The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society
https://lvaas.org/
https://www.facebook.com/lvaas.astro
Febuary 2021
Volume 61 Issue 2

ad astra **********

Welcome to a new year. I hope everyone got that shiny new piece of astronomy equipment they were hoping for at the holidays. If not, I thought I would point out a few places where you can find what you need.

Firstly, if you want to find equipment at a discounted price, do not be afraid to purchase equipment used. Most major vendors accept trade-ins when customers purchase new equipment. Additionally, used equipment can also be purchased at websites like Astromart (www.astromart.com) or Cloudy Nights (www.cloudynights.com) where there are large communities of astronomers looking to finance their own purchases of new equipment by selling their old equipment. This equipment can then be purchased by you at a 30% or 40% discount. I have purchased many pieces of equipment this way.

Secondly, there are many vendors available on the internet and even one close by, Skies Unlimited (www.skiesunlimited.com) in Pottsville, Pa. that are more than willing to guide you in obtaining your astronomy needs. One thing I have found is that all this equipment can quickly become very confusing so being able to talk to someone about your needs is extremely helpful.

Some of the vendors I have used include:

ADM Telescope Accessories	Adorama Camera	Agena Astro Products	Anacortes Telescope and Wild Bird
Astronomics	Camera Concepts and Telescope Solutions	Highpoint Scientific	Moonlight
OPT Telescopes	Starizona	Stellarvue	Thousand Oaks Optical
Woodland Hills Optical			

This list is not all inclusive, so I am sure there are others I have not used, but remember, these vendors are the lifeblood of our hobby so supporting them during the current health situation is paramount .

Board of Governors

A board of Governors meeting was held on January 31st. Current things we are pursuing are the ability to use a payment service like Paypal, setting up an LVAAS Zoom account (we currently use Assistant Director Rich Hogg's personal account), and updates to the LVAAS Bylaws. Bill Malkames, Rich Hogg, Gwyn Fowler, and Frank Lyter have volunteered to assist with this project.

Ad Astra!

Thomas Duff

Minutes from the LVAAS General Meeting – January 10, 2021

The January 2021 LVAAS General Meeting was conducted electronically using an on-line service in an effort to adhere to the social distancing guidelines with regard to the COVID-19 pandemic.

Approximately 35 people were in attendance.

Tom Duff opened the meeting at 7:05 p.m.

The General Meeting's presentation was Cherry Springs: PA's Dark-Sky Gem, by Eric Loch.
Cherry Springs State Park in Pennsylvania's Potter County is a favorite location to enjoy the night sky for our speaker and many others. We learned about the history of Cherry Springs from the beginning to current time, and how to best enjoy the park and many other details about Cherry Springs.
Eric has enjoyed the hobby of amateur astronomy since the first time he looked up at a dark sky full of stars, and like many of us, wondered what is up there. While Eric is not an astrophysicist, or a professional astronomer he has spent many hours with his collection of telescopes, enjoying looking out into our universe. He currently serves on the Cherry Springs Dark Sky Fund Board and is Director of LVAAS' Public Relations Committee.

Treasurers Report: Gwyn Fowler

The General Fund balance at the last meeting was $37,759.16. Income to the General Fund since then was $2088.79 and expense was $500.83. The new General Fund balance has increased to $39,347.12. We also received $65.00 from members towards the 40-inch project, bringing the membership donations to the 40-inch Fund this year to a total of $100.00. The income this fiscal year from members so far is $4,632.00 Dues are $3,240.00 of this total, with donations of $1,392.00. The donations are from Life Members who do not pay annual dues and from Full Members who give more than their annual dues.

Activity by Funds Since Last Meeting (amounts in dollars)

	12 Dec 2020	Income	Expense	10 Jan 2021
General	**37,759.16**	**2,088.79**	**500.83**	**39,347.12**
40-inch	**3,343.43**	**65.00**		**3,408.43**
PRoD	**5,537.97**			**5,537.97**
Roof	**16,000.00**			**16,000.00**
Red Shift	**260.50**			**260.50**
Core	**47,000.00**			**47,000.00**

Membership: Gwyn Fowler

2nd Readings:

- Krishan Thakker

1st Readings:

- Stephen Straka Jr.
- Fred Moskowitz

General Comments

UACNJ is having on-line meetings for the foreseeable future.

The 6-inch dome at South Mountain was stuck.

Next General Meeting

The next General Meeting will be Sunday, February 14th, 2021 and will be conducted electronically.

The January General Meeting was recorded.

The meeting was adjourned at approximately 8:45 p.m.

Submitted by Dennis Decker, Secretary

Benefit from giving to LVAAS through your IRA!

If you are 70 1/2 or older, you can make a charitable gift directly from your IRA to LVAAS without paying income tax on the withdrawal.

State laws about Qualified Charitable Deductions (QCDs) and how QCDs are handled vary. If interested, please consult an adviser so you can help LVAAS today! Click this link for more information at the LVAAS website:
https://lvaas.org/page.php?page=using_rmd_to_support_lvaas

Via Earl Pursell, UACNJ Liason: Virtual Presentations

During the off-season (November through March) UACNJ is presenting on-line astronomy related presentations occurring on the first and third Saturday of the month beginning at 8 p.m. on their website uacnj.org. You can also tune in by visiting their YouTube channel. Subscribe to get notifications when the presentations go live.

Via David Raker, Librarian: New Library Materials

Books:

When We Had Two Moons by Erik Asphaus

On the Trail of Stardust by Jon Larsen

Classic Feynman by Richard Feynman

Mapping the Planets by Anne Rooney

Missions to the Moon (50th Anniversary of Apollo 11 edition) by Rod Pyle

DVDs:

Journey to Space

Dr. John Lewis: Meteors

Cover image by Lynn Krizan: Pleiades Star Cluster, M45, in Taurus
Scope: William Optics 66
Camera: Starlight Express SX-H9 mono CCD, LRGB data
Date Jan. 7, 2013

Fireworks, anyone?

LVAAS General Meeting
Sunday, February 14 at 7 p.m.

- Meeting will be *online only -

Astrodynamics: Fun with M1, M13, M27, M51, and Betelguese...

We amateur astronomers look at and photograph beautiful star-clusters, nebulae, and galaxies. When we look at two pics of the same object taken days or months or years apart, they usually look the same. It seems like a static universe. But, it's not. Changes do happen. In this talk, I will show several pairs of pictures showing that things do change, and I'll discuss what causes these changes.

Robert Vanderbei

Bob first became interested in the stars in the summer of 1963 when he was 7 years old and the family did a camping trip around Lake Superior. He woke up in the middle of the night, went outside the tent, looked at the sky and was astonished by the beauty of the stars. He was an active amateur astronomer until his High School years, and returned to the hobby at about the turn of the century. He has been an active astrophotographer since shortly thereafter. Bob did a BS in Chemistry at Rensselaer Polytechnic Institute (RPI), a PhD in Applied Math at Cornell, and worked at AT&T Bell Lab's Math Research Center in Murray Hill, NJ before joining Princeton University in 1990. During his career he contributed to designing a NASA space telescope to image Earth-like planets. Since 2005 his amateur setup has included a Takahashi FSQ-106N and a 10" Ritchey-Chretien telescope from RCOS. He has had the pleasure of taking many astrophotos from the driveway at his house just eight miles north of Princeton. He's also co-written a book with J. Richard Gott entitled "Sizing Up The Universe," published by National Geographic.

***Members will receive an invitation to the on-line meeting by email. Prospective new members who wish to attend should contact membership@lvaas.org to arrange to receive an invitation.**

New Member Application

LEHIGH VALLEY AMATEUR ASTRONOMICAL SOCIETY

Make checks payable to: LVAAS
Mail your completed application(s), with your dues to:

LVAAS MEMBERSHIP
c/o Gwyn Fowler
97 Yeager Road
Lenhartsville, PA 19534

Name: _____ Are you age 18 or older? Yes ____ No ____

Address: _____ City: _____ State: _____ Zip: _____

Email Address: _____ Phone Number: _____

Occupation (Optional): _____

Where did you first hear about LVAAS? _____

Specific Astronomical Interests: _____

Are you a member of other Astronomical Societies? _____

Please list any astronomical instruments owned: _____

Experience in Astronomy (circle one): **Novice** **Amateur** **Advanced Amateur** **Professional**

Type of Membership (circle one):

Full-time student: $15 Individual: $45 Family: $65 Junior: $15 Sustaining: $90 Life: $675

If you are a full time student over the age of 18, you will need to show proof (class schedule, school ID) to the membership director via email or at a meeting. Students under 18, should apply for Junior membership if they are not a part of a family membership.

Are you a part of a Family Membership?: Yes: ____ No: ____
*(**Note:** Each family member must have a completed application regardless of age)*

Donations are greatly appreciated!
Would you like to give an additional donation? If so, please list the amount. If you want it to be designated please specify (e.g. roof, Prod, 40" telescope). **Donation:** _____

Committee Use Only:

Dues: _____ Donation: _____ Total: _____ Check #: _____ Date: ____/____/_____

1st Reading: ____/____/_____ 2nd Reading: ____/____/_____ Card Issued: ____/____/_____ To Treasurer: ____/____/_____

~ FOR SALE ~

Via Mark Elstein: A friend and former (and maybe soon to be again) LVAAS member would like to sell his **10" Meade Schmidt-Cassegrain scope**. His description follows:

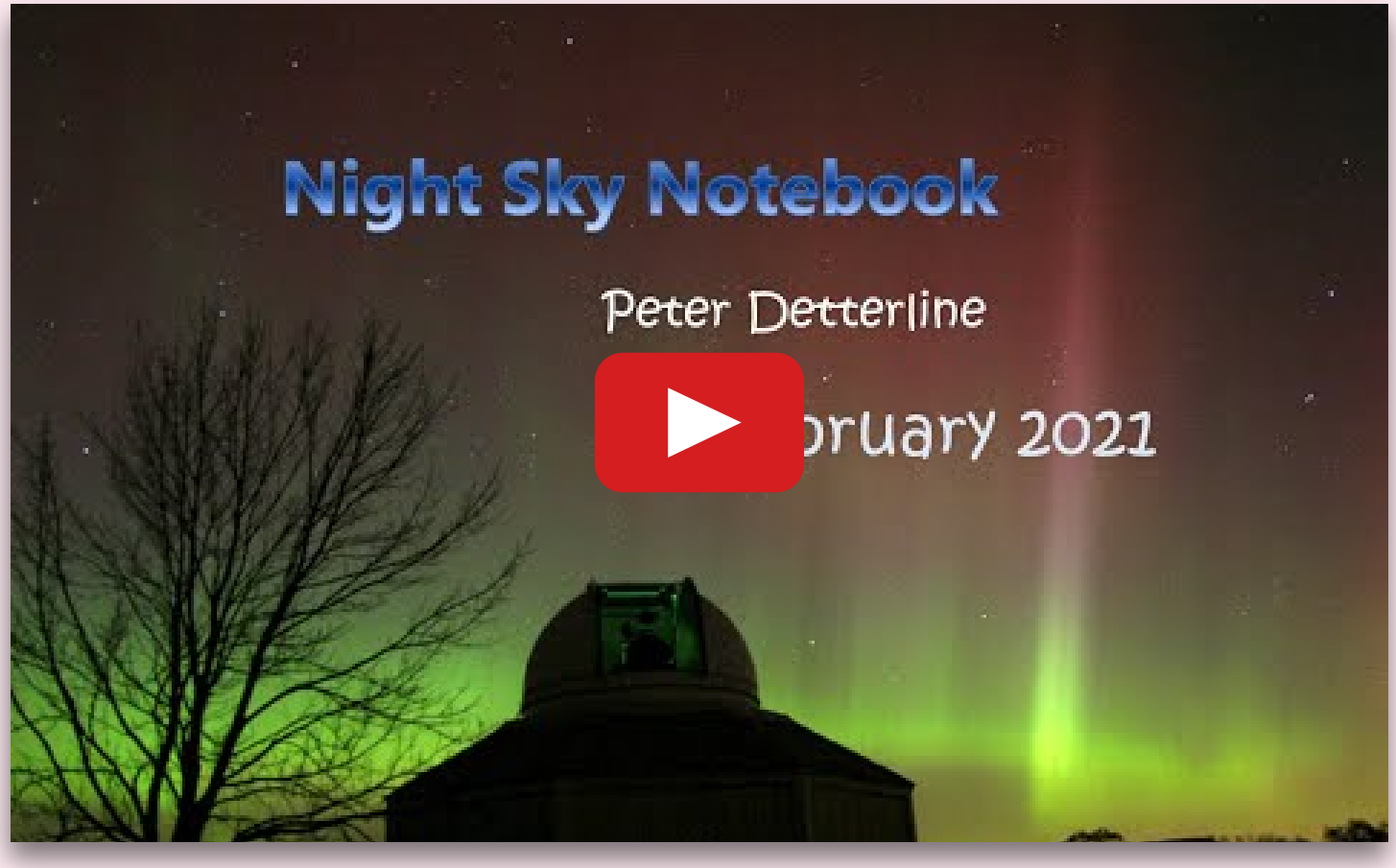
"I have decided to sell my 10" Meade Schmidt-Cassegrain scope. It is just too large for me to haul around. It has the quartz drive with remote control, and electric focus control. It is in very nice condition and includes the Meade field tripod and wedge, and additional access. I am asking $500. If you know of anyone who may be interested, please send them my way.

Thanks, Howard Sherer" Contact Howard: cell: 484-951-1622 email: howardms@lehigh.edu

Night Sky Notebook for *February*

by

Peter Detterline



Schlegel Observatory Report

by Rich Hogg – February 2021

In this episode, we follow through on a threat I made in the Schlegel Observatory Report for September of last year. I explained that I was thinking about putting a bathroom scale on a drill press, and promised to report on it if I did. Well, here is the report. I didn't do it! Instead I did something else.

As it turns out, my drill press is not big enough to hold a bathroom scale. I thought about performing the experiment at either South Mountain or Pulpit Rock, where a larger drill press is available, but I also needed access to an oven and a freezer, and I ended up working with the setup for several days. Plus, I realized I wanted more control than a drill press would give me. So, I decided to build a custom press for the experiment.

The objective was to characterize some silicon-rubber o-rings that I obtained from McMaster-Carr. Based on some rough characteristics described in the Parker O-Ring Handbook, it looks like these o-rings can be used for suitable elastomeric support elements, or cushions, to support the rim of the 40"- diameter, 5"-thick primary mirror. But, rough characteristics are not specs! I had enough questions about exactly how the rings would perform that I wanted to do some testing.

So, I ordered some samples and started thinking about how to set up the test. The High-Temperature Soft Silicone O-Rings (Durometer hardness 50A) have a profile height (cord diameter) of 0.275". In the photo, the Professor is inspecting one of the 1.5"-diameter rings, while Ginger has attempted to accessorize with the other one. The Skipper has easily shouldered the 4-1/4" ring and is chuckling at Gilligan's struggle with the 2-7/8" one.

(I can hear you saying, Ginger seems awfully tall. Hush. Just go with it. They didn't make a Ginger, so she's really an Ariel, but don't tell Gilligan.)

To test or "characterize" these things, we need to squeeze them, and we need to measure how much we are squeezing them (displacement, up to about 0.08") and how much force it takes to do that (up to maybe 300 pounds.) Most of the parts for the setup are shown here.

The Professor is fooling with my dial indicator, that I bought for a really good price at I-forget-which-surplus-dealer.com a few years ago. It is graduated in increments of 0.0001", so each full turn of the dial registers 0.01" and its full range is a bit over 0.1". It's perfect for this job.

Under Mary Ann and Ginger's feet, we have a pair of 1/4" aluminum plates, 5" by 6". On the top plate I have mounted a collar to hold the dial indicator, and there is a hole so the plunger can poke through and indicate from the bottom plate. There are also holes drilled and tapped in the corners, and retaining screws that match. I'll explain their function later.

The Skipper is surveying an inexpensive bathroom scale, on which I've mounted (with duct tape) a piece of plywood and a foam pad to distribute the force over the glass platform of the scale. Just try buying a bathroom scale that isn't made of glass these days! A nice laboratory scale would have been better, but also a lot more expensive.

And Gilligan is up there on the press itself, messing around with the handle on the turn screw, which is just a box-end wrench captured on the end of a bolt by a pair of nuts and washers. It is threaded into a coupling nut which is epoxied into the cross member.

The assembled setup is shown on the next page.

Here we are taking a measurement, or we will be once the *Minnow* boys get tired of trying to be helpful. The dial indicator has been mounted into the top plate, and one of the o-rings is situated between the two plates, ready for measurement. The plates are on the scale and the scale is on the press, which is clamped to the edge of the island counter top for stability. The U-bracket is installed straddling the indicator, ready to transmit the force from the turn screw to the top plate.

It looks like The Professor and Gilligan are trying to get a certain reading on the dial indicator by adjusting the turn screw. For a full-sized person who can operate the turn screw while watching the indicator, this is super-easy with this setup. The responsiveness of the dial indicator to adjustments of the screw is so quick and smooth that I want to use the word "slick." I got a little thrill from it the first time I tried it. Once you take your hand away, the pointer does have a tendency to settle a bit over the next minute or two, but only by about 1/10 of a turn or 1/1000 of an inch.

The responsiveness of the dial indicator is very helpful, because the inexpensive bathroom scale has a mind of its own. It is automatically activated by a change in the applied force, and when it senses that the force stops changing by some threshold, it stops measuring and "locks in," displaying its final value for a few seconds before turning off. This dictated the measurement procedure, as follows:

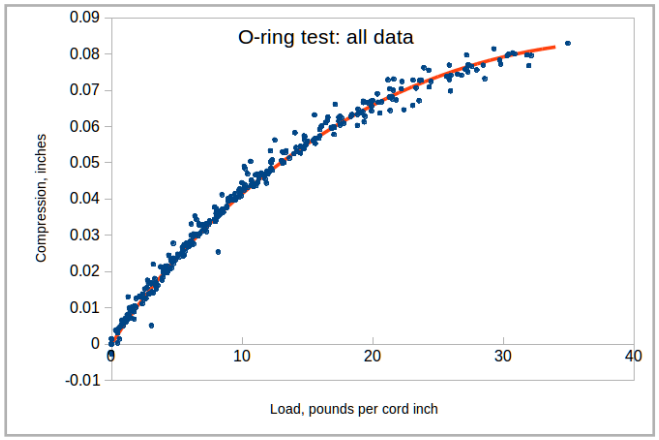
- Choose a target displacement, or dial-indicator reading.
- Quickly manipulate the turn screw to activate the scale and get the indicator to within about 1/1000" of the chosen target, and then stop.
- While the scale is locking in the measurement, read the exact setting of the dial indicator and record it.
- Read the scale and record it before it turns off.

I usually chose to measure in increments of 0.02", which would give enough "delta" to activate the scale, while being an easy target: two full turns of the dial. For each run I made several passes, starting at some point in between previous measurements, and advancing in increments of 0.02" up to the maximum (about 0.08".) I was able to get readings down to about 0.006" by quickly advancing beyond the target to activate the scale, and then backing off to the target before it decided to stop measuring.

All of this was pretty easy and quick once I practiced a bit, and I think it justified the effort of building my little measuring press. And I'm pleased to say that the results were "nice" enough that I can make the rest of this long story short! I was interested in answering the following questions with this experiment:

1. How much does the o-ring compress with applied force, and on what kind of curve?
2. Do all of the samples respond consistently (when adjusted for their size)?
3. Is the response dependent on temperature?
4. Is there any tendency to "take a set" when the rings are compressed for a long period of time?

To my complete delight the answers to question 2, 3, and 4 are, for all practical purposes, a very simple Yes, No, and No. The o-ring compression response is almost exactly the same, on a "per-inch" basis, for all of the rings I tested, whether measured at room temperature, 20°F, or 150°F. And they bounce back to almost exactly where they started, even if compressed to the maximum amount we are planning on, for many hours at either temperature extreme. I am surprised, very pleasantly, by how predictable they are. I can put all of the data points I collected on one graph, and except for two obvious outliers (almost certainly operator error), they all fit the same curve to within 1/100 inch.



The formula for that curve, shown in red on the chart, is $y = 0.0062 - 0.00065\ x^{3/2}$. I obtained this by just fooling around in the spreadsheet program. x is the compression load in pounds per inch of o-ring cord, and y is the amount of compression observed on the dial indicator measuring the spacing between the two plates. This is plenty good enough for our purposes; I will use it to engineer the final design of the support pads.

Here's one last photo, showing the two plates with the retaining screws in place, ready to go into the freezer for the "compression set" test. Mary Ann's not going along.

My kitchen was a natural place to run this experiment, with easy access to the freezer and the oven. It wasn't hard to make space on the island to set it up, and even the food thermometer came in handy. So, it was natural for Gilligan and the rest of the gang from *The Minnow* to stick their noses in. They weren't much help, but not really any trouble, either. They've been stuck on the island for a long time, generally with not much to do.

From the LVAAS Archives:

A Frigid Lunar Eclipse and an Earthquake

by Sandy Mesics

In 1971, amateur astronomers were a hardy bunch. On Wednesday February 10, 1971, a group of about a dozen LVAAS members braved 8°F temperatures to observe a 3 a.m. lunar eclipse from South Mountain. While the temperature was frigid and a light wind was blowing, seeing conditions were perfect. Unfortunately, the dome of the Knecht Observatory was frozen solid from a recent sleet storm, so the observers utilized a society-owned 8-inch reflector to make timings and drawings.

Members were encouraged to make drawings of terminator details during the partial phases, to shoot color slides of totality, or to judge the color and darkness of totality using the Dajon Scale. Using that scale, observers generally agreed that the color was brick red to deep red at totality. Members Stan Hacker and Gary Becker shot slides of the event, which were shown at a subsequent meeting of the Astronomy Study Group.

This eclipse marked an opportunity to observe eclipse-related changes on the lunar surface from instruments left by Apollo's 12 and 14. At the Apollo 12 site on the Ocean of Storms, the temperature dropped from 168.3 degrees Fahrenheit to 153 degrees below zero, a 321.3-degree change. At the Apollo 14 Fra Mauro site, the temperature dropped from 154.1 degrees to 153 degrees below zero, a change of 307.1 degrees. NASA scientists reported that the instruments registered no unusual seismic events or radiation fluxes during the eclipse, and all the instruments survived without any apparent damage despite the sudden sharp temperature drop.

Interestingly, the day before the eclipse, a magnitude 6.5 earthquake rocked southern California. This earthquake was just one of a series that affected the Los Angeles area around this time. Damage was locally severe in the northern San Fernando Valley, and surface faulting was extensive to the south of the epicenter in the mountains, as well as urban settings along city streets and neighborhoods. Uplift and other effects affected private homes and businesses. In the media, one account linked the eclipse with that earthquake.

Dr. William Kaufmann, director of the Griffith Park Observatory at Los Angeles, said the

1. Dr. William J. Kaufmann 111, 1942-1995. Photo courtesy of the Griffith Observatory.

relationship between the eclipse and the earthquake was “more than coincidental.” Kaufmann said the alignment of the earth, the sun and the moon may have caused the earthquake by causing tremendous gravitational tugging in both directions. He said the gravitational pull from the sun and the moon brought about powerful stresses within the earth and the resulting deformation of the earth’s shape "quite probably triggered the quake.” Kaufmann said the 1900 San Francisco earthquake also occurred within a few days of a similar lunar eclipse. His theory was largely dismissed by other scientists.

References

The Observer, February & March, 1971.

Wikipedia: https://en.wikipedia.org/wiki/1971_San_Fernando_earthquake

The Palm Springs Desert Sun, Volume 44, Number 162, 10 February 1971
https://cdnc.ucr.edu/?a=d&d=DS19710210.2.28&e=-------en--20--1--txt-txIN--------1

Moon Instruments Called Undamaged by Lunar Eclipse, New York Times, 2/11/1971.
https://www.nytimes.com/1971/02/11/archives/moon-instruments-called-undamaged-by-lunar-eclipse.html

History of the Griffith Observatory. http://www.griffithobservatory.org/about/history.html

StarWatch

by Gary A. Becker

Winter Halos

On December 30, I witnessed the most vibrant lunar halo (See here) of my 60+ years of observing the heavens. November 30 and January 3 were halo nights too. These types of atmospheric phenomena are more common during the winter months. They can be created by the sun or the moon and generally form at high altitudes in cirrus clouds where small, pencil-shaped (hexagonal) ice crystals are prevalent.

Without dark adaptation, the red interior and blue exterior of the December halo was immediately apparent upon going out-of-doors from a brightly lit room. Part of the halo was diffuse, which I first thought was due to cloud structure, but later discovered that it was really a distinct entity called a circumscribed halo. It was also more intense than the inner, more common 22-degree halo. Also, when I digitally processed my images, an additional whitish halo became visible, known as a parhelic circle. It intersected the moon and fanned away from both sides. This was not detectable as I visually observed the other two halos.

The 22-degree lunar halo and circumscribed halo are refraction phenomena caused by light entering and passing through mediums of different density, air to ice to air. Each wavelength of sunlight (color) is bent uniquely, separating the different energies to create the rainbow of colors which emerge from the crystal. Blue light is bent at a steeper angle than red light, thus causing the observer following the line of sight of these chromatic “rays” to see the blue light forming the outer regions of the halo and the red light creating the inner boundary. The interior edge of the halo represents the minimum deviation (refraction) angle (22 degrees) of red light emerging from the tumbling ice crystals, thus giving rise to its name, the 22-degree lunar or solar halo. In order for the circumscribed halo to form, light must pass through alternate faces of hexagonal (pencil-shaped) ice crystals that are falling through relatively still air with their long axes parallel to the ground. This is analogous to the way leaves fall from a tree or what occurs to grass when thrown into tranquil air.

Here is where halo research becomes mind-boggling because the circumscribed halo takes on radically different shapes for different moon and sun altitudes. You might guess that in halo research computer simulations play a primary role in understanding these shapes.

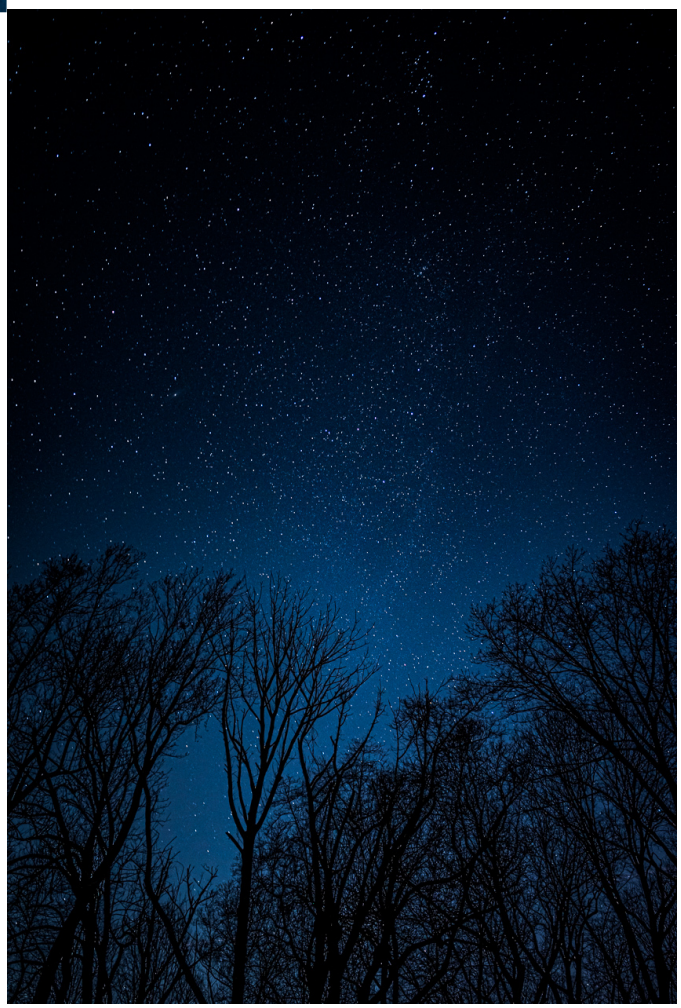
I found a computer simulation for a circumscribed halo at a moon/sun altitude of 70 degrees which provided excellent agreement to my image with a moon altitude of 72.5 degrees. That brings me to the white parhelic circle that I first thought was a lens defect. Delving into Robert Greenler's, Rainbows, Halos, and Glories, Cambridge University Press, 1980, I found the answer. This halo was created by moonlight reflecting off the narrow sides of hexagonal plate crystals or the ends of pencil crystals. In both cases the plate surfaces and the long axes of the hexagonal crystals had to be parallel to the ground. This causes the parhelic circle to sweep around the sky parallel to the horizon and at the same altitude of the sun or moon creating it.

Besides the sheer beauty of these apparitions, everyone sees a unique halo. When my wife, Susan, joined me, a distinct set of hexagonal crystals created the halos she saw. Even the individual colors are created by different crystals, each positioned at their specific refraction angles from the moon or sun. Halos are truly one of the most wonderful and intriguing gems of the atmospheric optics family. Keep looking up, and eventually you will be bound to get the opportunity to see this spectacular sight.

beckerg@moravian.edu or garyabecker@gmail.com
astronomy.org facebook.com/StarWatchAstro/

From the Field ~ Mike Waddell

Orion the Hunter is perhaps the most easily recognized and prominent constellation in the northern hemisphere winter sky.
Its sheer size and story make it an image that begs to be photographed! ~ MW



Nightscape imaging is always interesting for me because many times I'll have a plan for a clear sky night...and I end up with something unexpected. For example...I was looking for some Geminid shower meteors outside Vera Cruz but instead found the Milky Way behind me over these trees. Nikon Z5 30s, f4, 24mm ISO 1600 ~ MW

Where does the name Wolf Moon come from? It's tempting to think of hungry wolves howling outside snow-covered villages at this time of year. The name is often said to come from Native American culture, but Indian Country Today pointed out in 2013 that the name Wolf Moon doesn't appear on the lists of American Indian moon names compiled by Phil Konstantin, who worked for NASA, among other places. *Indian Country Today* wrote:

"Of the 29 tribes listed [by Phil Konstantin], not one actually calls January the Wolf Moon, although the Sioux name is Wolves Run Together Moon. The Algonquin … call the January moon *squochee kesos*, or Sun Has Not Strength to Thaw …

The moon names tend to mirror latitude somewhat. For instance, to the Haida in Alaska it's *táan kungáay*, or Bear-Hunting Moon. The Hopi in southwest Arizona call it *paamuya*, Moon of Life at its Height. In the Pacific Northwest it's *atalka*, meaning Stay Inside. Moving farther south, the Choctaw word for the January full moon is *rv'fo cusee*, which means Winter's Little Brother (as opposed to December's moon, *rvfo-rakko*, meaning Big Winter.)"

Source https://earthsky.org/tonight/full-wolf-moon-in-late-january-2021

Full Wolf Moon with Tulip Tree Seed Pod image courtesy Mike Waddell

Sky Above 40°33'58"N 75°26'5"W Friday Feb 5 2021 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

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

FEBRUARY 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	01	02	03	Last Quarter Moon 04	05	06
07	08	09	10	New Moon 11	12	13
General Meeting - on-line 7:00 PM 14	15	16	17	18	First Quarter Moon 19	20
Deadline for submissions to the Observer 21	22	23	24	25	26	Full Moon 27
LVAAS Board of Governors Meeting 28						

MARCH 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	01	02	03	04	Last Quarter Moon 05	06
07	08	09	10	11	12	New Moon 13
Daylight Savings Begins 14 General Meeting - on-line 7:00 PM	15	16	17	18	19	Spring Begins 20
Deadline for submissions to the Observer 21 First Quarter Moon	22	23	24	25	26	27
Full Moon 28 LVAAS Board of Governors Meeting	29	30	31			

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 at 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.

To become a member of LVAAS, please complete and submit an application form, which can be downloaded at https://lvaas.org/filemgmt_data/files/LVAAS_New_Member_Form.pdf

Existing members please update your LVAAS profile information by emailing the membership director at membership@lvaas.org