all support more research to figure out how to deal with the threat once we identify it.

(This is one reason I like hanging out with LVAAS people. Not all of us like science fiction as much as I do, but for the most part we know where the boundary between fiction and science is. We know the true shape of the Earth and we know that human beings really did walk on the moon 50 years ago. We know a lot of stuff that for too many seems easy to disbelieve.)

## It's easy if you think about it

Well, maybe we don't always know precisely where the line between science and science fiction is, but at least we have a better idea than the general public. I'm about to tell you my sure-fire plan for dealing with the asteroid/comet threat, as well as truly exploiting the resources of outer space. This may sound like SF to some of you, but I really think this is what will happen. I think we are going to fill up the Solar System with robots.

The thing is, it's really expensive to launch things into space from Earth's surface. The cost is coming down and it will keep coming down for a while yet, but I think there is a limit. I hope we succeed in colonizing Mars, or the moon, or some space habitats that we build, but I have trouble believing that we'll succeed in doing that using physical resources that we launch from Earth's surface.

What I think will happen, somewhere between 10 and 100 years from now, is that we will design robots that can mine the asteroids for resources and build copies of themselves. Millions of copies. Then they can build new homes for us throughout the system, as well as finding all of the dangerous rocks and gently redirecting them. The space around our sun has plenty of energy and materials, and once it is seeded with a well-adapted form of life, all of that richness can be exploited in a self-sustaining and self-replicating fashion, and the fruits of the labor can literally rain down on us, hopefully in a controlled fashion.

## Out of the frying pan?

Does it sound like replacing one kind of "fire in the sky" with another? There is a new Terminator movie coming out this fall, and though it is clearly on the fiction side of the dividing line, the concept is a valid concern. How do we make sure we don't lose control of our robot children? Maybe on some far-distant day, carbon-based humanity will decide it is time to retire and bequeath the universe to our machine-like offspring; but until then, we need to make sure that they remain our obedient servants. It is not a trivial problem.

For the short term at least, I have an answer for that as well: we should not make the robots completely self-reproducing. Their silicon brains are one of the hardest parts to manufacture, but also a small fraction of their mass. We should keep the technology for producing those chips right here on the ground, so we can maintain control. (This is a practical plan also, because making advanced chips is really, really difficult. The



current state-of-the-art 7nm processors can literally be made at only 5 or 6 semiconductor "fabs," and in the entire world, I think only one is shipping production quantities.)

### **The hard part**

As good as I think my ideas are, I am sure somebody out there has some even better ones. The killer asteroid is a truly inevitable, existential threat to humanity, but it's a long-term problem; we probably have plenty of time to work out how to deal with it. The more immediate existential threat to humanity seems to be, as usual: humanity. We still seem to spend most of our energy squabbling over stupid stuff and sowing discord and distrust, instead of figuring out how to work on real problems together and make truly effective long-term plans for our species.

We all remember Star Trek and dream of having the Starship Enterprise at our disposal, to go off exploring the galaxy at Warp Factor 5. (The crew of the Enterprise dreams of having a decent Android or Apple smartphone instead of those clunky tricorders, but that's another story.) What we should be dreaming of is a principled government like the United Federation of Planets. While we gaze at up at the sky, can we imagine making a world that we don't want to escape so badly? Shouldn't that be easier than breaking the speed of light?

Ad Astra!

— *Rich Hogg*



# LVAAS General Meeting at Pulpit Rock

**Saturday, August 10, 7:00 p.m.**

**Raindate: Sunday, August 11; check website**

This is LVAAS' annual meeting at [Pulpit Rock Astronomical Park](#). It is an opportunity for members to visit the site, to receive training on the observatories and get keys to the facility. The gate will be manned from 5 until 6:45 p.m. for new members who do not have gate keys. Please bring a chair!

## Program: Schlegel Observatory Update

*Presented by*

**Rich Hogg**

**Director, LVAAS; Chief Engineer, Schlegel Observatory Project**



The latest news on the progress in building LVAAS' Schlegel Observatory, including our 40" Cassegrain Telescope.

Rich Hogg is a career engineer and software developer, and a "glutton for punishment" when it comes to taking on difficult projects. He has BS and MS degrees in Electrical Engineering from Lehigh University.



## Minutes for the LVAAS General Meeting - July 13, 2019

The July 2019 LVAAS General Meeting was held on July 13th at the LVAAS facility on South Mountain in Lower Saucon Twp. Attendance numbers were not recorded. The meeting was preceded by the annual picnic, with uncharacteristically wonderful weather. The meeting was opened by Rich Hogg, Director, at 7:15 p.m.

The speaker was Virginia ("Ginny") McSwain, Associate Professor of Physics at Lehigh University. She described herself as a professional astronomer who studies massive stars, interacting binaries, and pulsating variable stars. Since she recently adopted her first rescue dog her topic for this fun talk was "Dogs in Astronomy." She started with Sirius (the Dog Star) in Canis Major, who, along with Canis Minor, are usually portrayed as Orion's hunting dogs. Sirius, the brightest star in the night sky, is an A1 star, and also a binary with a 50 year period. As one of the closest bright stars, with its companion being one of the closest white dwarfs, they are very well studied. There are several other bright stars in Canis Major:  $\beta$  - a pulsating Cepheid variable with a wobbly surface;  $\gamma$  - Muliphein - a B giant;  $\epsilon$  - Adhara - a B2 supergiant that is one of the most luminous in the UV; and  $\kappa$  - a Be star- hot, massive, and spinning so rapidly it is flinging matter into a decretion disk, although this may be a temporary phenomenon. Canis Minor hosts an annual meteor shower, the 11 Canis Minorids, which peak a few days after the Geminids (Dec 10-11.)

Of course, we must talk about the Dog Planet - Pluto. The New Horizons mission took the first detailed photos of the planet, and one feature, Tombaugh Regio, bears a striking resemblance to the profile of Disney's dog Pluto!

Apollo 10 named their command and lunar modules Charlie Brown and Snoopy, respectively. Since the LM was not used to land on the moon, it was released into a heliocentric orbit on the return voyage, where it may have been recently located by radio astronomers. NASA also gives out a Silver Snoopy award to contractors and employees for "outstanding performance, contributing to flight safety and mission success."

The USSR sent dogs into orbit as test subjects. The first was Laika in Sputnik 2. Unfortunately, they had no way of recovering the capsule, so she died in space after 5-7 orbits. All the other dogs they sent into space were recovered and survived, however. All the dogs in the Soviet space program were female (smaller and more trainable) and strays. One dog, Strelka of Sputnik 5, had puppies after returning to Earth. At a US/USSR summit meeting about a year before the Cuban Missile Crisis, Jackie Kennedy asked about the pups. One of them was subsequently sent to the Kennedys, named Pushkin, and became a White House pet!



The talk was followed by a Q&A session, which ended at 7:52 p.m.

Rich Hogg resumed the meeting at 8:02 p.m.

**Membership** (Rich spoke for Gwyn Fowler) : There were no second readings, but there were two first readings: Jennifer Craig and John Angelella, living near Hamburg, about 1.25 miles from Pulpit Rock, who have become more interested in astronomy over the last several years.

**Treasurer**, Scott Fowler: no report

July 20th - **50th anniversary of Apollo 11** - first manned landing on the Moon:

The club will have a presence at the **DaVinci Science Center's** "One Giant Leap" event. We will have people there the entire time (10 a.m. to 10 p.m.), so we can use all the help we can get, so come out for a few hours, with or without a telescope, to help out. We will have a display with club info, as well as telescopes for solar and nighttime viewing. There will be many activities. Admission will be free to volunteers. Blaine Easterwood will send out an e-mail blast. All interested parties should contact him.

**Pulpit Rock Observatories**, Frank Lyter: There are many activities going on at Pulpit Rock with regard to maintenance. If interested in helping, please sign up for the Pulpit Rock Buzz (see LVAAS website) to receive notices of upcoming activities.

**MegaMeet**, Tom Duff: This is an informal overnight club observing activity, held at Pulpit Rock, currently scheduled for the weekend of July 26-28. Watch our website and for e-mails, as this is a weather-dependent event.

**Library**, Dave Raker: He will be doing the annual inventory during August, so the library will be closed for the first half of August.

**Board Meeting** : July 28th, 7 p.m. Any member may attend, not just board and committee members.

**Star Party**: August 3rd, starting at 6 p.m. All members are encouraged to attend and help out.

**General Meeting**: August 10th at Pulpit Rock (rain date is August 11th.)

**Note**: MegaMeet and the August meeting are good opportunities for members to get training on the club equipment at Pulpit Rock and to get keys (gate and observatories.)

**Astroimaging** is in recess until September.

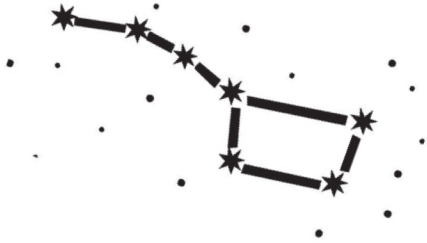
Priscilla Jacobsen pointed out that there are many programs and articles now dealing with the 50th anniversary of the Moon landing, and Bonnie Buratti, a member of the club and frequent speaker, was quoted in two different magazines.

The meeting adjourned at 8:18 p.m.

Submitted by Earl Pursell, Secretary

# UNITED ASTRONOMY CLUBS OF NEW JERSEY

**FREE**



**Saturday,  
August 24<sup>th</sup>  
at 3pm**

**Bring the whole family to New Jersey's premier site  
for free public astronomy, located in Jenny Jump State Forest!**

3:00 - 5:45 pm : Solar Observing, Kids' Activities,  
Member Clubs and Guest Exhibitors Displays

3:00 pm : Welcome to Jenny Jump with Ernie Kabert

3:15 pm : Our Weird Solar System with Sebastien Post

4:30 pm : One Giant Leap with Kevin Conod

5:45 - 7:00 pm : A Brief Geologic History of Jenny Jump State Forest  
followed by a geology walk with Mark Zdziarski

9:00 - 10:30 pm : Night Time Observing and Star Party

6:30 pm : Binocular Astronomy with Sean Post

8:00 pm : You Bought a Telescope. Now What? with Paul Ficher

## FEATURED GUESTS!

Teeter's Telescopes, Jenny Jump State Park, West Morris Amateur Radio Club  
Warren County Library Northeast Branch, Al Witzgall Meteor Display,  
Pearl Observatory, and Our Member Clubs

Street Address:

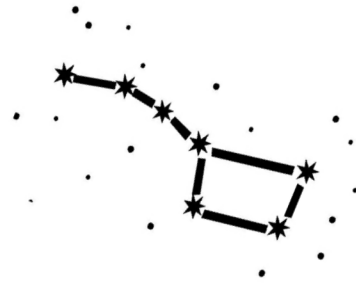
**333 State Park Road  
Great Meadows, NJ**

More information and alternate directions  
can be found through our website

**[www.uacnj.org](http://www.uacnj.org)**







UACNJ provides free public programs at our Observatory in Jenny Jump State Forest from April through October on Saturday evenings. An astronomy presentation begins at 8 PM in the lecture hall regardless of the weather and is followed by stargazing on the observatory's telescopes until 10:30 PM, weather permitting.

## UACNJ Weekly Talks for 2019

April 6	- What's Up in the April Sky?	- Lonny Buinis
April 13	- Size Scales of the Solar System and Beyond	- Jason Kendall
April 20	- Journey to the Stars	- Karl Hricko
April 27	- What Happened to Pluto?	- Ron Kunkel
May 4	- What's Up in the May Sky?	- Lonny Buinis
May 11	- Making Isaac Newton Proud: Modern Newtonian Telescopes	- Rob Teeter
May 18	- Astronomy for Beginners	- Ken Taylor
May 25	- Night Vision and Astronomy	- Earl Pursell
June 1	- What's Up in the June Sky?	- Lonny Buinis
June 8	- How the Stars Got Their Names	- Bill Murray
June 15	- The Life and Death of Stars	- Walt Windish
June 22	- Mars Through the Dust Storm	- Clif Ashcraft
June 29	- Eclipses, Occultations, and Transits	- Gregg Waldron
July 6	- What's Up in the July Sky?	- Lonny Buinis
July 13	- Fly Me to the Moon	- Sean Post
July 20	- New Rides to the Moon	- Dale Skran
July 27	- Let's Go to the Moon	- Karl Hricko
Aug 3	- What's Up in the August Sky?	- Lonny Buinis
Aug 10	- Astronomy for Beginners	- Ken Taylor
Aug 17	- New Horizons Visits Ultima Thule	- Michael Dean Lewis
Aug 24	- You Bought a Telescope, Now What?	- Paul Fischer
Aug 31	- The Milky Way Galaxy - Structure & Evolution	- Ron Kunkel
Sept 7	- What's Up in the September Sky	- Lonny Buinis
Sept 14	- Photographing Night Sky Landscapes	- Stan Honda
Sept 21	- Traveling in Space and Time	- Gary DeLeo
Sept 28	- Northern Lights	- Gregg Waldron
Oct 5	- What's Up in the October Sky?	- Lonny Buinis
Oct 12	- Introduction to Video Astronomy	- Bill Murray
Oct 19	- The Cosmic Distance Ladder	- Jason Kendall
Oct 26	- The Beauty and Power of the Universe	- Walt Windish



Street Address:  
**333 State Park Road**  
**Great Meadows, NJ**

More information and alternate directions  
can be found through our website

[www.uacnj.org](http://www.uacnj.org)



# Library News

by David Raker, LVAAS Librarian

## The following **DVDs** are new to the library:

Somayeh Khakpash: Microlensing and Exoplanets

Richard Hanes: Stellar Fingerprints-An Introduction to Spectroscopy

Edward Guinan: Red Thumb, Mars Gardens

Ron Kunkel: The Astronomy of Beer

Virginia McSwain: Astronomy and Dogs

John Glenn: A Life of Service

Wonders of the Universe

Understanding The Universe

The Great Courses: Introduction to Astrophysics



## The following **books** are new to the library:

The Backyard Astronomer's Guide (revised) by Terence Dickinson

Smithsonian Intimate Guide to the Cosmos by Dana Berry

Science & the Reenchantment of the Cosmos by Ervin Laszlo

The Nature of Space and Time by Stephen Hawking

Gus Grissom: The Lost Astronaut by Ray Boomhower

American Astronaut Photography 1962-1972 by Ron Schick

The Greatest Adventure by Edward Gibson







*From the LVAAS Archives:*

## **A Tale of Two Telescopes**

**by Sandy Mesics**

LVAAS Director Paul Shenkle was an amateur telescope maker of some note. At the annual Amateur Telescope Makers meeting at Stellafane in August 1969, Paul was awarded second prize for optical excellence for his open tube 8-inch f-5 Newtonian reflector.



From Stellafane archives:

<https://stellafane.org/convention/historic/photos2.html>



Left: Paul G. Shenkle's 8-inch  $f/5$  Newtonian won second prize for optical excellence. The diagonal is supported in the open-frame tube by 8/1,000 piano wire. This reduces diffraction and improves planetary contrast. The tube is made of aluminum tubing supported by Masonite rings. Mr. Shenkle is a member of the Lehigh Valley Astronomical Society, Allentown, Pennsylvania.

From the November 1969 issue of Sky and Telescope.



Speaking of telescopes, the LVAS Bulletin for November 1939 announced that the topic for the December meeting would be a slide show of the soon to be opened Hale 200-inch telescope. Here is an excerpt from the Bulletin:

“This year a new eye will pierce the heavens and who knows what mysteries of the great universe it will unfold to the astronomers. What will be the true power of this giant eye? Will naked eye observation with this telescope be successful? Will the moon be viewed as if only 25 miles distant from mother Earth? Will we be able to read Martian newspapers? How many miles further will the astronomer be able to see as compared to the 100-inch? These and many other questions are to be the topic of discussion at our December meeting.”



The presentation had to wait a bit. Dr. George Knecht, who was to present this program, was unable to attend the December meeting. The group decided to postpone the program until the January 1940 meeting. According to the meeting minutes, “Dr. Knecht’s lecture told in a very interesting fashion the life story of Dr. George Ellery Hale who was not only responsible for the founding of the 200 Inch Telescope but also the founder of the great Yerkes Observatory and several others. According to Dr. Knecht, Dr. Hale was fond of telescopes and observatories even as a boy, and later was responsible for the remarkable science of Astro-Physics.”

The excitement at that time was understandable. The construction of the telescope had begun in 1936. The telescope components were built at the Westinghouse plant in South Philadelphia and then shipped by boat through the Panama Canal to San Diego and trucked to Palomar Mountain for assembly inside the dome. The telescope and observatory were finished in 1939, except for the mirror. This story will sound familiar to anyone acquainted with our 40-inch telescope project.

The 200-inch Pyrex blank was cast in 1934, and after a long period of annealing, arrived at Caltech in 1936, ready to be ground and polished.

Then World War II happened.

The partially finished mirror sat in the Caltech optical shop for 11-1/2 years. It was eventually completed, and real work with the 200-inch scope began in 1948. Until 1993, it was the largest effective telescope in the world.

To answer some of the questions posed in the November 1939 LVAS Bulletin, naked eye observations were not done using the Hale telescope, and images of the moon and planets done using film, while satisfactory, can’t compare with imaging done today with much smaller telescopes. The limiting magnitude was about 1.5 magnitudes greater than the 100-inch Hooker telescope.

Some significant work has been accomplished with the Hale Telescope. It was used to correct the distance estimate of the Andromeda Galaxy, which effectively doubled the size of the universe; it helped astronomers gain a new understanding of galaxy formation and stellar evolution; it helped discover the acceleration of the universe, and it was used to discover the nature of quasars located several billion light-years away, which are among the most distant astronomical bodies ever observed.

With new technology that was unimaginable in 1939 such as adaptive optics and CCD digital imaging, the scope has been able to accomplish direct imaging of exoplanets as well as accomplishing the first observation of the galactic center in infrared light. While threatened by light pollution, the Hale telescope continues to do useful science.

But as far as the author knows, no one has yet ever read a Martian newspaper using the Hale telescope.

## **References**

LVAS Bulletin November 1939

Sky and Telescope November 1969

<https://stellafane.org/convention/historic/photos2.html>

# LVAAS Participates in Da Vinci Center's Apollo 11 Anniversary Celebration

Photos courtesy of Blaine Easterwood

When the Da Vinci Center held its event to mark the 50th Anniversary of the moon landing, LVAAS was there to man the telescopes for those who braved the sweltering heat to join in the celebration.



LVAAS's Bill Dahlenburg stays relatively cool under a canopy while illustrating the finer points of telescope viewing on the grounds of the Da Vinci Center during the Apollo 11 Anniversary Celebration.

Pete Detterline helps a young girl get into position for viewing through a telescope at the Apollo 11 Anniversary Celebration at the Da Vinci Center.

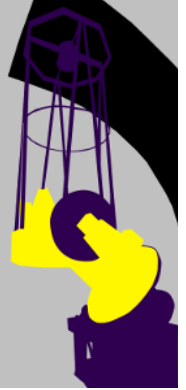


A young boy peers while another practices looking through one eye while waiting in line to use the telescope under the guidance of Bill Dahlenburg.



# Schlegel Observatory Report

by Rich Hogg – August 2019



In a couple of ways it feels as if we have turned a corner on the 40" project. To me, it feels as if all of the big questions are answered. There were significant concerns about a few aspects of the design of the scope, so we have made some changes and we think we've addressed them. There is still a lot of engineering and building to do, but I don't see any more major disassembly and modification. From here on out, it is mostly all progress that looks like progress: building up instead of taking down.

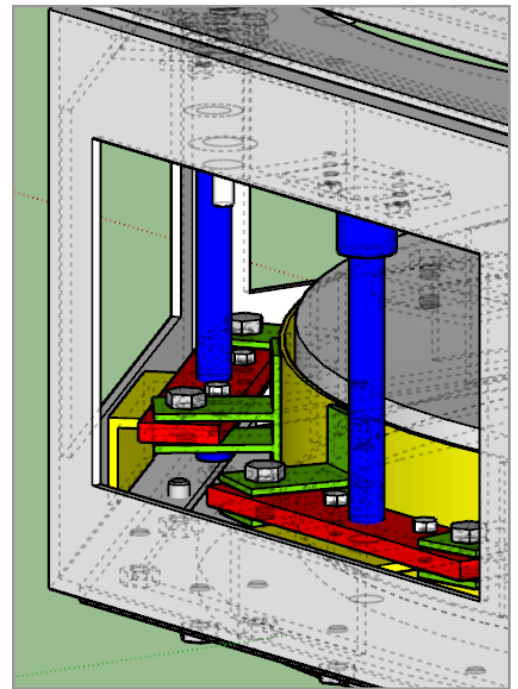
**Radial Support Structure** - there is one small exception, namely, the color-coded parts shown in the illustration, based on a 3D design model that I built using SketchUp a few years ago. This is the framework for supporting the edge of the primary mirror. The illustration shows most of two of eight identical assemblies spaced evenly around the mirror.

Starting from the inside, immediately surrounding the mirror, is a flat band of steel, colored yellow in the model. Something needs to go between this and the mirror; see the next section for more discussion. We have already removed the steel band for refinishing.

The band is held by sixteen brackets, each shaped sort of like the Greek letter Pi turned on its side, and colored green here. The legs of each Pi are bolted around a piece of steel flat bar stock, colored red. There are eight of these bars, and each one has two Pi brackets, one on each end.

Each bar is mounted to an angle bracket, yellow, which is welded to the outside bottom member of the structure. There are two hex bolts securing it, as well as a post (blue) that goes up to a similar bracket welded to the top outside member.

The way this is constructed, it almost looks like the red flat bar was intended to see-saw back and forth on the blue post, but it can't because it is secured by the two hex bolts on either side. The flat bar does



not need to move, so it's not clear. We have not disassembled this yet, but we are planning to, so that we can refinish everything more easily.

The thing is, we are debating whether the blue post needs to go back in when we put it all back together. It seems as if the bottom (yellow) bracket should be enough to hold everything.

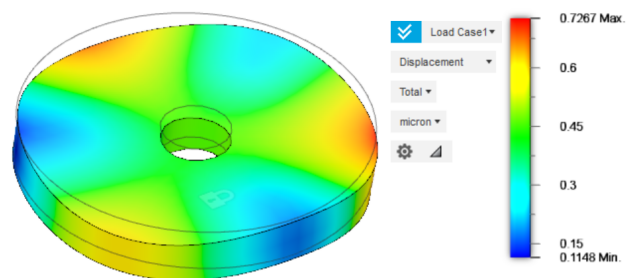
We'll investigate further when we take it apart. I'm also planning to build a more accurate CAD model using Autodesk Fusion 360, a software package that I've written about here before and that we continue to find useful. Fusion 360 can do structural analysis, including a prediction of how much deformation of this structure we will see under the weight of the mirror, with and without the blue post.

**Mirror Deformation** - between the steel band and the mirror itself, we need something to support the actual glass as evenly as possible. This means, we need a system that responds as we tilt the telescope in various directions, applying just the right amount of force to compensate for the weight of the mirror.

For a couple of years now, I've been thinking that our best option is a system of airbags around the circumference of the mirror, with the amount of pressure in them controlled by a computer depending on the tilt angle. As I've mentioned before, blood pressure cuffs should make just about the perfect airbag for this application, and I think we want twelve of them. The next step, which I've started working on, is to simulate this setup and predict the amount of deformation we will see. It looks like Fusion 360 will be a good tool for this.

So far, I've set up a simulation of the mirror pointed straight up, with no airbag, supported only by the three hard points. I did this to compare to a similar computation that I did in 2013, using software called Calculix. I was pleased to see that the result was very similar, and it indicates that the big airbag that supports the back of the mirror, designed to take most (but not all) of the weight off the hard supports, is required. (The results are shown at right, with the deformation exaggerated to make it visible.) The glass is predicted to sag in between the hard supports by about 700nm, or about one wavelength. We need to get it under 1/4 wave at worst. With the airbag operating, we should do significantly better than that.

**Mirror News! Finally,** Mike Lockwood at Lockwood Custom Optics has begun work on grinding our secondary mirror. He will figure it and polish it while testing it with our primary, which is still at his shop. When he is finished, the secondary will need to be shipped to a coating shop, and we will need to drive out and fetch the primary with a pickup truck.





*from Frank Lyter, Pulpit Rock Observatories Director*

**MegaMeet weekend** Truly a great night on the mountain and, with luck, tonight will be the same. As you can see from the Andromeda photo, we had some visitors last night. We were all sworn to secrecy, so mum's the word, unfortunately. We can say that we gained a new appreciation for the universe based on our time on the mountain. :)

Hope to see even more folks on the mountain tonight!

Frank

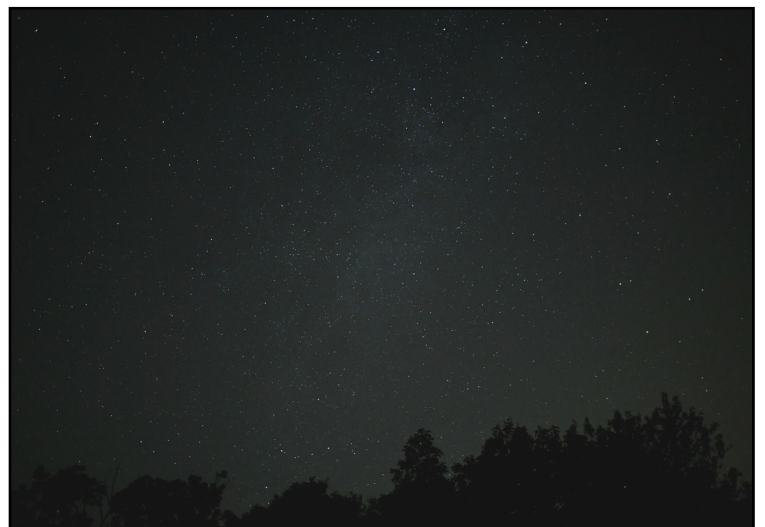


Camping on the field at Pulpit Rock Astronomical Park during MegaMeet 2019



Photography at Pulpit Rock

Northern Sky







Andromeda Over Pulpit Rock (+ 'Flying Saucers descending on the field')

View from Pulpit Rock



Moonrise

# Pottsville, PA's 50th Anniversary Celebration of Apollo 11 Moon Landing

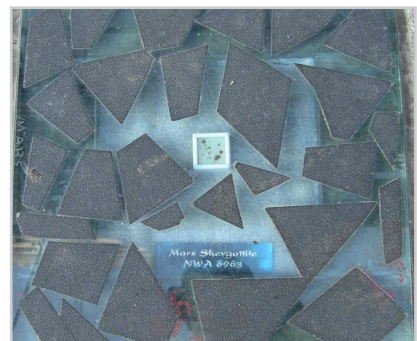
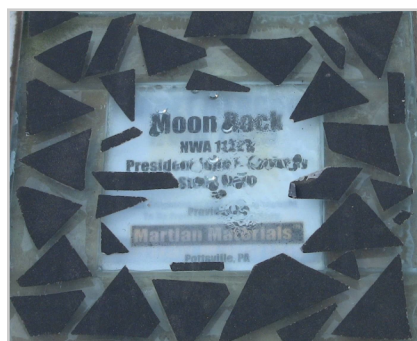
## by David Raker

On July 20 I attended a celebration of the first moon landing at the Pottsville Area High School in Pottsville, PA. Although the activities were few, I did have the pleasure of seeing the high school's planetarium and observatory. The main buildings of the high school were built in the 1930s (no AC!) while the planetarium and observatory were built in the 1960s. The planetarium projector (a Spitz model) and console are very similar to the ones used at LVAAS.

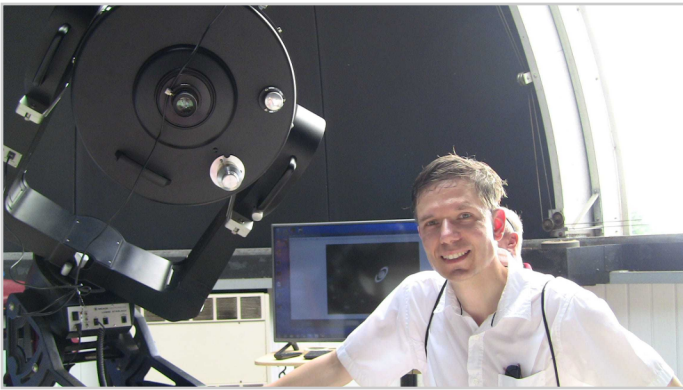
An actual planetarium show was not presented, however, the presenter, Adrian Portland, did give a talk that covered the history of the planetarium and the observatory. He showed a video clip from President Kennedy's speech given at Rice University in Houston, Texas on September 12, 1962 in which he announced his desire for a landing on the moon before the end of the 1960s.

The high school's observatory is in a wonderful location where one has a 360° view of the sky and a great view of the town of Pottsville below. The observatory houses a Meade 16" Schmidt-Cassegrain telescope. Since the event took place during the day and the high school does not have a solar filter for the telescope, we were not able to do any observing. Adrian did show us one black and white photo of Saturn which he took using the telescope the previous night, when a star party attended by about 60 people had been held.

When John F. Kennedy was running for U.S. President in 1960, he stopped by Garfield Square in Pottsville and gave a speech outside the Garfield Diner. At that location and embedded in the sidewalk is a sample of a meteorite that came from the moon, ( [https://en.wikipedia.org/wiki/Lunar\\_meteorite.](https://en.wikipedia.org/wiki/Lunar_meteorite.)) The sample was donated by the owner of a store in town called "Martian Materials." Some pieces of a Martian meteorite are also embedded in the sidewalk in front of the store. Thus, one could stand at these locations and imagine that they are standing on the moon or Mars. I have included some photos from the trip in this article.







Photos top to bottom; left to right:

The observatory at Pottsville Area High School

Inside the observatory

The planetarium console

View of the town of Pottsville from the observatory

The Spitz planetarium projector



by Gary A. Becker



## Perseid Meteors on the Fly This Week

Last year, my friend Peter Detterline and I volunteered at Guernsey State Park, located in southeastern Wyoming, to host a long weekend of viewing the Perseid meteor shower, the best annual shooting star event that combines high meteor rates with temperate observing conditions. We spent four all-nighters entertaining park visitors, stargazing, and meteor watching. By day we gave presentations about how to best observe the Perseids. It was a wonderful experience, but I can tell you that by the fourth nightfall, I was pretty much spent, including developing a sore throat from the dry Wyoming air.

That evening, sky conditions were hazy from California wildfires, and then it became mostly cloudy. I decided that because we were leaving for home the following day, it would be prudent to pack up my telescope and camera gear to get a jump on the morning's activities. It took a little over an hour to wrap carefully and stow my equipment into the numerous cases which I had brought. When I emerged from my yurt a little after midnight, the haze was gone and so were the clouds. The sky was pristine. Our lawn chairs, sleeping bags, and comfy pillows were still beckoning us to join them, but I resisted. Then a bright Perseid scorched the heavens, leaving a short-lived luminescent trail of ionized atmosphere behind it. And then there was another, and yet another. In 10 minutes, I observed 10 Perseids, about as good as it gets for this annual event. So back to the chairs and bags we went, all pumped up by a new adrenalin rush. We each saw an additional 100 meteors before twilight interfered about four hours later.

As a kid interested in astronomy, but without a lot of available cash on hand, the Perseids represented my introduction into observational astronomy, and for over 50 years they have provided some of the fondest memories of why I enjoy this science so much. Created by the particulate tail debris discarded from the numerous passages around the sun of Comet 109P/Swift-Tuttle, Perseids swarm into Earth's atmosphere (mesosphere) at 37 miles per second. They are swift, sometimes leaving a train of ionized gasses behind their fiery glow as electrons reunite with atoms and molecules of tenuous air.

The Perseids are active right now, but they peak on the evening and morning of August 12-13. Unfortunately, bright moonlight will play a prominent factor in reducing counts on the maximum evening and morning, but you can catch some of these falling stars this week under darker skies. On Friday morning the moon sets at 12:30 a.m. providing at least four hours of optimum skies for observing, however on the 13th moonset does not occur until just after 4 a.m., leaving only a half-hour of prime viewing time. Set up your lawn chair with sleeping bag, and pillow facing towards the NE. View the area of sky nearest to the zenith, the highest and darkest part of the heavens. As you begin to catch meteors now and then, you'll notice that a large percentage of them will appear to be diverging from a vanishing point in the NE; those will be Perseids.

A map and all-night composite image showing the radiant (diverging point of the Perseids) can be found at <https://astronomy.org/StarWatch/August/index-8-19.html>. More information is available at <https://astronomy.org/StarWatch/August/index-8-18.html> when in 2018, this best-of-the-summer meteor shower was last seen under a new moon. Here's to a successful Perseid week!

© Gary A. Becker – [beckerg@moravian.edu](mailto:beckerg@moravian.edu) or [garyabecker@gmail.com](mailto:garyabecker@gmail.com)  
Moravian College Astronomy - [astronomy.org](https://astronomy.org)

**Now on Facebook at** [facebook.com/StarWatchAstro/](https://facebook.com/StarWatchAstro/)



# Night Sky Notebook for August

by  
Pete Detterline

## Night Sky Notebook

Peter Detterline

Our closest neighbor greets the largest planet near south at sunset.

•  
**Saturn**

It will take the Moon another two days to reach the ringed world Saturn.

•  
**Jupiter**

•  
**Antares**

The Moon and Jupiter point to the Red Supergiant star Antares. Antares means "Rival to Mars" due to its color and brightness.

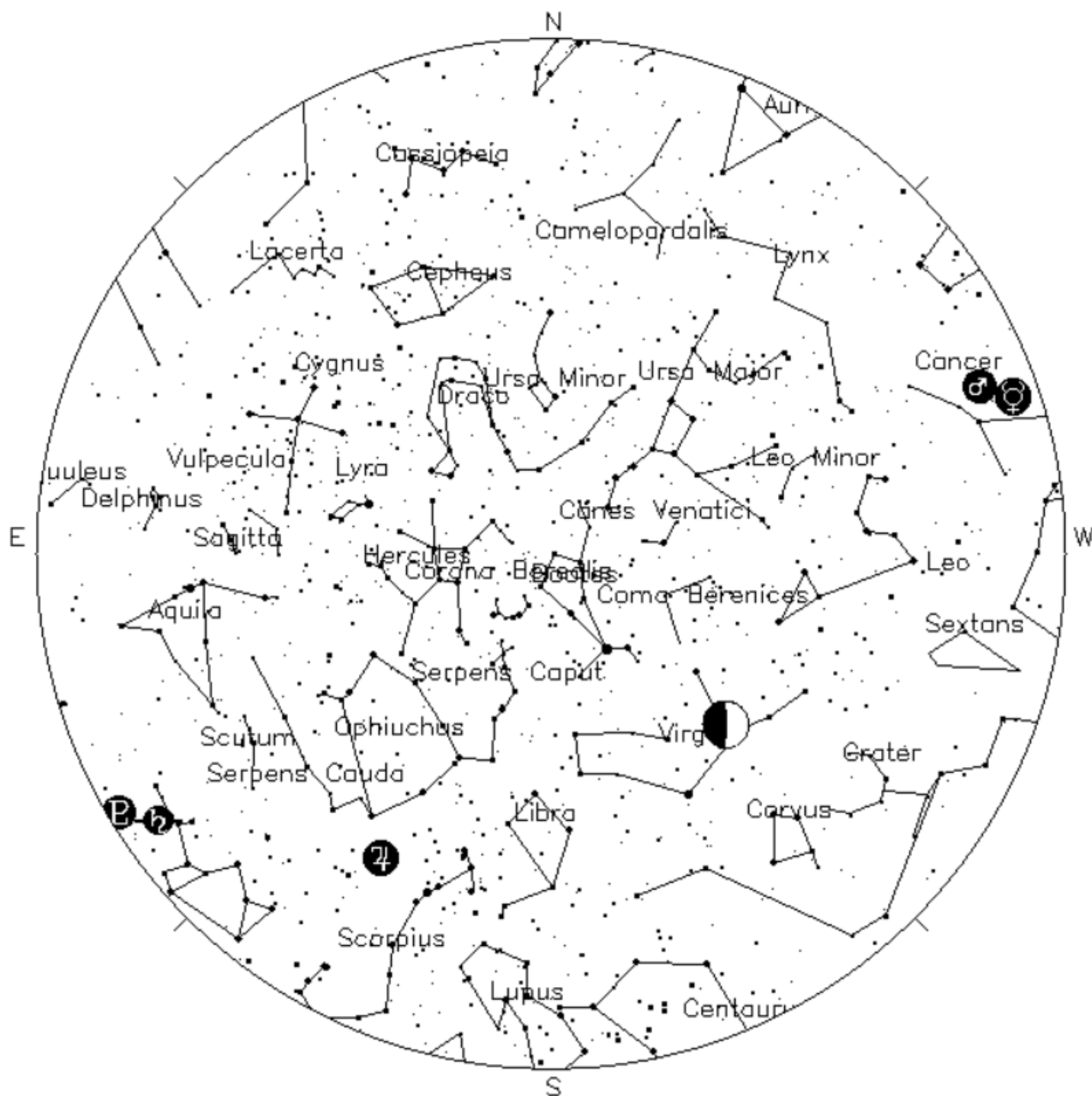
August 9

S

9:30 PM



**Sky above 40°33'58"N 75°26'5"W Tuesday 2019 July 9 1:00:00 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 ->

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

## AUGUST 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				<a href="#">01</a> <a href="#">Stellafane Convention</a>	<a href="#">02</a> <a href="#">Stellafane Convention</a>	<a href="#">03</a> <a href="#">Stellafane Convention</a> <a href="#">Star Party</a>
<a href="#">04</a> <a href="#">Stellafane Convention</a>	<a href="#">05</a>	<a href="#">06</a>	<a href="#">07</a> <a href="#">First Quarter Moon</a> <a href="#">LVAAS Scout Group</a>	<a href="#">08</a>	<a href="#">09</a>	<a href="#">10</a> <a href="#">General Meeting Pulpit Rock - 7:00 PM</a>
<a href="#">11</a> <a href="#">General Meeting Pulpit Rock (rain date) - 7:00 PM</a>	<a href="#">12</a>	<a href="#">13</a> <a href="#">Da Vinci Leonardo Society</a>	<a href="#">14</a>	<a href="#">15</a> <a href="#">Full Moon</a>	<a href="#">16</a> <a href="#">Scouts at Pulpit Rock</a>	<a href="#">17</a> <a href="#">Scouts at Pulpit Rock</a>
<a href="#">18</a> <a href="#">Scouts at Pulpit Rock</a> <a href="#">Deadline for submissions to the Observer</a>	<a href="#">19</a>	<a href="#">20</a>	<a href="#">21</a>	<a href="#">22</a>	<a href="#">23</a> <a href="#">Last Quarter Moon</a>	<a href="#">24</a>
<a href="#">25</a> <a href="#">LVAAS Board of Governors Meeting</a>	<a href="#">26</a>	<a href="#">27</a>	<a href="#">28</a>	<a href="#">29</a>	<a href="#">30</a> <a href="#">New Moon</a>	<a href="#">31</a>

## SEPTEMBER 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<a href="#">01</a>	<a href="#">02</a> <a href="#">Labor Day</a>	<a href="#">03</a>	<a href="#">04</a>	<a href="#">05</a> <a href="#">First Quarter Moon</a>	<a href="#">06</a>	<a href="#">07</a> <a href="#">Star Party</a>
<a href="#">08</a> <a href="#">General Meeting - 7:00 PM</a>	<a href="#">09</a>	<a href="#">10</a>	<a href="#">11</a>	<a href="#">12</a> <a href="#">Astro Imaging - 7:00 PM</a>	<a href="#">13</a> <a href="#">Scouts at Pulpit Rock</a>	<a href="#">14</a> <a href="#">Full Moon</a> <a href="#">Scouts at Pulpit Rock</a>
<a href="#">15</a> <a href="#">Scouts at Pulpit Rock</a>	<a href="#">16</a>	<a href="#">17</a>	<a href="#">18</a>	<a href="#">19</a>	<a href="#">20</a>	<a href="#">21</a> <a href="#">Last Quarter Moon</a>
<a href="#">22</a> <a href="#">Deadline for submissions to the Observer</a>	<a href="#">23</a>	<a href="#">24</a>	<a href="#">25</a>	<a href="#">26</a>	<a href="#">27</a> <a href="#">Black Forest Star Party</a>	<a href="#">28</a> <a href="#">Black Forest Star Party</a> <a href="#">New Moon</a>
<a href="#">29</a> <a href="#">Black Forest Star Party</a> <a href="#">LVAAS Board of Governors Meeting</a>	<a href="#">30</a>					

# 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  
*see website*



## 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.

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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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