

The Observer

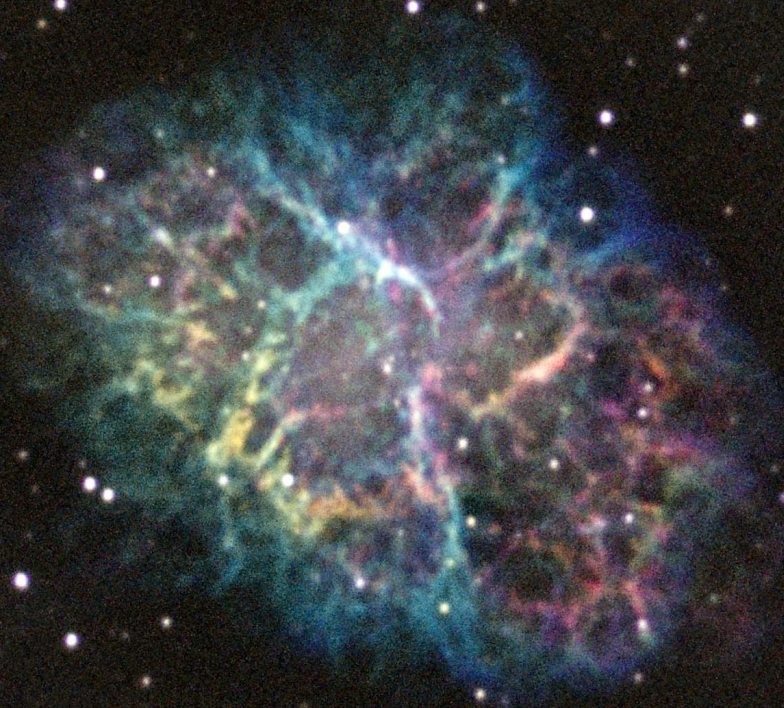
The Official Publication of the Lehigh Valley Amateur Astronomical Society

<https://lvaas.org/>

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

June 2021

Volume 61 Issue 6





ad astra *****

After review by the Board of Governors it was decided that additional changes will be made to the By-Laws. This includes changing the Fiscal Year from October - September to the calendar year, so the new Fiscal Year will run from January to December in 2022. This will result in new dates for LVAAS membership dues. As always dues should be received by January 1st. Membership dues will continue to be collected until March 1st; from March 1st until June 1st members will be considered in arrears. If dues are not paid by June 1st you will no longer be considered a member.

I'm sad to report Carol Kiely has decided to step down as Star Party Coordinator due to family commitments. Carol has been a mainstay in running Star Parties for the last few years. I am sure Carol will continue to help as she is able. If anyone is interested in this position, please contact me at director@lvaas.org

The state of Pennsylvania has decided to lift many pandemic restrictions as of May 31st. In line with this change LVAAS has decided to open up some activities to its members. The BOG has approved the following activities for **LVAAS Members Only** at the South Mountain site:

- ▶ Astro Imaging Meeting June 19th
- ▶ Star Party June 26th
- ▶ LVAAS Picnic July 10th
- ▶ Star Party July 17th
- ▶ Star Party August 14th

Note: These events will be held for **LVAAS Members Only** with the following restrictions:

- ▶ Masks and Social Distancing are required as per Pennsylvania state requirements in force at the time of the event.
- ▶ While the building will be open to use the bathroom and look around, the Star Parties will not have Planetarium Shows and the Red Shift will not be open. We will make drinks and snacks available outside the building.
- ▶ Observatories that are open will have alcohol swabs available to wipe down the equipment and viewers will only be allowed in the building one at a time. Others are asked to wait outside the Observatory until it is their turn.

Like LVAAS other events are starting to open up to people interested in astronomy. Please check their various websites for details of these events. Below is a list of some events I am aware of:

- ▶ Stellafane: August 5th to 8th (Registration is already open)
- ▶ York County Star Party: September 8th to 12th
- ▶ Black Forest Star Party: October 1st to 3rd
- ▶ York County Star Party Event 2: October 6th to 11th

Lastly, I would like to thank Glenn Bressner of Emmaus who has donated to LVAAS a Celestron Nexstar 6SE.

Note: Volunteer opportunities for Director of Membership Services and Star Party Coordinator remain open for those who may be interested in supporting LVAAS.

AdAstra

Thomas Duff

Minutes from the LVAAS General Meeting – May 1, 2021

The May 2021 LVAAS General Meeting General Meeting was held both outdoors at the Pulpit Rock dark sky site as well as utilizing an on-line service.

Approximately 50 people were in attendance; 20 on-line and 30 at Pulpit Rock.

Director Tom Duff opened the meeting at 8:40 PM.

The General Meeting's presentation was An Evolutionary Way to View the Moon by Peter Detterline.

Peter is an avid astronomer whose interests cover a wide range of the astronomical spectrum. For thirty-five years he was the Director of the Boyertown Planetarium, where he gave programs to over half a million people. He is a recipient of the Thomas Brennan award from the Astronomical Society of the Pacific for exceptional achievement related to teaching high school astronomy. He teaches an astronomy course at Montgomery County Community College, Moravian College and Montana State University. In research he has coauthored numerous papers on eclipsing binaries and contributes data to the AAVSO, ALPO, IMO, and IOTA. He is the Observatory Director for the Mars Society where he heads up an Astronomy Team providing a solar and a robotic telescope for their members at the Mars Desert Research Station in Utah. He also provides training for a robotic telescope in New Mexico as the Lead Astronomer for the Montana Learning Center. Both robotic telescopes are used remotely by students around the world.

Peter was selected to be part of the "Astronomy in Chile Educator Ambassador Program", where he visited the largest American observatories in that country. As an amateur astronomer he has traveled the globe to view solar eclipses, built his own observatory, and has completed over 35 observing programs including the Astronomical League's "Master Observer". He is an honorary life member of the Lehigh Valley Amateur Astronomical Society (LVAAS).

When he's not staring at the heavens, Peter is preaching about them as a commissioned minister for the United Church of Christ, and fills in for various churches as needed. Astronomy for him is a deeply enriching experience that connects the heavens to the Earth.

Treasurers Report: Gwyn Fowler

- All expenses are being managed. Currently only have normal expenses (utilities, maintenance and supplies for work parties). No changes in the budget.

Membership: Gwyn Fowler

- 2nd readings
 - Patricia Keller

- 1st readings
 - Charles and Sasha Davies
 - Jamie Elovski
 - Peter Miller
 - Justin Riddle

General Comments

Gwyn Fowler

- I received \$28 cash donations for the Red Shift (hot drink sales and donations for providing candy and cookies) and a member gave me a \$400 anonymous donation (check). I received \$39 cash plus a \$44 check for LVAAS keys and received a \$65 check for membership.

Tom Duff

- The LVAAS bylaws revisions are finished. The final drafts of the revised bylaws will be submitted for Board review and will be brought to a vote at the May Board meeting. After Board approval, they will go to the membership for approval.
- An outdoor imaging meeting (weather permitting) is planned for June at South Mountain. COVID precautions will be observed. The topic would be Equipment Setup and imaging example. Please check the website to verify meeting start date and time.

Frank Lyter

- Awareness about LVAAS e-mail groups. Currently there are three: one for South Mountain, one for Pulpit Rock, and one for Astroimaging. The intent of the e-mail groups is that they focus on a specific part of LVAAS. If you wish to learn more about or become part of an e-mail group, please reach out to one of our members on the LVAAS website contacts page.

Next General Meeting

- The next General Meeting will be Sunday, June 13th, 2021 and may be conducted as a dual outdoor/online meeting. Please check the website to verify meeting format and start date and time.

The May General Meeting was recorded.

The meeting was adjourned at approximately 9:50 PM.

Via Ron Kunkel:

The video recording of Dr. Ruth Daly's presentation "[An Overview of Black Holes in Galaxies Across the Universe](#)", from this year's 9th Annual George J. Losoncy Lecture in Physics and Astronomy is available on Professor Daly's website:

<https://sites.psu.edu/rdaly/april-9-2021-9th-annual-losoncy-public-lecture/>

Information on the event is included in the link

Via Earl Pursell: NEAF : The Virtual Experience - Livestream Link:

<https://www.youtube.com/embed/KP-GPuHc3BI>

Via Earl Pursell, UACNJ Liason: Presentations through October 2021

UACNJ provides FREE public programs at our Observatory in Jenny Jump State Forest from April through October on Saturday evenings. For the safety of the public and our volunteers, we will be operating the observatory much as we did last year: the entire event will be held outdoors with masks and social distancing required. Weather permitting, an astronomy presentation begins at 8 p.m. As you will be outdoors, please bring a chair or blanket to sit on and be prepared for cool weather. The presentation is followed by some stargazing and we will have screens set up to show live video from the observatory's telescopes until 10:30 p.m. These public programs are free but donations are appreciated. Note admission is limited and by reservation ONLY. For more information and free registration see our website: <http://www.uacnj.org/index.php>. Reservations for the following week's program go on sale Sunday at 12 noon. Please join us or watch our presentations online by subscribing: [youtube.com/UACNJ](https://www.youtube.com/UACNJ)

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!

https://lvaas.org/page.php?page=using_rmd_to_support_lvaas



Cover image: M1 - The Crab Nebula, by LVAAS member Warren Landis

The 'Medusa' Telescope System

Observatory: SkyShedPod

Mount: iOptron CEM120

WO z61 / Adjustable FF, ZWO EAF, ZWO Filter Drawer, ZWO ASI183mm-cool

Apertura 60ED / Adjustable FF, ZWO EAF, ZWO Filter Drawer, ZWO ASI183mm-cool

AstroTech 60ED / Adjustable FF, ZWO EAF, ZWO Filter Drawer, ZWO ASI183mm-cool

Celestron 8" SCT, Celestron Focus Motor, ZWO Filter Drawer, ZWO ASI1600mm-cool

Pegasus USB Control Hub Rig Runner 4012 Power Distribution

LVAAS General Meeting: Sunday, June 13 at 7:00 p.m.

Meeting will be via Zoom only. Link will be emailed to members; prospective new members who wish to attend should please email membership@lvaas.org

Finding My Way in the Universe

presented by

Jessica Mink

Here's the story of the professional life of an astronomer whose scientific interests range from the origins of life to the structure of the universe, across orders of magnitude of size and distance in time and space, and whose main contributions have been tools to help other astronomers and astrophysicists understand their data.



Jessica Mink has been a positional astronomer and developer of astronomical tools, data pipelines, and archives at the Smithsonian Astrophysical Observatory for over 30 years, working with data from ground-based (and one space-based) telescopes. Between her MIT BS and MS degrees and this job, she was involved in solar system optical spectroscopy, high-speed occultation photometry, and the geometrical astronomy and catalog development needed to predict the occultations she observed with her colleagues. Her life story is complicated by the fact that she has spent the last decade of her life in a different gender than she spent the first six decades.

Pulpit Rock, night....



A small group gathers for a meeting under the stars at LVAAS's dark-sky site, Pulpit Rock, early in May, 2021. Image courtesy of Mike Waddell.

...and day

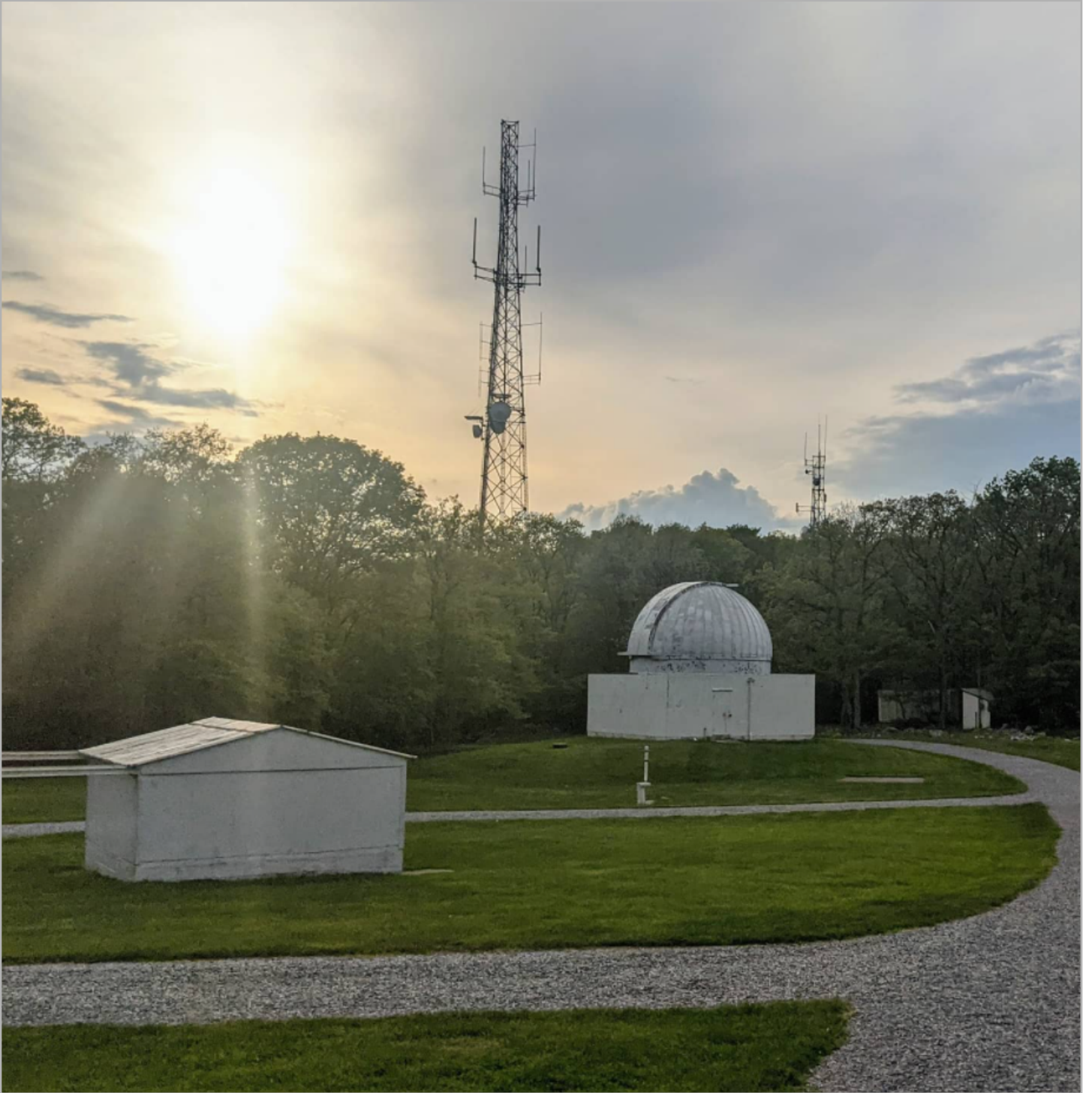


Image courtesy of Jim Blandford; May 2021.



~ FOR SALE ~

~Celestron 9.25 SCT on an Orion Atlas EQ-G. Asking \$2100

The EQ-G mount is two years old with not even 20 hrs on it. I have a 14" dob I use mostly. I also have a CGEMII go-to mount. The Celestron 9.25 I bought from an elderly gentleman in my neighborhood. It is in mint condition. It comes with a telrad, dew shield, dew strap that fits around the corrector. It has a 8x40mm finder scope. Also comes with a William optics 2" diagonal with 1.25" adapter plus focuser.

Please contact Jeff Lovaasen jdlovaasen@icloud.com



Night Sky Notebook For *JUNE*

by

Peter Detterline

Night Sky Notebook

Peter Detterline



June 2021



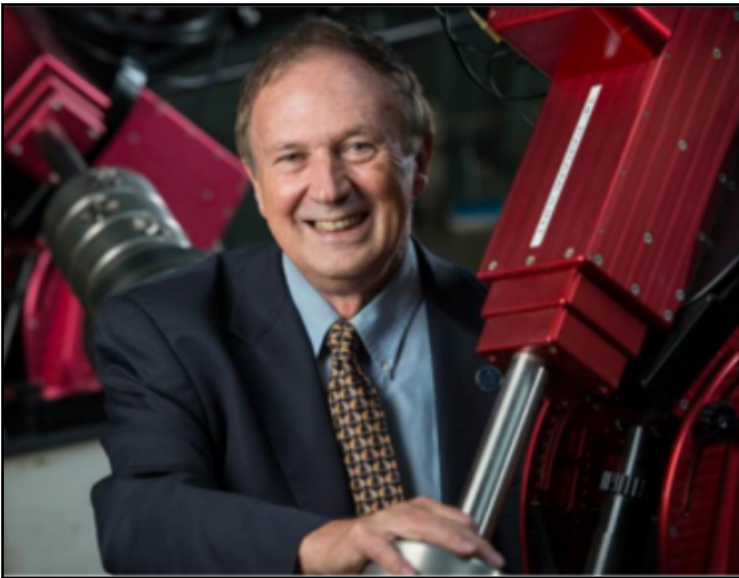


From the LVAAS Archives:

Dr. Ed Guinan; and Neptune Occults a Star by **Sandy Mesics**

Some of you may remember that Ed Guinan from Villanova University spoke at the May 2019 LVAAS meeting on Martian Farming. But this was not the first time Ed spoke at LVAAS. In May 1971 he presented a talk on a rare occultation of a star by the Planet Neptune, which occurred on October 7, 1970.

At the time, Guinan was a newly minted PhD in astronomy from The University of Pennsylvania, but he was already making significant contributions to astronomical research in. In 1968, he and two colleagues observed evidence of Neptune's ring system, which was confirmed by Voyager 2 in 1989.



Speaking at LVAAS Guinan reported that a lot of information was gained from that event. Photometric observations of the star were recorded as the starlight was diminished first by Neptune's atmosphere and subsequently by the planet itself. By analyzing this data, Guinan was able to calculate the mean molecular weight and composition of Neptune's atmosphere. The light curve appeared to diminish in a ragged shape, which indicated turbulence in Neptune's atmosphere. The size of Neptune's disc at the time of this event was about 2.5 seconds of arc, which is about as good as observing conditions get. The following measurements based on these observations are as follows:

1. Ed Guinan, Villanova University

Neptune's Diameter: 47,070 KM \pm 150 km

Oblateness: 0.025

Height of Atmosphere from the surface: 2015 km

Density: 1.59 that of the earth.

Ironically, Wikipedia states that despite this occultation, "the first scientifically useful observation of Neptune from ground-based telescopes using adaptive optics was commenced in 1997 from Hawaii." Since this event, Neptune has been analyzed by Voyager 2, which flew by Neptune in 1989, and by the Hubble Space Telescope since the 1990s. So how do those findings from the 1970 occultation fit with our present knowledge? Here are the current statistics:

Neptune's Diameter: 49,244 km

Oblateness: 0.0178

Height of atmosphere from the surface: 20 km

Density: 1.64 g/cm³ which is 0.29 that of Earth

Findings for diameter and oblateness were surprisingly accurate based on this one observing event. Neptune's density and the height of the atmosphere are interrelated, and that science continues to evolve. Admittedly, we now know that Neptune does not really have a solid surface, so the height of the atmosphere is now arbitrarily fixed at the point where 1 bar of atmospheric pressure is exerted.

Yet the presentation by Ed Guinan was a great example of the amazing work Earth-based astronomers with modest equipment, excellent knowledge of science and mathematics, and a bit of luck could accomplish fifty years ago.

Dr. Guinan has had a most prolific career in Astronomy. A few years after this presentation, he traveled to Iran, where he was instrumental in establishing the Biruni Observatory. Returning to Villanova, he was a Kepler mission guest investigator, searching for Earth-sized exoplanets. He contributed to the research related to Betelgeuse's dimming, as well as researching growing food on Mars. In 2018 Guinan's photometry work contributed to the discovery of a planet orbiting Barnard's Star, Barnard's Star b. We hope Ed will return again to LVAAS.

References

The Observer, June 1971.

A candidate super-Earth planet orbiting near the snow line of Barnard's Star:

https://www.nature.com/articles/s41586-018-0677-y.epdf?sharing_token=2mVPvv81gLD3pLgxfoa2HtRgN0jAjWel9jnR3ZoTv0NZDzdYmRIXOtab27hjzy6mpeqhzS91o6dsAxNCvOMelmRj1JOGTDy5qdut9KA6HhIrkbfW4sN3UjwBbGUg4EfAvGuMYWaDIVOmBg8QCuKCdi0CudDG1_ERBJXMoR7G4ua6goE1pYtJq14sIoagquVIBMJCK44U_TA2Rrfz8O1athMZflH8VYRPF8DoHmKyFvxDLiMxJjTRu2zkSOKKcIOF51-wSyK4VZYyr35h60yy2SKZOUv_yjagnc74WFnY-A%3D&tracking_referrer=www.space.com

Neptune, Wikipedia: <https://en.wikipedia.org/wiki/Neptune>

Schlegel Observatory Report

by Rich Hogg – June 2021



I skipped May in writing this report, and it will be brief this month, because I have a major distraction that is preventing me from spending too much time on the project. My brother and I still own the house in Scranton that we grew up in, but we have decided that we don't want to own it for much longer. So, I am pushing to get it ready to sell.

I have been spending what time I can on refining the design of the brackets to support the edge of the main mirror, because I was worried about procuring the metal stock for them. In a previous report I showed a design that would need to be milled out of a 4 inch aluminum cube. Getting hold of something

like that can be expensive, so I wanted to converge on a final requirement in case it would involve waiting for the right offer to come up on eBay or something like that.

Further analysis convinced me that the brackets do not need to be so beefy. Instead, they can be made from 1-inch plate, to a final shape as shown in the illustration. This makes the shopping much simpler. Once I have buy-in from the rest of the team, I think it will likely be taken care of with a visit to Moses B. Glick in Fleetwood.

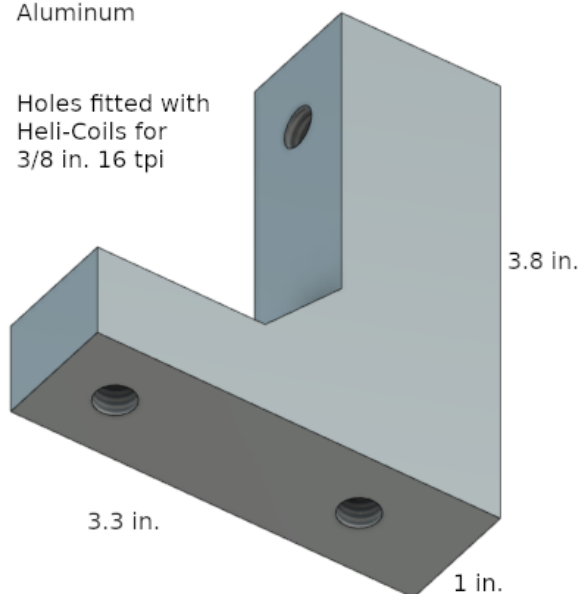
One key difference with this less-beefy design is that we will not have room for two rows of through-bolts with nuts, as was shown in the 4" design. Instead it will need to be a single row, and they will need to be threaded, because a through-bolt in the rear hole would interfere

with the threaded stud of the cabinet leg I am planning to use to mount the support pad.

Which brings up Heli-Coils. Fellow LVAASer Bob Moore clued me in to this situation. Machining aluminum is easy, which includes cutting threads, but it is also easy to ruin threads that are cut into aluminum. Especially when frequently assembling and disassembling a threaded joint, but also when just

Radial mirror support brackets (8)
Aluminum

Holes fitted with
Heli-Coils for
3/8 in. 16 tpi



applying a lot of torque to the bolt when assembling, the aluminum threads can be damaged by the harder steel bolt, which can cause failure, often in the form of the joint seizing up.

Heli-Coils are a solution. You drill and tap the hole to a larger diameter (but the same thread pitch, using a special tap) and then screw in the Heli-Coil, which is fabricated from steel and looks like a spring made out of diamond-shaped wire. The outside of the spring nestles tightly into the aluminum threads, without damaging them since the joint is not yet under load (even though the spring tends to expand after the installation torque it removed, so that it fits the threads tightly.) Then, the steel bolt is threaded into the Heli-Coil, with a steel-on-steel movement as the bolt is torqued and the load is developed. The Heli-Coil spreads the load out over a larger aluminum thread, and protects the aluminum from friction under load. The combination is stronger and more durable than a plain threaded hole in aluminum.

Of course, we'll need some additional holes in the bottom plates to attach the brackets. Actually, we'll need to re-use one of the existing holes which is for holding the two bottom plates together, so we'll need to drill those a bit larger as well as replace them with some new bolt locations.

Here is a side-view rendering of the bracket in-place with the cabinet foot and support pad, supporting the edge of the mirror from the right.



by Gary A. Becker

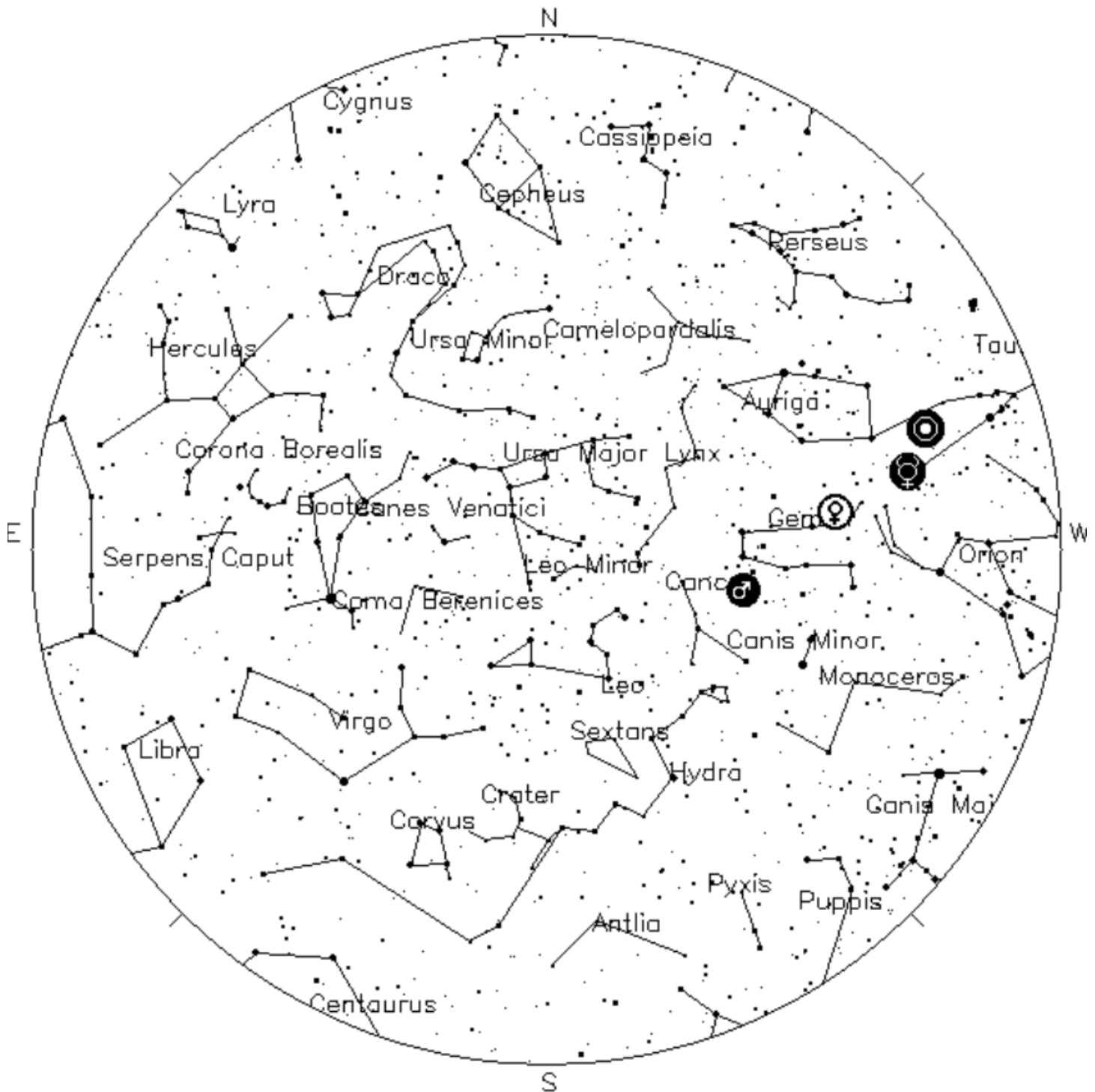


Safe Solar Eclipse Observing June 10

On Thursday, June 10, my birthday, the sun will rise along the northern mid-Atlantic, New England, and northern mid-Western states partially eclipsed by the moon. Along a rather wide band starting north of Thunder Bay, Ontario, Canada, eastern Hudson Bay and almost all of James Bay, most of Baffin Island, extreme northwestern Greenland, the North Pole, and ending in northeastern Siberia, Russia, this eclipse is annular (ringed), meaning that the entire silhouetted disk of the moon will be seen against the bright sun; the moon too small—too far from the Earth to cover the sun completely. Locally, about 75 percent of the sun's disk will be obscured by the moon at sunrise which could produce some interesting visual effects as the sun approaches the horizon. The challenge for June 10 is how do you observe the sun safely? The solar glasses that you may have purchased for the 2017 eclipse are your best bet. If the Mylar or black film material is still in good shape—no scratches—then you have in your possession all that you need to view this event. If you want to purchase glasses, I would suggest immediately ordering a pair from Rainbow Symphony. Its website can be found [here](#). If you did not purchase solar glasses, all is not lost. Go to a welding supply store or Google welders shades (no apostrophe) and purchase a number 13 and a number 14 welders' shade. A number 14 shade is good for viewing the sun when it is higher in the sky or at sunrise, if the sky is crystal clear, while a number 13 works well if there is haze near the horizon. Welders' filters are additive, so if a number 14 filter is not available, the purchase of two number seven filters will do the trick. Regular welders' shades give you a green image of the sun while "gold" coated filters produce an orangey view. The gold shades are more expensive. If you own a small telescope, spotting scope or binoculars, you can project the image of the sun through an eyepiece. Since the sun is a dangerous star to observe without filtration, observers should never locate Sol by looking through the instrument. Have someone hold a white piece of cardboard in back of the eyepiece and allow the rising sun to cast a shadow of your equipment onto the board. Manipulate the barrel of your scope or binoculars so that it is pointing towards the sun and producing the smallest possible shadow on the whiteboard. The instrument will then be projecting the sun's image. The white cardboard can be used as the projection screen. This technique is actually easier than it sounds, but I would strongly suggest practicing before E-day. Make sure that if kids are involved, the finder scope on your telescope or spotter is covered, and an adult is always officiating. Do not expose your equipment to excessive heat buildup by projecting the sun for long periods of time. Even easier techniques, such as building a simple solar projection box, can be found on my website, [astronomy.org](#). I also recommend listening to my Moravian College class video on observing techniques for solar eclipses which is located [here](#). Think clear and sunny for Thursday, June 10. My 95-year-old mother, Elsie, says that it has never rained on my birthday. I'm holding her accountable to that statement. Clouds be gone too...! Ad Astra!

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

©Gary A. Becker for StarWatch



Your Sky was implemented by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows. The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

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

Based on GIFENCOD by David Rowley

Lempel-Zim compression based on "compress"

Modified by Marcel Wijkstra

Copyright © 1989 by Jef Poskanzer.

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

JUNE 2021

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

JULY 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				Last Quarter Moon 01	02	03
Independence Day 04	05	06	07	08	New Moon 09	General Meeting/Picnic - 5:00 PM 10
General Meeting (rain date) - 5:00 PM 11	12	13	14	15	16	First Quarter Moon 17
Deadline for submissions to the Observer 18	19	20	21	22	Full Moon 23	24
LVAAS Board of Governors Meeting 25	26	27	28	29	30	Last Quarter Moon 31

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: ____/____/____

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. **Please submit your finished ad as a PDF, with pictures and text.** 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.

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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

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