The Observer

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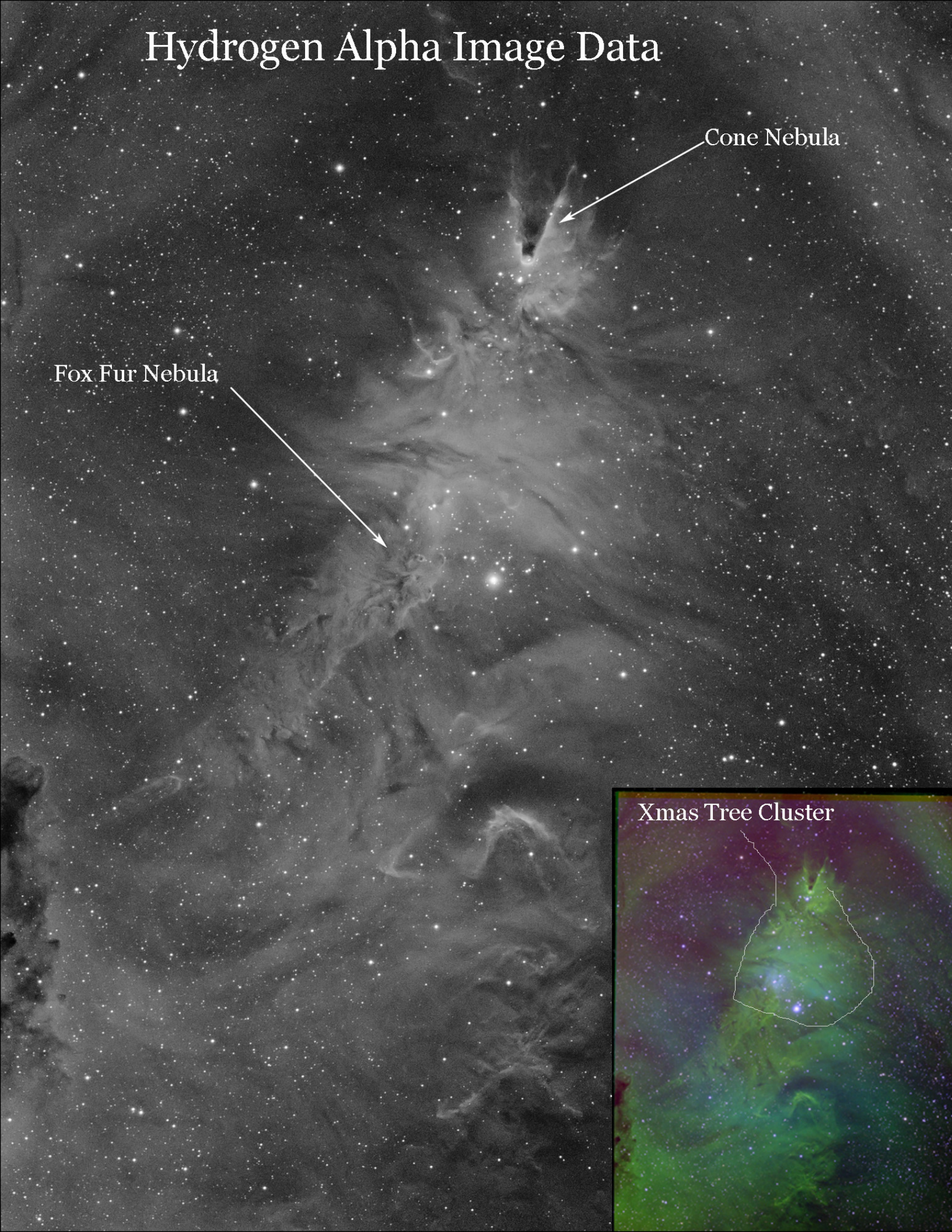

Hydrogen Alpha Image Data
Cone Nebula
Fox Fur Nebula
Xmas Tree Cluster

This is an image of the NGC 2264 region in Monoceros. It is a combination of image data taken through Hydrogen Alpha (Ha), Oxygen Three (OIII), and Sulfur Two (SII) narrow band width filters. The filters I used are restricted to 5 nanometers. For instance, Ha is in the deep red wavelength of 656 nm. So the Ha filter restricts the light wavelength approximately 653.5 to 658.5nm. Most emission nebula such as NGC 2264 are dominant in hydrogen alpha and a true color RGB image will render them mostly red. Of course the stars will vary in color. However this image is processed using the Hubble palette which assigns the color green to the Ha channel, blue to the OIII channel and red to the SII channel. In the early processing stage the image is primarily green (as seen in lower right smaller greenish image of the Hydrogen Alpha image on pg. 2.) Through processing the other OIII and SII channels are weighted to reveal more of the OIII blues and SII reds. Consequently the result is the multi varied color image.

This image was taken through a 106 mm refractor working at F3.64, using a mono CCD cooled camera. Each sub frame was a 10 min. long exposure. The total exposure time was 7.9 hours over four nights during February and March. One of the advantages of using narrow band filters is that they are effected very little by light pollution and the illumination of the moon. The image was taken in my highly light polluted backyard.

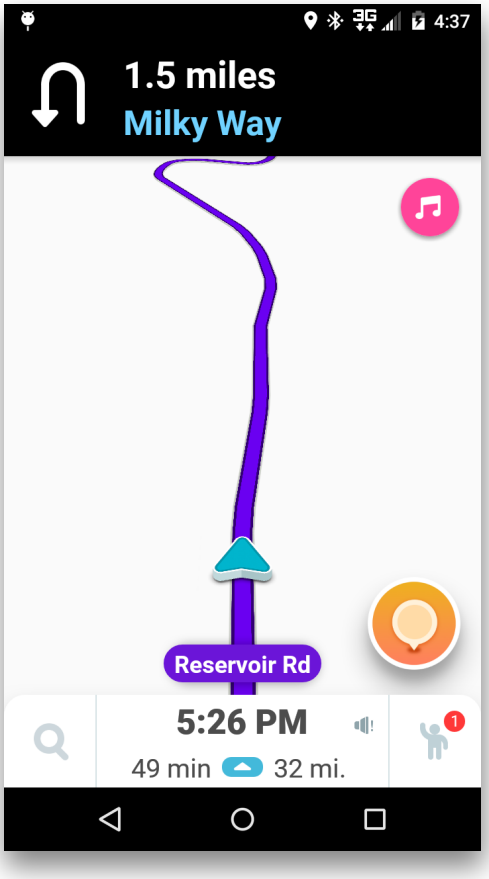
Most views of this object will only reveal the Christmas Tree Cluster, which is easily viewed with even a small scope. But it will take a large aperture scope under very dark skies to reveal the nebulosity. Today, through digital technology and with even a small aperture scope one can capture surprising detail, that only a few decades ago, would only be possible from the larger professional observatories. ~ Lynn Krizan

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

This time I'm reporting on two more (mis)adventures I experienced while returning from Pulpit Rock.

Misdirected

It was the last day of May, and I was leaving Pulpit Rock after a few hours working on the 40". I cared a bit more than usual how long it would take to get where I was going, so I fired up the Waze app on my phone. Not because I didn't know the way — I know more than one way — but because Waze can use the data from other drivers to tell you where there are delays and jams, sometimes allowing you to avoid them.



See image at right for what I saw on my phone.

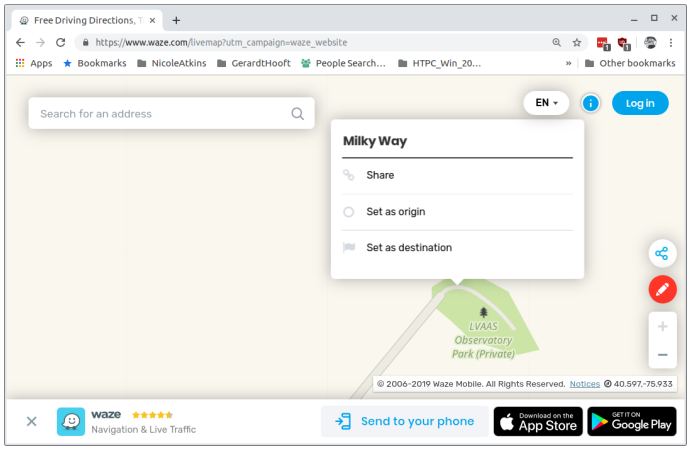
Interpreted carefully, here is what it is saying: that I am currently on Reservoir Road (which was true) and that to get where I was going, I needed to proceed for 1.5 miles and make a U turn on Milky Way.

By the shape of the road depicted, you can tell that Waze thinks I was headed up the mountain, rather than down. The sharp bend to the right seen at the top of the screen is just before where Reservoir Road crosses the creek coming out of the Reservoir. Since I wasn't moving at the time, it's sort of understandable that Waze guessed incorrectly and thought I was headed the wrong way. And, it does not like to suggest 3-point turns or U-turns at any old location. It seemed as if it knew about the loop at the top of the mountain and it wanted me to use it.

The really interesting part, of course, is that Waze thinks the loop is named Milky Way. I saw this once before, but the first time I did not have the presence of mind to capture a screen shot, and after a day or so I began to doubt that it had actually happened. This time I didn't let it get away.

Back home, I searched a bunch of other mapping websites, but none of them have Milky Way as the name of the road. Some of them call it Reservoir Road, some call it Valley Rim Trail, and some call it Unnamed Road. (I would love to see somebody make Unnamed Road the actual, official name of a road somewhere, just to see how much havoc it would cause.)

(I did discover an undistinguished country lane named Milky Way, near Zionsville about 8.5 miles southwest of our South Mountain headquarters.)



However, if you go to the waze.com site and click on Live Map, you will reach a map that will let you navigate to Pulpit Rock, where you can see that it has at least a portion of our drive. (It doesn't show the loop, so I wonder why it wanted me to go all that way to turn around, after all.) But then, if you click on that road, it identifies it as Milky Way, just as the mobile app does.

I would love to know how this designation got into the Waze road name database, but honestly, I don't care enough to pursue it any further than I already have. Maybe somebody out there has some inside knowledge.

Mistaken Identity

Another time, I was not in a hurry to get home so I decided to take the scenic road, come what may. As usual I turned left from Kistler Valley Road onto Schochary Road and then right on Bausch, my favorite road, swinging wide to avoid the Lynnville Hotel customers who always park blocking half of the highway.

About a quarter mile down, I saw three critters crossing the road, right-to-left in front of me. They paused on the shoulder, so I stopped to take a look, right next to them.

My window was down. The three juvenile raccoons turned to face me and eagerly looked up at me.

Yeah, they were really cute. I could not resist saying "Hi, guys!" like some idiot who thought he recognized them from a previous encounter.

Still looking up, they began to approach the vehicle.

Visualizing myself in the act of trying to chase the cute raccoons out from under my car, so that I could continue on without carnage, I decided the interview was over and drove off before they could get beneath my wheels. In my rear-view mirror, I saw them back out in the road, sitting on their haunches, watching wistfully as I sped away.

It really seemed as if they thought I was their new Mama. Well, I hope they made out OK.

Upcoming Events

July 20th will be the 50th Anniversary of the Apollo 11 moon landing! Da Vinci Science Center is planning a very interesting program for the day (watch for details on their web site) and LVAAS is participating. If you are interested in participating, contact Education Director Blaine Easterwood.

Ad Astra!

— Rich Hogg

LVAAS Members' Night, Annual Picnic and General Meeting

Saturday, July 13, 5:00 p.m.

Raindate: Sunday, July 14

South Mountain Headquarters
620B East Rock Road -- Allentown, PA 18103

Ginny McSwain

Associate Professor of Physics
Lehigh University, speaking on

"Dogs in Astronomy"

Dogs in Astronomy: From the Dog Star to the dog Laika, dogs have always been along for the journey in astronomy and space exploration. I will highlight some of the science inspired by man's best friend.

Ginny McSwain is an Associate Professor of Physics at Lehigh University. Her research includes various topics related to massive stars, interacting binaries, and pulsating variable stars. She recently adopted her first rescue dog.

This is LVAAS' annual Members' Night and picnic. Please plan to bring a covered dish, snack, or dessert. LVAAS will provide hamburgers, hot dogs, and beverages.Also, we will have our annual swap meet! Bring any astronomy-related goodies that you think someone else might enjoy having more than you do, and see if you can make a deal. You will need to bring your own display table.

Minutes for the LVAAS General Meeting - June 9, 2019

The June 2019 LVAAS General Meeting was held on June 9th at the LVAAS facility on South Mountain in Lower Saucon Twp. Attendance was not recorded. The meeting was opened by Rich Hogg, Director, at 7:07 p.m.

Our speaker was Ron Kunkel, a long-time LVAAS member who has held, at one time or another, all the elected offices of the club. Ron has a degree in physics and worked at Bell Labs for 33+ years before he retired. He bought his first telescope when he was 48 years old. He is primarily a visual astronomer, with an interest in globular clusters. He currently runs the Scout program at Pulpit Rock and is also responsible for the maintenance of that site.

Ron's talk for the night was "The Astronomy of Beer." He started with examples of beers that have astronomical names and what they refer to, e.g.: Blue Moon (2nd full moon in any given month, but originally the 3rd full moon in a quarter with 4 full moons), Dubhe Imperial Black IPA (one of the pointer stars in the Big Dipper), Alcyone Ale and Pleiades Ale (Alcyone is one of the stars in the Pleiades star cluster), etc. He noted that Rising Tide Brewery alone must have over 40 astronomy-related beers (one attendee noted that names of beers must be unique to be registered and used, and with all the craft breweries now, they may have decided astronomy is a ready source of unique names to select from.)

Next he discussed the origins of the water that is a major component of beer: 70% of the Earth's surface is covered by water, but only 0.12% of its total volume is water. By comparison, some moons have much more: Titan is 26% by volume and Ganymede is a whopping 46% ! Water consists of one atom of oxygen and two atoms of hydrogen. All the hydrogen existing in the universe was created in the Big Bang, along with helium, and small quantities of lithium, beryllium, and boron. Heavier elements, up to iron, are created in the cores of stars, while still heavier elements are created during supernovae of massive (> 8x solar masses) stars, neutron star collisions, etc. Only large stars contribute oxygen to the universe, since smaller stars retain their oxygen when they collapse into white dwarves.

Currently, there are estimated to be a 2500: 1 hydrogen to oxygen ratio in the universe. How did it get to the Earth? The process by which stars and planets form is thought to be too hot for water to survive, so originally it was thought to arrive later in the process, after cooling sufficiently, possibly from comets and asteroids. When the ratio of deuterium to hydrogen (D/H) of the earth's surface was examined, it was determined to be a relatively high ratio, matching that of asteroids, but examination of the D/H ratio from zircon crystals in magmas brought up from below by volcanic activity (thought to more closely match the ratio of the primordial Earth) show a lower D/H ratio, more consistent with the D/H ratio of the solar nebula. The debate as to the origins of water on Earth is far from settled! The Q&A ended at about 7:54 p.m., and was followed by a break.

Rich called the meeting back to order at 8:05 p.m., and made an announcement requesting help with the Red Shift and for someone to volunteer for the post of **Member Services Director**.
Membership Report (Gwyn Fowler): Second Reading - Abigayle Ward. She is now a full member of LVAAS, entitled, among other things, to obtain keys to the facilities and be trained on and use club equipment. There were no first readings.

The next **General Meeting** will be July 13, 5:00 p.m., at South Mountain. This will be the annual picnic and swap meet. The club will provide burgers, hot dogs, and beverages. More details to follow. Ginny McSwain, associate professor of physics at Lehigh University will speak on "Dogs in Astronomy."

The next **Star Party** is scheduled for Saturday, July 6, beginning at 6:00 pm.

July 20th is the 50th anniversary of the **Apollo 11** moon landing. Blaine Easterwood discussed the event taking place at the DaVinci Science Center. The event will be from 10:00 a.m. to 10:00 p.m. and LVAAS will be participating by setting up telescopes for solar and nighttime viewing. No one is expected to be there for the whole 12 hrs, so all volunteers are welcome, whether or not you plan to set up a telescope. More info will be forthcoming and he will send out an announcement and a call for volunteers.

Rich mentioned that there is also a new event: the **Easton Spacefest** taking place (they hope to make it an annual event.) Due to our commitment at DaVinci, the club will not be participating this year, but if any members wish to participate in their star party or other events, they are encouraged to do so. It is being run in conjunction with the Nurture Nature Center in downtown Easton and has Facebook and websites for those interested in participating.

Blaine also brought up an idea that was first mentioned at the board meeting: starting a **book club.** He wanted to know if there was any interest. He can be reached at blaine@ieee.org. There could also be book reviews published in the Observer.

Treasurer's Report (Scott Fowler): Expenses for the last month were $805.60, and income was $1145.51. There was also $48.76 in expenses from the 40" Fund. The year to date net income over expenses for the Society was $3,772.46.

Library (Dave Raker): A list of newly acquired books, DVDs, etc. will be printed in next month's Observer. There are still books for sale in the Red Shift and in the South Mountain Library (in cardboard boxes, prices as marked.) Last month's General Meeting presentation is available on DVD.

Pulpit Rock Maintenance (Ron Kunkel): snake report for Pulpit Rock! Ron stepped on two copperheads near the Dob Shed! There had always been non-poisonous black snakes in that area, but this was the first encounter with copperheads. He poured mothballs down the holes around the concrete slab and filled them in with dirt. Dave Moll had circulated, electronically, the currently accepted treatment for snakebite: keep the person calm, call 911, drive them down to the gate, where the ambulance will meet them. This also applies to most any medical emergency that might occur at Pulpit

Rock. Note: for snakebite, it is **no longer recommended** that cuts be made to the wound, attempts at sucking the venom out, or application of a tourniquet above the wound.

MegaMeet has been rescheduled to the last weekend in June (28th, 29th, and 30th) at Pulpit Rock. This is an informal get-together. Participants will have to supply their own shelter (tent or vehicle), water, food, and method to cook it (no open fires.)

40" Telescope Update (Frank Lyter): They are carefully disassembling and documenting the telescope for the purpose of stripping and repainting the components before reassembling it. Improvements to the structure will be made where deemed feasible and necessary. There have already been changes made to the truss assembly to improve stiffness. The **PRBuzz** will be used to communicate when work parties will be held - anyone is welcome to volunteer! Mike Lockwood would like to finish polishing and coating the secondary mirror in late July, and would appreciate our picking up both mirrors as soon as possible after that to make room in his shop. We are waiting for his call!

South Mountain Maintenance (Bill Dahlenburg): Although there was nothing special to report, people are working at South Mountain most Saturdays from 9:00 a.m. to noon, so anyone needing training on club equipment, rentals, help with their own equipment, or who would like to help with the maintenance, is welcome to show up.

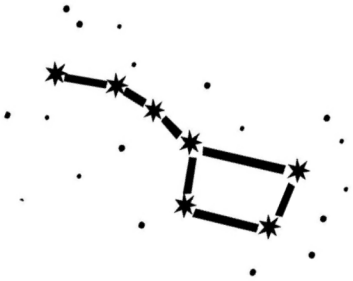
Risk Management: Dave Moll checked the bylaws and reported that there are no specific prohibitions regarding consumption of **alcoholic beverages** on the premises, but that members engaging in anything "illegal or embarrassing to the club" could result in their expulsion. In addition, there is a limit of 9 guests at any time. Events with ≥ 10 guests requires the approval of the Director.

Dark Skies and Light Pollution (Dave Moll): introduced a new project he hoped to start - a **night sky survey**. He would like volunteers to monitor the darkness of the sky at their homes. This would require an app only available on iPhones: Dark Sky Meter ($1.99). Participants would take one dark frame (camera covered) to calibrate the camera, then take readings starting at 30° above the horizon and continuing up to the zenith. This would need to be done on multiple days and averaged to generate sky brightness data. Since it would be best if everyone were out doing this on the same days, he will try to set up approx. 20 possible nights (weather permitting.)

United Astronomy Clubs of NJ (Earl Pursell): They have begun their season, and have public nights (star parties) every Saturday until October at Jenny Jump State Park in NJ. There is a presentation starting at 8:00 p.m. (rain or shine, topics are published in the Observer and at www.uacnj.org) followed by observing using their telescopes (weather permitting) until 10:30 p.m. There is also room for visitors to set up their own telescopes, should they so desire.

The meeting adjourned at 8:43 p.m.

Submitted by Earl Pursell, Secretary



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

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RED SHIFT REVENUE

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- **Purchase inventory!**
- **Manage production!**
- **Complete sales!**
- **Report revenue and expenses to the Board!**
- **Help a great organization do a valuable public service!**

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

The only way to lose is to not play!

Contact director@lvaas.org to sign up!

From the LVAAS Archives:

Astronomy and Religion

by Sandy Mesics

Discussing astronomy or any science and religion these days can be touchy, though occasionally it pops up such as in an article in the December, 2003 issue of Sky & Telescope entitled “Science and Religion: Can We Talk” by George V. Coyne.

But eighty years ago an article in the September 1939 Lehigh Valley Astronomical Society (LVAS) Bulletin was entitled “Religion and Astronomy.” The author’s name was not given, though it was attributed to the Editor. At that time, the editors were Eugene Carl Jr., and Forrest Dorney, so one could assume it was written by one of these individuals. Written at the time of the build-up to World War II, it is an articulate and sensitive statement addressing the struggle between science and religion, and describes an event that could either have been simply fatigue or a profound spiritual moment.

I am reprinting it here in its entirety:

“Astronomy and Religion: Have you ever thought out the meaning of this question? Do you know how far infinity extends? Does religion stop where astronomy begins? It’s a funny thing but on several occasions when speaking to persons about star clusters, great nebulae and the like, they have interrupted me and jumped to conclusions asking me such questions.

Frankly speaking, I usually tell such people that on the contrary astronomy plays and should play a great part in religion. I do not see why they should conflict. I must confess however, that at one time I also had ideas such as these people had. But as time went on, instead of disbelieving, I found myself becoming quite religious and I now see astronomy and religion as inseparable.

‘But what makes you believe so strongly that astronomy is a part of religious belief?’ I have been asked. This question I usually answer by stating an actual experience of my own. I don’t doubt that other persons have had the same experience in some form or other.

It happened one splendid night two summers ago [ed. Note, this would be in 1937]. The day had been quite hot I remember, but the evening had cooled off considerably, and it was just ideal to be out of doors, and so as I had done many times before, I lay flat on the grass with my eyes skyward.

It was indeed a beautiful night. Vega shown directly overhead, and I began picking out constellations to myself. There in the south was the Great Scorpion. Coming up in the Milky Way was the Milk Dipper in Sagittarius, (which by the way, I had not learned to correctly recognize) and nearby overhead was the striking figures of the Northern Cross. I was alone in the back yard and I lay there fully a half hour trying to pick out correctly the star groups.

Then it happened!

I still can't explain how it happened, but my eyes must have become tired. Anyway, I could no longer recognize even the simplest of the constellations. The sky which just a minute or two before had been a glorious map of beautiful legends had vanished, and now it seemed to be just a great maze of fiery points of light. My eyes must have been quite tired, I may have even dozed off, I don't know. But I am quite sure I had been looking directly toward the zenith.

Suddenly a very strange feeling came over me, something I had never known before. It seemed as though everything about me, the several trees, the telescope and our house had for a moment vanished. I suddenly became bewildered by what I seemed to have seen. Thousands of stars all about me and I felt as though I had suddenly entered space itself. I felt a great fear come over me and for a moment I couldn't move. Then I remember I blinked my eyes and quickly jumped to my feet. It was all over, I could again pick out the constellations.

As I have said before, my eyes must have been tired. But of this much I am sure: that at that bewildering moment I had a strange feeling, a feeling of the presence of something great and mighty, and it mad me feel quite little.

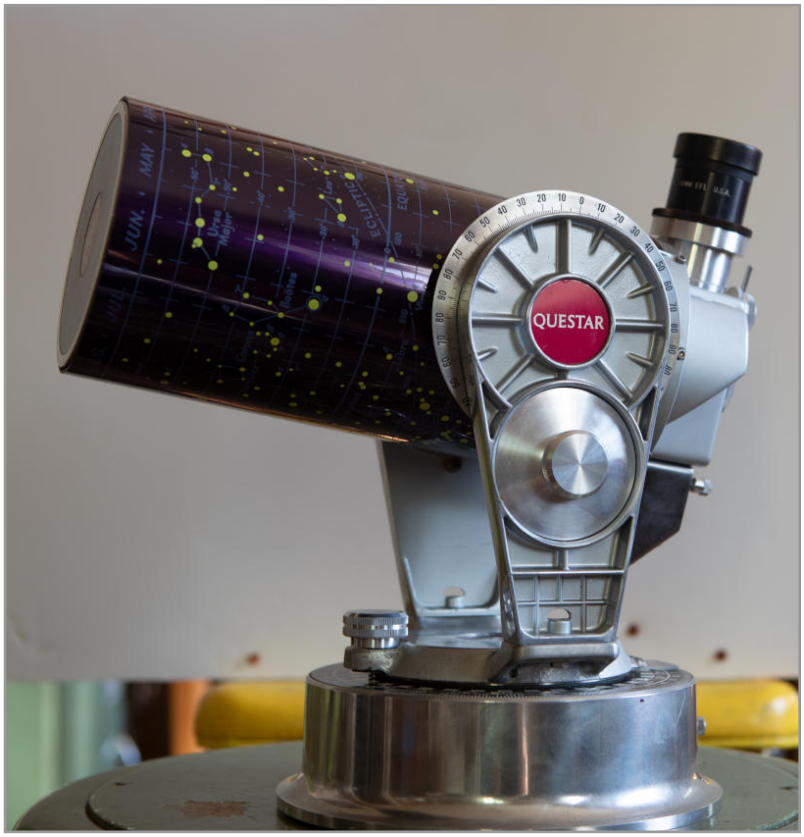
Since that experience, I have always liked to believe astronomy and religious belief are inseparable.

Regardless of the belief of one individual man, if he will but look into the heavens, he cannot help but to see the Creator there. If only more [people] would sometimes do this.

Men blindly fight for sections of this little Planet of which they are a part, and how futile there [sic] fight is. They call themselves civilized. I sometimes feel that a truly civilized man would laugh at such silly doings. What do you think? THE EDITOR."

Well, now it's 2019, and we are asking the same questions. What do YOU think?

Would you like to own a Questar 3.5"?



The Questar 3-1/2” Maksutov Cassegrain telescope has been a prized instrument for amateur astronomers since 1954, and is considered by many to be the best small telescope in the world.

LVAAS owns two, one of which is in good working order while the other is under repair. But neither of the club's Questars is in as fine a condition as this specimen (Serial #9-7354), which was the prized possession of LVAAS member Fred Munson.

Fred passed away last year at the age of 95, and this beautiful telescope is being offered for sale by his daughter Marty, who would love to see it become the cherished property of another LVAAS member, which is why we are helping her by presenting it here in the Observer.

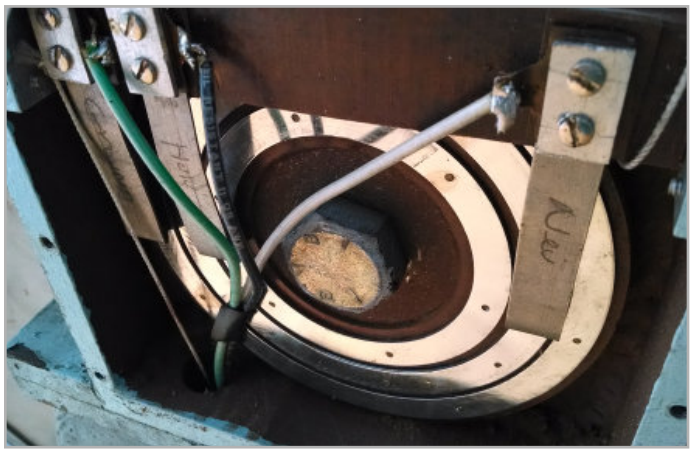
If you are interested in owning your own Questar, particularly one that was cared for by a legendary LVAASer, please contact me and I will put you in touch with Marty.

-- Rich Hogg, Director

Schlegel Observatory Report

by Rich Hogg – July 2019

Work continues on the 40-inch Cassegrain telescope project at Pulpit Rock. We are still working on breaking down the instrument for repainting. Soon, we will need to begin a push to complete stripping the old paint, preparing the bare metal, and priming and painting; then we can start putting it back together.



It's been helpful to receive feedback on the project from folks reading this column, so here's the latest item for discussion. The existing wiring included slip rings for the declination axis on both sides of the fork. On one side, three wires for 110V power (hot, neutral, and ground) came up through the arm of the fork and were transmitted through a set of slip rings (shown at right) to the primary mirror cell. On the other side, four control wires entered by the same method. They were intended for controlling the mirror covers and the secondary focuser.

I removed these slip rings and protected the ends of the wires to prevent damage from the painting process. The question is, should we reinstall them when we rebuild the instrument, or replace them with something else?

In case it isn't obvious from the picture, a slip ring is a method for propagating electrical power or signals through a rotating joint. The "ring" side of the connection can be a flat ring on an insulating board, in a so-called "pancake" slip ring as we have here, or the more traditional cylindrical ring wrapped around a cylinder of insulating material (LVAAS' 20-inch scope, currently in storage at Pulpit Rock, has this type of slip ring.) The other side of the connection is a "wiper" or "brush" that slips along the surface of the ring as the joint rotates, while maintaining electrical contact.

Slip rings provide the benefit of allowing the joint to rotate freely, without limit, at the cost of introducing a potential failure point: the electrical contact between the mechanical parts can degrade. The metal can oxidize or become dirty, or a bug could crawl between the brush and the ring and separate the two. (In addition to the slip rings, I removed a number of dead bugs from the enclosure where they were installed.)

The thing is, for this application, I don't see why we need slip rings! The declination axis of the 40-inch does not enjoy rotation without limit, because the front end of the telescope is too long to pass through the base of the fork. There is a hard mechanical limit somewhere around -45° declination, giving the joint a total range of motion of about 270°.

For this reason I propose to replace these slip rings with short loops of wire that will simply bend back and forth as the joint rotates to the limits. I think this will greatly improve the reliability of these connections. There is a type of wire available called "continuous flex wire" that is designed for applications such as this; in fact, it is designed to bend back and forth at high speeds continuously for millions of cycles without failure, so it's overkill for what we need.

It will require a bit of design to arrange things so the cable can bend freely without abrading the insulation, but I'm confident we can do this.

So at least in my mind, the plan is to replace these slip rings with a bit of continuous flex wire. If you think I'm making a mistake, send me an email and convince me.

from Frank Lyter, Pulpit Rock Observatories Director

A great day on the mountain at Pulpit Rock yesterday (May 18) with a lot of activity all around. Boy Scouts were there, solar scopes on the Tinsley were in use, and a group worked on the 40". I was not able to return for evening viewing, but the skies did clear somewhat in the evening.

Earlier in the week folks were at the site getting ready for the weekend work on the 40" and conducted training on the 12" Meade (details provided in Rich's Pulpit Rock Buzz email.)

Andy Heilman tested some citrus-based paint remover on the peeling paint on the 40" support structure. Results look good and we plan to proceed with removal before repainting the structure.

This was a significant day for work on the 40" as we planned to remove the concrete mirror. Removing the mirror assembly allows us to:

- Gain access to some of the components that need attention
- Test the removal / installation processes

Significant planning and onsite discussion occurred at each step to ensure we were all in agreement w/r next steps and safety precautions. We cleared the lower levels of people when we were doing heavy lifts. Where feasible, we used two means of supporting mirror assembly; jack stands were primary with an engine hoist as a backup.

Participants included:

- Scott & Gwyn Fowler - both had participated in previous installation / removals of the concrete mirror and their insight was very helpful
- Terry & Mike Roszhart - photo documented the activity to facilitate future work
- Rich Hogg, Kyle Kramm, Ron Kunkel, Frank Lyter

Complete steps included:

- Positioned jack stand under concrete mirror assembly backed up by a chain through center hole, "X" frame and an engine hoist
- Unbolted mirror assembly and lowered the assembly ~10" and rolled the jack stand and engine hoist out from under the support structure
- Lowered the entire assembly to the floor (concrete mirror and two metal plates on the bottom of the mirror)
- Assembled the "X" frame with the mirror support brackets and lifted the concrete mirror off of the plates exposing the neoprene air bladder

The concrete mirror was temporarily stored over the load bearing wall on the west side and the metal plates are adjacent to it. The neoprene bladder appears to be in excellent shape.

Next steps include:

- General clean up of the structure in preparation for painting - lots of bugs & loose paint to remove
- Work on the shutter drive - currently, something is slipping in the mechanism preventing reliable operation
- We anticipate replacing the rusty chain with a new chain
- Work on the wiring - Rich is evaluating recommended activities

Removing the Concrete Mirror
Frank Lyter, Rich Hogg, Kyle Kramm, Scott and Gwyn Fowler, and Terry Roszhart
Videography: Mike and Terry Roszhart

Separating the Concrete Mirror from the Back Plate
Ron Kunkel, Kyle Kramm and Frank Lyter
Videography: Mike and Terry Roszhart

Repair and maintenance activities are also ongoing at our South Mountain headquarters location. Here Pete Brooks, Earl Pursell, Bill Dahlenburg, and Tom Duff replace aged wood inside the building that houses the 6" telescope.

Join the South Mountain Buzz to keep abreast of ongoing activities and help-needed requests. Many hands make light work!

Cherry Springs Star Party 2019

LVAAS members Bill Dahlenburg, Lynn Krizan, Chris Smith, and Tom Duff attended the 2019 Cherry Springs Star Party.

Images submitted by Tom Duff.

StarWatch

by Gary A. Becker

As Constant As the North Star?

“I am constant as the northern star,/Of whose true-fix’d and resting quality/There is no fellow in the firmament.” That statement was made on a bad day for Julius Caesar, moments before he was assassinated in the Curia Pompeia. When William Shakespeare wrote those lines in 1599, our guide star, Polaris, was nearly three degrees from true north, the pivot point of the Earth’s axis. It inscribed a six-degree ring around the north celestial pole as the Earth rotated each day. Caesar saw the Pole Star about 12 degrees from its present location, a little larger than an angle created by a fist held against the sky at arm’s length, not a very good indicator of true north if you are just eyeballing the sky.

Today, Polaris is about 1.5 lunar diameters (43 minutes of arc) from true north, and as the 22nd century dawns, that angular distance will shrink to approximately a single lunar diameter or one-half degree. After that, the North Star will begin to become a less accurate guiding light. This positional change is not the result of Polaris’ own motion through space, but rather the wobbling of the Earth’s axis in a nearly 26,000-year cycle called precession. During this period, the Earth’s axis points to a succession of different positions along the circumference of a 47-degree in diameter circle.

Thuban, in Draco the Dragon, was the pole star of Old Kingdom pharaohs in Egypt (2500 BC), while Vega, in Lyra the Lyre, will assume that position 12,000 years into the future. Going back to Roman or Greek eras, records are not in evidence for Polaris being the North Star, although the center of its arc made around Earth’s axial pivot point could have been easily determined through observations. The first mention of Polaris as a northern marker dates to circa 850 AD in an Anglo-Saxon poem when the “North Star” was about seven degrees distant from true north. From that point onward it seems to be recognized as a source to be used for navigation.

Polaris was also used as a reference for measuring the brightnesses of other stars until it was discovered that it pulsated. It is a Cepheid variable, an aged star which is having issues with its energy production in its now helium fusing core. Most Cepheids are exceedingly consistent, the rate of pulsation related to their luminosity. By knowing a Cepheid’s period, astronomers can determine how bright the star is in

reality, allowing it to be used as a standard candle to calculate the distances of other Cepheids to a range of approximately 200 million light years from the sun.

Polaris, however, is a weirdo. Its pulsation period is dependable, but its luminosity has been increasing over the centuries. Astronomers use a system called magnitude to measure the brightnesses of stars. Each magnitude is separated by an intensity difference of 2.51, and the more negative the number, the brighter the object. Keep in mind that one is a more negative number than two, even though both numerals are positive. The Greek philosopher Ptolemy (140 AD) measured Polaris to be about +3.6, while Al-Sufi (964 AD), the great Persian astronomer, noted the brightness of the North Star at +3.3, an increase of about 30 percent in intensity. By 1795, Polaris was measured at +2.35 - almost 2.5 times brighter than Al-Sufi's estimate. The latest photometric evaluations of Polaris' brightness place the star at +1.95 magnitude, another increase of about 45 percent from the late 18th century values.

Remember the Drinking Gourd song where antebellum slaves in Alabama were taught to follow the stars of the Big Dipper northward to freedom in Ohio? The whole story is based on a house of cards, but let's say that some aspects of it are true. Why were slaves not simply taught to follow Polaris? Maybe back then, a dimmer, fainter Pole Star was a contributing factor in the reasoning. Astronomers are truly baffled by the brightness changes of our Pole Star, which in no way has shown any consistency during the last two millennia. Inspiration for this article was adapted from "Secrets of Polaris," written by Camille M. Carlisle in the March 2019 issue of ***Sky and Telescope*** magazine.

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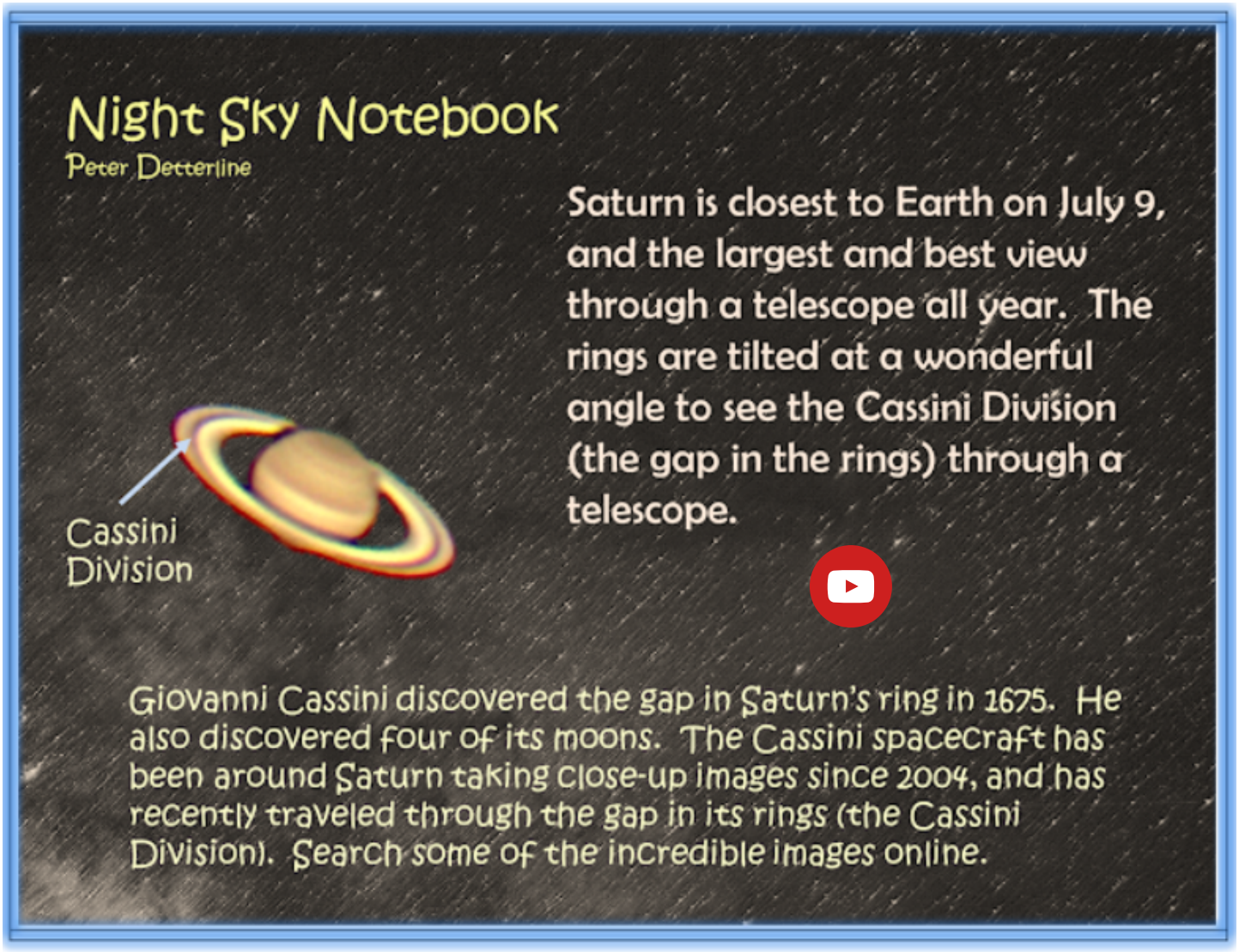
Moravian College Astronomy - astronomy.org

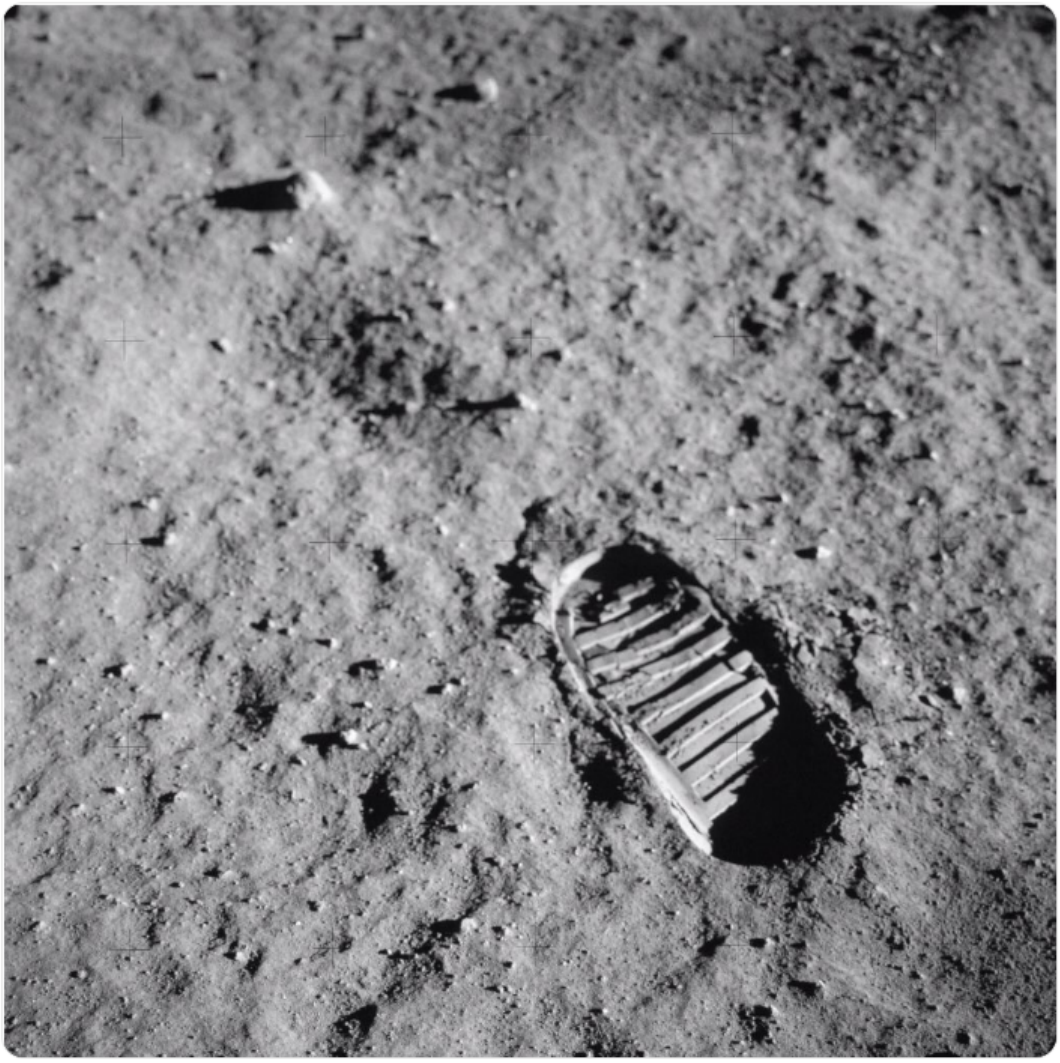
Now on Facebook at facebook.com/StarWatchAstro/

Night Sky Notebook for July

by

Pete Detterline

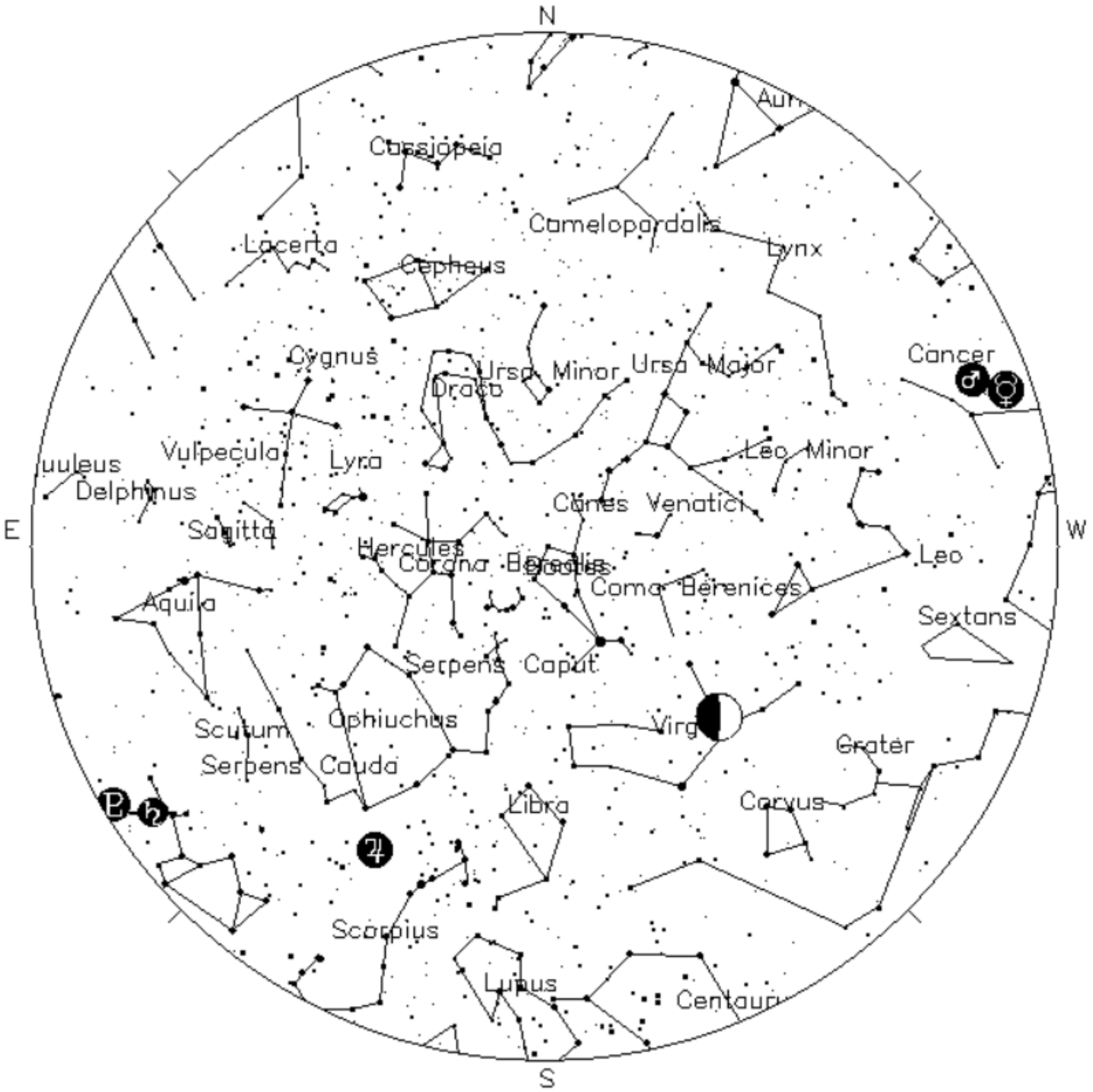




7:00 AM - 1 Jul 2019 from Cuyahoga Falls, OH

Source: Astronaut Doug Wheelock on Twitter

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

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

JULY 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01	02 New Moon	03	04 Independence Day	05	06 Star Party
07	08	09 First Quarter Moon	10	11	12	13 General Meeting/Picnic - 5:00 PM
14 General Meeting (rain date) - 5:00 PM	15	16 Full Moon	17	18	19 Scouts at Pulpit Rock	20 Scouts at Pulpit Rock
21 Scouts at Pulpit Rock Deadline for submissions to the Observer	22	23	24 Last Quarter Moon	25 Luther Crest Visit	26	27
28 LVAAS Board of Governors Meeting	29	30	31 New Moon			

AUGUST 2019

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

2019 LVAAS Event Calendar

2019 LVAAS Event Calendar

	Sundays				Thursday	Saturday	Mondays	Multi-Day Weekends	Moon Phase			
	General Meeting time	Date/location	Board meeting	Observer submission deadline	Astro Imaging	Star Parties	Scouts at S. Mountain	Scouts at Pulpit R.	New	First	Full	Last
January	2:00 PM	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	April 6 – 7
Cherry Springs S.P.	May 30-June 2
Stellafane	Aug 1 – 4
Black Forest S.P.	Sept 27 – 29
Mega Meet	*see website*

Contributed by Bill Dahlenburg

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, images or videos 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 usually appear in the upcoming month's issue. **PDF format is preferred**. **JPEG images** emailed directly to the editor following above guidelines are preferred. Early submissions are greatly appreciated. Articles may be edited for publication. Comments and suggestions are welcome.

Every effort is 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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