The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society
https://lvaas.org/
https://www.facebook.com/lvaas.astro
January 2021
Volume 61 Issue 1

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

I would like to introduce myself, Thomas (Tom) Duff, as the new Director of the Lehigh Valley Amateur Astronomical Society (LVAAS.) I feel I should let you know to whom you have entrusted this important position.

I joined LVAAS in 2010, and am just recently retired from Teva Pharmaceuticals from a job in Quality Assurance/Information Technology. As an Information Technology person, I am a true Amateur Astronomer. Most of what I know comes from reading astronomy magazines and support from fellow LVAAS members who have put up with my hundreds of questions-people like Mike Tapper, Lynn Krizan, Simon Porter, Bill Dahlenburg, Ron Kunkel and too many others to name have supported me on this journey.

I have always believed in supporting organizations like LVAAS, so over the last eleven years I have tried to help wherever I could. Some of these roles have included officer positions like Assistant Director and Treasurer. Others instances have included supporting roles like Astro-Imaging leader, Megameet Coordinator, and Key Coordinator. I am almost always at Star Parties and member meetings to help wherever needed.

As the new Director of LVAAS I would like to give a great big Thank You to Rich Hogg and the Board of Governors. Over the last two years Rich has done an excellent job of leading our society through some very trying times. Rich has spearheaded changes that had to be made to provide the best possible experience for our members.

For 2021 along with myself as Director, Rich Hogg will continue to support LVAAS as its Assistant Director. Also, Gwyn Fowler will join us as Treasurer and Dennis Decker will continue as the Society's Secretary. Additionally, you should know that LVAAS is not a one-person show. Without the help from a couple of dozen dedicated members who volunteer their time and knowledge, your society could not exist. If you would like to help, please do not hesitate to contact me.

Regarding the future of LVAAS, while we all wish things would go back to the way they were before the current public health situation I am sure things will continue to be uncertain into 2021. All I can promise you is that the Board of Governors will continue to do their absolute best to guide the society through this situation.

I hope all of us in LVAAS have put some thought into our future together, and how we can support the society. We cannot keep doing any of the things that we do without the effort contributed by our active members.

Ad Astra!

Thomas Duff

Minutes from the LVAAS General Meeting – December 12, 2020

The December 2020 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 40 people were in attendance.

Rich Hogg opened the meeting at 7:05 PM.

The General Meeting's guest speaker presentation was "Pulsars and Gravitational Waves" by Dr. Megan DeCesar. Dr. Megan DeCesar is a post-doc fellow at Lafayette College. She works primarily on radio pulsar searching and timing, with the goal of detecting gravitational waves from supermassive black holes with the NANOGrav pulsar timing array. Her other interests include X-ray and gamma ray pulsar astrophysics, and the study of millisecond pulsars in globular clusters.
You can listen to the sounds of pulsars at http://www.jb.man.ac.uk/research/pulsar/Education/Sounds/.
Dr. Megan DeCesar explained how her research depends on data from large radio telescopes, including the Arecibo Telescope, which tragically collapsed on December 1, 2020. She also expressed her concern about the jobs of her colleagues who worked at Arecibo, and explained how the Arecibo program was a vital element in most of the STEM activities in Puerto Rico. Please consider joining the petition to Rebuild the Arecibo Observatory at https://petitions.whitehouse.gov/petition/rebuild-arecibo-observatory, which needs to collect about 39,000 more signatures by January 1, 2021 to receive a response from the White House.

Treasurers Report: Gwyn Fowler

The General Fund activity since the start of FY2021 is presented in Table 1. Most of the income, $2,494.50 is from membership dues and donations. There was a transfer to the Core Fund from the General Fund to reimburse the cost of a new arc lamp for the planetarium. This was treated as a retroactive change to the FY 2020 budget. The board authorized the use of the Core Fund for this purchase and the membership approved the action about a year ago. It was recently recommended to the board to treat the expense as a line-item expense in the FY 2020 budget because the budget

deficit at the end of FY 2020 was sufficiently reduced. This change eliminates the need to repay the Core Fund over time.

Table 1. General Fund Activity FY 2021 Year-to-date (amounts in dollars).

General Fund

Balance on 01 October 2020	**38,012.46**
Income since start of FY 2021	**2,775.79**
Expenses since the start of FY 2021	**1,641.52**
Transfer to Core Fund	**(1,387.57)**
Balance on 12 December 2020	**37,759.16**

There were transactions in three other funds, including a member donation of $35 to the 40 inch Fund. Red Shift income is from the November General meeting at Pulpit Rock. There was additional expense for the electrical work on the field at Pulpit Rock. These transactions are shown in the next table.

Table 2. Other Funds (amounts in dollars).

	01 Oct 2020	**Income**	**Expense**	**Transfer**	**12 Dec 2020**
Core	**45,612.43**			**1.357.57**	**47,000.00**
Roof	**16,000.00**				**16,000.00**
PRoD	**5,571.78**		**(33.81)**		**5,537.97**
40-inch	**3,308.43**	**35.00**			**3,343.43**
Red Shift	**258.00**	**2.50**			**260.50**

Membership: Gwyn Fowler

2nd Readings:

- Carl Picco
- Ron Spross (needs to submit application and dues)

There were no 1st Readings

Induction of Officers for 2021

Bill Dahlenburg officiated the swearing in ceremony of the new and returning officers for 2021.

- Director – Tom Duff
- Assistant Director – Rich Hogg
- Treasurer – Gwyn Fowler
- Secretary – Dennis Decker

The Great Conjunction

The greatest window of opportunity for observing the great conjunction of Jupiter and Saturn will be from 12/18/20 through 12/23/20, with minimum separation on 12/21/20. During the great conjunction it will be possible to view Jupiter and the Galilean moons Io, Europa, Ganymede, Callisto, and Saturn and its largest moon Titan all in a single eyepiece. To observe the great conjunction, look to the southwest after sunset. The planets will set around 7:00 PM.

Next General Meeting:

The next General Meeting will be Sunday, January 10th, 2021 and will be conducted electronically.

There is no link to the December General Meeting since it was not recorded.

The December General Meeting concluded with an open forum for holiday fellowship.

Submitted by Dennis Decker, Secretary

LVAAS 2021 Renewal Form

Questions? Contact: membership@lvaas.org

2021 Dues (Circle One)

Type Of Membership	*Dues*
Individual	$45.00
Full-time students, over 18	$15.00
Family	$65.00
Sustaining	$90.00
Junior (under 18 as of 1/1/21)	$15.00
Life	$675.00

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

Donation: _____

Complete this form and give it, with payment, to the Membership Director (Gwyn Fowler):

- At any membership meeting – cash or check
- via US Mail – check only (payable to LVAAS) – to:

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

Full members should renew by January 1, 2021, to remain in good standing. If you are not renewing, please arrange to return society keys, library books and rental telescopes.

If there are no changes in your information, you may just mail your check. If you want to give an additional donation, just include it with your dues. If you want to designate your donation please specify.

Individual Membership Renewal	
Name:	
Street Address:	
City/State/Zip:	
Home Phone:	
Cell Phone:	
Email	

Would you like a receipt for payment?
Yes ___ **No** ___

Would you like a membership card?
Yes ___ **No** ___

Note: If the answer is "yes" to either of these questions please include a stamped/self-addressed envelope with your renewal form to the address listed on the top right of this form. Membership cards will be mailed until we are able to have in person General Meetings.

Family Membership Renewal	
A Family is 2 Adults + Minor Children (under 18), all living at the same address.	
Adult #1 Name:	
Adult #2 Name:	
Child Name	Age:
Child Name	Age:
Child Name	Age:
Street Address:	
City/State/Zip:	
Home Phone:	
Cell (Adult #1):	
Cell (Adult #2)	
Email (Adult #1):	
Email (Adult #2):	

Official Use Only: Dues: _____ Donation: _____ Total: _____ Check#: _____ Date Paid: _____

Card Issued: _____ Receipt: _____ Keys/Rentals Notified: _____ Cash to Treasurer: _____

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, planetarium). **Donation:** _____

Committee Use Only:

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

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

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: Smartphone Astrophotography

From Dr. Sten Odenwald of the NASA Space Science Education Consortium, FYI. Please share this product announcement with anyone interested…

A Guide to Smartphone Astrophotography has now gone through NASA Product Review and has been recommended for wide distribution. This lavishly-illustrated book features detailed instructions for how to use your smartphone to take photographs of the night sky, and numerous astronomical objects included. Previously, expensive cameras were required, but the advent of smartphones brings this exciting hobby into the hands of students and life-long learners for exciting journeys of exploration. This step-by-step guide written by a professional astronomer will show you how to do it! (189 pages, 185 illustrations, PDF).

Please link to the main SpaceMath@NASA webpage where the document is being featured so that I can keep track of the number of downloads. Download at http://spacemath.gsfc.nasa.gov

Send comments to Sten Odenwald at odenwald@astronomycafe.net

https://spacemath.gsfc.nasa.gov/SMBooks/AstrophotographyV1.pdf

Cover image by Warren Landis: NGC 281 The Pac-Man Nebula
Imaging telescopes or lenses: Williams Optics ZenithStar 66 · ASTRO-TECH AT60ED 60MM F/6 FPL-53 ED DOUBLET #2 · ASTRO-TECH AT60ED 60MM F/6 FPL-53 ED DOUBLET
Imaging cameras: ZWO ASI183MM PRO cooled · QHY163M · ZWO ASI 1600MM-Cool
Mounts: Celestron CGX
Guiding telescopes or lenses: ASTRO-TECH AT60ED 60MM F/6 FPL-53 ED DOUBLET #2
Guiding cameras: ZWO ASI120MM-Mini
Focal reducers: Williams Optics Adjustable Flat 61 · WO x0.8 · Williams Optics Flat 61
Software: Adobe Lightroom CC · AstroPixel Processor · Adobe Photoshop CC 2017 Photoshop CC 2017 · APT
Filters: Chroma SII 3nm · Chroma Ha 3nm · Chroma OIII 3nm
Accessory: ZWO EAF · ZWO OAG

~ 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

LVAAS General Meeting
Sunday, January 10 at 7 p.m.

- Meeting will be online only -

Cherry Springs: PA's Dark-Sky Gem

Cherry Springs State Park, in Pennsylvania's Potter County, is a favorite location to enjoy the night sky for our speaker and many others. Learn about the story of Cherry Springs from the beginning to the current time, and how to best enjoy the park.

Eric Loch

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 nor a professional astronomer, he has spent many hours with his collection of telescopes, enjoying looking out into our universe.

Eric currently serves on the Cherry Springs Dark Sky Fund Board and is Director of LVAAS' Public Relations Committee.

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.

Night Sky Notebook for *January*

by

Peter Detterline

From the LVAAS Archives:

Remembering Roland Lovejoy

by Sandy Mesics

In 1971, forty-year-old Dr. Roland Lovejoy took the helm as LVAAS Director. At that time, he was Associate Professor of Chemistry at Lehigh University. Roland grew up in Portland Oregon and was the first in his family to attend college. He came to Lehigh after earning a B.A. in Chemistry at Reed College in Portland, OR in 1955 and a Ph.D. in Chemistry at Washington State University, followed by postdoctoral study with Paul C. Cross at the University of Washington from 1961–1962.

1. Dr. Roland Lovejoy
1931-2010

Roland joined LVAAS in July 1965. He quickly became involved in the Society, serving as Parliamentarian in 1966. He was the first person to swear in new officers. In 1968, he led the Astronomy Study Group. This was a highly active subgroup of LVAAS members who were considered “serious” about the hobby. They met monthly to cover various topics, many times followed by an observing session. The group sometimes took turns presenting chapters of Astronomy textbooks to each other. In 1969, he and I shared the job of librarian, and he also filled the term of the membership chairperson who had resigned. In 1969 and again in 1970 he was elected Assistant Director before becoming Director in 1971.

Roland was also an amateur telescope maker. In 1972, he won 3rd Place in the optical competition at the Stellafane Convention for his 6-Inch Dall-Kirkham telescope. He also had an interest in constructing and flying model airplanes.

During his 32-year career, all spent at Lehigh, he did research in the area of molecular spectroscopy and structure, and received grants from Stanford and NASA to investigate the depletion of the ozone by taking measurements of molecules found in the stratosphere above the poles. On a sabbatical trip with his wife, Deborah, he conducted infrared astronomy research at the University of Arizona’s Lunar and Planetary Laboratory. Apparently, this trip led the couple to decide to retire in Tucson in 1994. The couple also kept a summer home in Maine.

2. Roland Lovejoy, left and Ernie Robson both from LVAAS, speaking at the Astronomical League in 1969.

Lovejoy died on April 19, 2010, as the result of a fall in his Tucson Arizona home. Survivors include his wife, two daughters, three granddaughters, and a brother.

References

Reed Magazine, September 2010. https://issuu.com/reedcollege/docs/issuu_2010_09

“Mudd In Your Eye,” Newsletter of the Department of Chemistry, Lehigh University, No. 39, Sept. 2010. https://chemistry.cas.lehigh.edu/sites/chemistry.cas.lehigh.edu/files/issue39.pdf

From the Field ~ Ron Kunkel

"All,

Here at my home and my son's home, 6 and 7 miles west of Hamburg respectively, the weather was not cooperative for viewing the Jupiter and Saturn super-conjunction on either 12/20 or 12/21, with 12/21 being the closest position of the two planets. And the weather forecast for viewing on 12/22 was only marginally better, with various weather services calling for cloudy all day, with clearing starting variously at 5:00 p.m. to 7:00 p.m.

Despite the total overcast all afternoon, I decided to set up my 8" LX200 at my son's home, hoping for a miracle. I wanted so much to show the conjunction to my two grandsons, as I had been building it up to them for quite some time. Miraculously at 5:00 there was a rather large clearing in the southwest just where it had to be to view the conjunction.

Here are three photos taken with my son's Android S8+ phone. One photo shows the sky view of the close pair Jupiter and Saturn with just the phone camera looking directly at the sky. Another photo shows my 6 year-old grandson, Colton, standing on my observers' chair looking into the eyepiece of the telescope at the conjunction. And the third photo shows the telescope view of the actual conjunction. This later photo was taken at 91X magnification on the telescope. I also tried viewing at 161X, and although both planets were still in the same field of view, the image was very soft, as the seeing was actually quite terrible.

All the photos were taken between 5:17 and 5:29 p.m. and shortly thereafter a huge dark cloud rolled into the southwest and viewing suddenly ended. But it was grand while it lasted."

Ron Kunkel

Courtesy Ron Kunkel

StarWatch

by Gary A. Becker

Sequel to the “Star”

The great conjunction of Jupiter and Saturn that brought memories of the Star of Bethlehem into focus this past Christmas is fading, but one last saga of the story needs to be highlighted: what ensued after the triple conjunction of Jupiter and Saturn and how there is a similar grouping of planets that will be happening from January 9 through the 11th. I would also like to provide a comparison with the conjunction of today and the one of yesteryear that possibly heralded the birth of the Christ Child over 2000 years ago. There are some notable differences.

Our 2020 conjunction was rare only because of the closeness that Jupiter approached Saturn (1/10th degree), and it was a relatively short event lasting throughout the latter half of December. Convergences of Jupiter and Saturn occur every 20 years. The most popular astronomical explanation for the Star of Bethlehem took about a year to transpire and began with Jupiter and Saturn emerging from the glare of the morning sun in the predawn winter months of 7 BC. Jupiter then caught up to and passed Saturn on May 29 of 7 BC, similar to what we have just witnessed. The separation of Jupiter and Saturn was one degree, 10 times greater than what has just occurred.

By the summer of 7 BC, the Earth was catching up to both planets which were still near to each other in the sky. The analogy is identical to a car passing a group of trucks on a long, steep hill. During the act of driving past the trucks, the 18-wheelers appear to move backwards or to retrograde. This is exactly what occurred with Jupiter and Saturn as the faster orbiting Earth caught up to and passed the two slower orbiting Jovian worlds. This caused Saturn and then Jupiter to retrograde, to begin moving backwards in July of 7 BC. Since Jupiter was closer to the Earth, its retrograde motion was more exaggerated, and it passed Saturn while both planets were moving westward for a second time on September 30 of 7 BC. This must have piqued the Wise Men’s attention because retrograde motion was not a well understood phenomenon at that time.

As the Earth passed Jupiter and Saturn, both planets assumed their normal eastward motion in the heavens, causing faster orbiting Jupiter to overtake and pass Saturn high in the evening sky for a third time on December 5 of 7 BC. If that was not enough, Mars brought a conclusion to the “Star” by entering the scene and catching up to Jupiter and Saturn to form a loose triangle in the western sky during late February of 6 BC.

This brings us full circle to what will be occurring on January 9-11 when Mercury, instead of Mars, will enter the scene to form a loose triangle with Jupiter and Saturn. Mercury will be the planet to the left. Jupiter will be ahead of Saturn which will be the faintest of the three. All three planets will be visible in the same binocular field of view.

To see this association, you'll have to scout a location with an impeccable southwestern horizon. The center of the triangle will be only three degrees above the horizon, 35 minutes after sundown, so the sky will still be bright. You may catch Jupiter and Mercury with the unaided eye, but I think binoculars will be needed to reveal Saturn.

While the 6 BC conjunction involving Mars would have been placed a little higher in the sky, the convergence of Mercury with Jupiter and Saturn is another similarity with respect to the "Star" which prodded the Wise Men to journey to Judea to pay homage to the Christ Child.

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

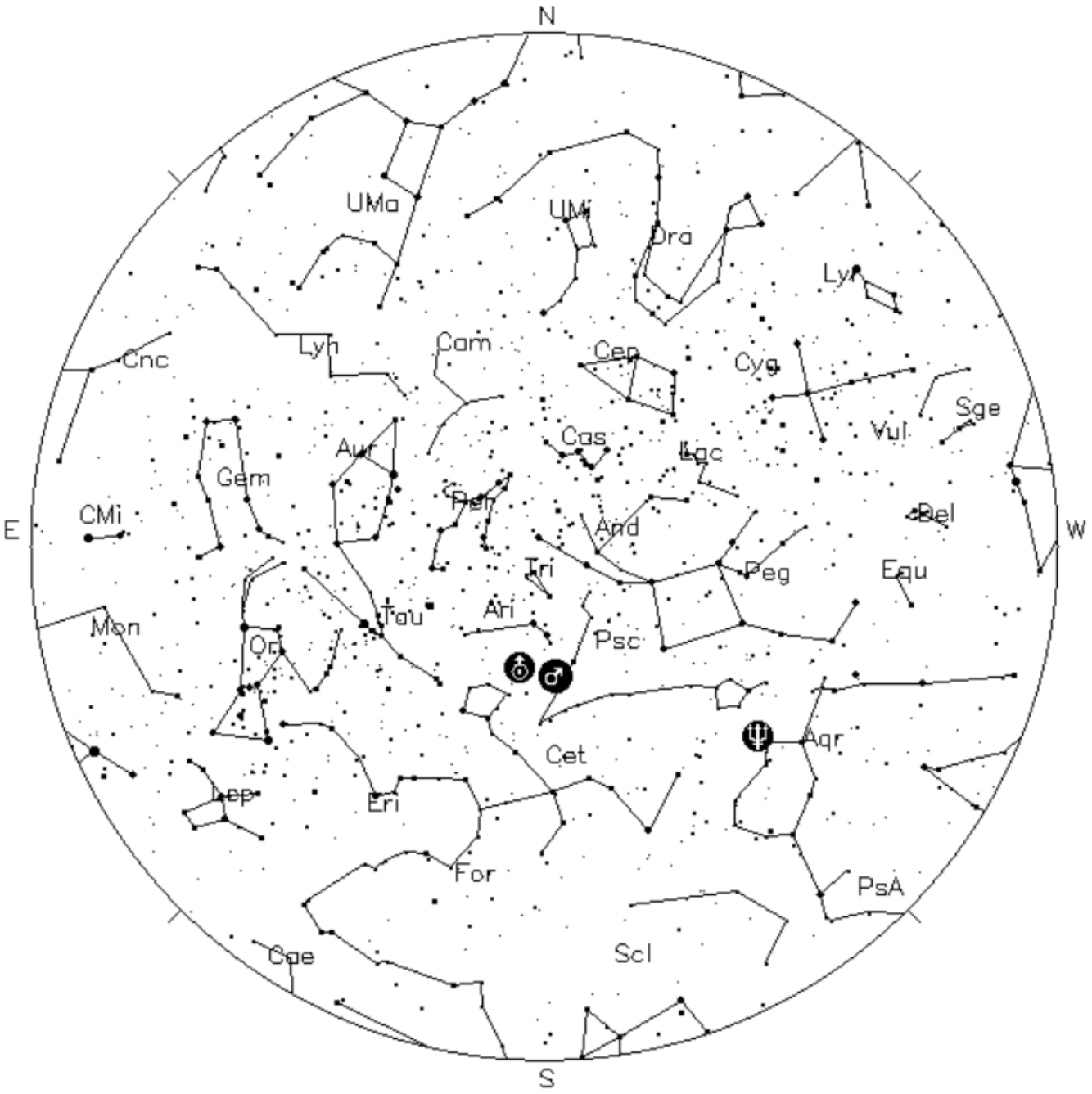
From the Field ~ Mike Waddell

I anxiously awaited the night of December 13, 2020 like a child waits for Christmas. The Geminids meteor shower was hyped to be one of the best of the year and I had visions of meteor trails dancing in my head. I knew that I was ready with a new Nikon Z5 camera, clothing for any weather, and unlike Ralphie, I hoped that this momentous meteor shower would shoot my lenses out! And like some Christmases, my hopes were dashed when I set up two cameras (Nikon Z5 and Nikon D5500) for over three hours of sky watching and not one meteor graced my sensors. There were, however, numerous clouds and sometimes when doing nightscape imaging you just have to take what Mother Nature gives you. I liked these images because they were interesting with the clouds flying past overhead and stars intermittently peeking through. These three images were shot in my backyard and all are 30 second shots at f2.8, 17 mm, ISO 200, Nikon D5500 and edited in Lightroom CC. I also used a light pollution filter to diminish the skyglow.

May the clear skies be with you,

Mike Waddell

Sky Above 40°33'58"N 75°26'5"W Tuesday Jan 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/**

JANUARY 2021

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

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						

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. 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.

Every effort will be made to properly credit the sources of the material used in this publication. If additional credit is required, please notify editorlvaas@gmail.com.

No permission is required for non-profit educational use of the material in this publication. Please send a link to, or copy of the publication containing the reprinted material to the editor at the above address. ***Some material in this publication may be copyrighted.***

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