

The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society

<https://lvaas.org/>

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May, 2019

Volume 59 Issue 05



ad astra *****

This month, a brief recognition of one of our own, then a dissertation about one of my astronomy quest items.

Congratulations to Sandy Mesics

Sandy has been a part of LVAAS for a long time. I've been with the Society for a little over seven years now, and Sandy was a well-established fixture, and then some, by then. She served two one-year terms as Director since I joined, and she was instrumental in convincing me to accept the nomination for my first stint as Director. She served as Assistant Director during that time.

Through all of this, she has been Chairman of our Programs Committee, in charge of lining up speakers for our General Meetings (occasionally with a little help from some of the rest of us.) She also writes a regular column for this newsletter, about the history of LVAAS and other astronomical goings-on in the region.

But she also has a distinguished career outside of LVAAS! She is the Director of St. Luke's School of Nursing, the oldest continuously operating nursing school in the U.S. And, she was recently honored for her career achievements with an honorary doctor of science degree from the University of the Sciences in Philadelphia. You can read about the honor in the Morning Call article at [this link](#).

Bucket List Item

Have you seen a dinosaur lately? I mean, a live one, in real life, not on the movie screen. If not, it's probably because a massive asteroid slammed into the Yucatan Peninsula sixty-five million years ago, creating so much havoc in our planet's climate that almost all of the large creatures then alive became extinct.

Ever since we learned this, humanity has made it a higher priority to discover and keep track of the Solar System bodies that come close to Earth, and fairly frequently we detect a big rock that comes nearer to us than our own moon. Most of these are relatively small, and the mass media ignores them, instead raising the alarm for larger bodies even if they are many times the earth-moon distance from us.

But getting to the point – I have an informal list of things that I would like to see through a telescope at some point, and one of these is an asteroid while it is closer to Earth than the moon. I thought I would spend the rest of this column explaining how I plan to fulfill that plan.

The first step is to consult the spaceweather.com website, which I do almost every morning. They publish a list

of asteroids that are close to Earth at any given time, and highlight the ones that are closer than the moon with a dark red. Currently, there are two listed, as shown in the edited screen capture at right. **2019 GC6** was a bit rare in that it appeared on the list more than a week before it flew by; obviously this was very helpful in planning to observe it during its approach. Unfortunately, the approach was during daylight hours and below the horizon from our observing location.

2019 HE did not show up in time to make plans to see it, as is often the case, since our monitoring systems often pick up these rocks when it is too late. But if it had, it would have been a more favorable observing target.

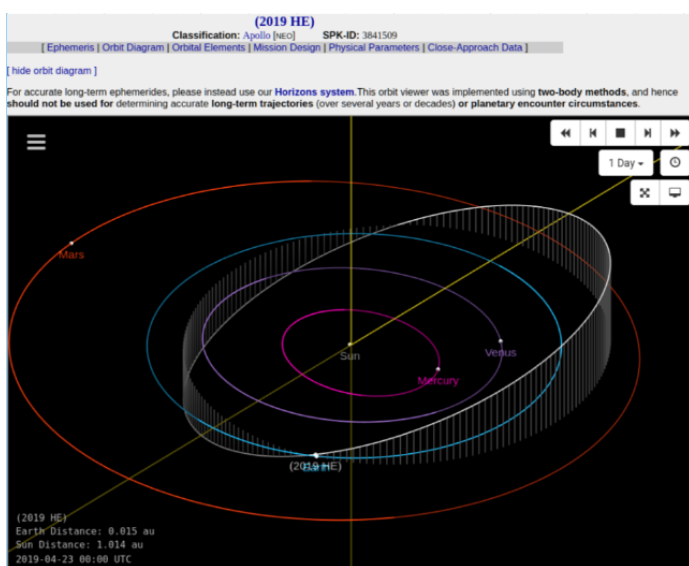
Near Earth Asteroids

Potentially Hazardous Asteroids (PHAs) are space rocks larger than approximately 100m that can come closer to Earth than 0.05 AU. None of the known PHAs is on a collision course with our planet, although astronomers are finding [new ones](#) all the time.

On April 23, 2019 there were **1967** potentially hazardous asteroids.

Recent & Upcoming Earth-asteroid encounters:

Asteroid	Date(UT)	Miss Distance	Velocity (km/s)	Diameter (m)
2019 GC6	2019-Apr-18	0.6 LD	5.6	18
2012 XO134	2019-Apr-18	14.8 LD	11	56
2019 FN2	2019-Apr-18	4.1 LD	7.7	65
522684	2019-Apr-19	19 LD	11.5	214
2019 HE	2019-Apr-20	0.6 LD	12.2	18
2019 GZ3	2019-Apr-20	10.1 LD	14.2	23

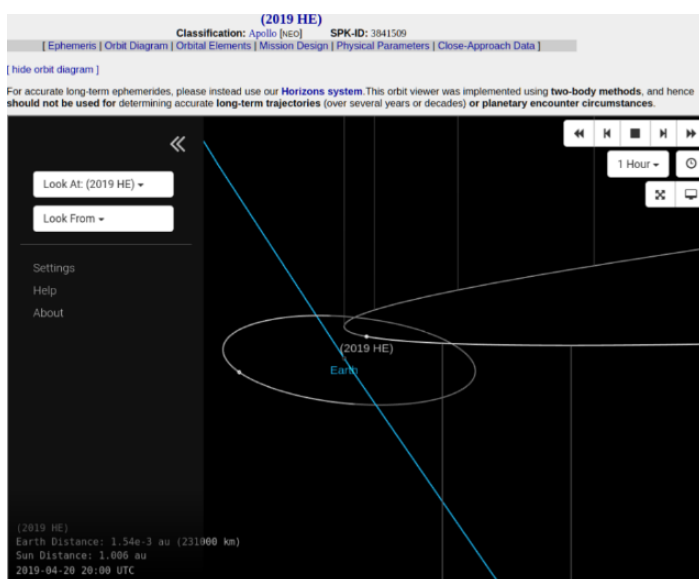


To determine this, the first thing I do is to click on the [2019 HE](#) link in the table, which takes me to the NASA Jet Propulsion Laboratory Small-Body Database Browser, showing a depiction of the inner Solar System with the asteroid's orbit.

This is a pretty neat little app, with features that allow you to turn various bodies on and off, while using the mouse to view them from different angles, and zoom in and out. One secret I found is to open the "hamburger" menu in the upper-left corner, and change the "Look At" target object (which initially defaults to the sun) to either Earth or the asteroid.

To the right, we see the results of zooming in, with the asteroid as the target. I also used the time control to step to roughly the hour of the closest approach, 20:00 UTC on April 20. By "orbiting" the view with the mouse, you get a nice 3-D effect that makes it easy to confirm that the orbit of the asteroid "scores" through the hoop defined by the Moon's orbit.

The next step is to get a detailed ephemeris from JPL's Horizon system, using the [Ephemeris](#) link on the left, above the diagram. Before doing this, remember the date of the closest approach. The discussion continues on the next page.



To get what we need out of the ephemeris, it will be necessary to set up some options; the initial defaults, shown to the right, are not quite what we need.

First, we need to put in our observing location, not only because it will make a difference in the apparent coordinates for an object this close, but also because Horizons will compute altitude and azimuth to allow us to determine visibility. I usually use Reading as my location, since it is close enough to Pulpit Rock for this purpose, and it is easy to find in the location database.

Next, set the observing time to begin on the day of the closest approach and end the day after. I also change the time step to 10 minutes. For an asteroid approaching this closely, things change quickly and a 1-hour time step may be too coarse.

Finally, under the Table Settings, I turn off "Sun-Observer-Target ELONG angle" and "Sun-Target-Observer ~PHASE angle." I turn on "Apparent AZ & EL" and leave "Astrometric RA & DEC," "Visual mag. & Surface Brght," and "Observer range & range-rate," which are already turned on, alone. I also change the distance units to "kilometers" instead of "a.u." The astronomical unit is appropriate for solar system distances, but the kilometer makes more sense this close to home. Once the setup is complete, the screen should look like the image to the right.

Now it's time to click the "Generate Ephemeris" button. On the next page, I'll explain what we can learn from the data provided.

Jet Propulsion Laboratory
California Institute of Technology

+ View the NASA Portal
+ Center for Near-Earth Object Studies

JPL HOME EARTH SOLAR SYSTEM STARS & GALAXIES TECHNOLOGY

Solar System Dynamics

BODIES ORBITS EPHEMERIDES TOOLS PHYSICAL DATA DISCOVERY FAQ SITE MAP

IMPORTANT: The SSD Announcement email list is now available. Major changes are coming in the near future, including possible hostname and/or URL changes. To be notified of such changes, subscribe to this email list.

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HORIZONS Web-Interface

This tool provides a web-based *limited* interface to JPL's HORIZONS system which can be used to generate ephemerides for solar-system bodies. Full access to HORIZONS features is available via the primary [telnet](#) interface. HORIZONS system news shows recent changes and improvements. A [web-interface tutorial](#) is available to assist new users.

Current Settings

Ephemeris Type [\[change\]](#) : **OBSERVER**
 Target Body [\[change\]](#) : **Asteroid (2019 HE)**
 Observer Location [\[change\]](#) : **Geocentric [500]**
 Time Span [\[change\]](#) : **Start=2019-04-23, Stop=2019-05-23, Step=1 d**
 Table Settings [\[change\]](#) : **defaults**
 Display/Output [\[change\]](#) : **default (formatted HTML)**

[Generate Ephemeris](#)

Special Options:

- set default ephemeris settings (preserves only the selected target body and ephemeris type)
- reset all settings to their defaults (caution: all previously stored/selected settings will be lost)
- show "batch-file" data (for use by the E-mail interface)

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FIRSTGOV 2019-Apr-23 04:32 UT (server date/time) **NASA** Site Manager: Ryan S. Park
Webmaster: Alan B. Chamberlin

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JPL HOME EARTH SOLAR SYSTEM STARS & GALAXIES TECHNOLOGY

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Current Settings

Ephemeris Type [\[change\]](#) : **OBSERVER**
 Target Body [\[change\]](#) : **Asteroid (2019 HE)**
 Observer Location [\[change\]](#) : **Reading, PA (75°55'40.1"W, 40°20'08.9"N)**
 Time Span [\[change\]](#) : **Start=2019-04-20, Stop=2019-04-21, Step=10 m**
 Table Settings [\[change\]](#) : **QUANTITIES=1,4,9,20; range units=KM**
 Display/Output [\[change\]](#) : **default (formatted HTML)**

[Generate Ephemeris](#)

Special Options:

- set default ephemeris settings (preserves only the selected target body and ephemeris type)
- reset all settings to their defaults (caution: all previously stored/selected settings will be lost)
- show "batch-file" data (for use by the E-mail interface)

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FIRSTGOV 2019-Apr-23 04:42 UT (server date/time) **NASA** Site Manager: Ryan S. Park
Webmaster: Alan B. Chamberlin

Date (UT)	HR:MN	R.A. (ICRF/J2000.0)	DEC A11 (a-appri)	Elev	APmag	delta	deldot
2019-Apr-20 00:00	C	03 46 20.47	-38 17 05.5	231.5696	-14.2819	21. 9.4882433330E+05	-11.4623310
2019-Apr-20 00:10	Cm	03 46 36.47	-38 11 28.6	232.9184	-15.6924	21. 9.4194905581E+05	-11.4541861
2019-Apr-20 00:20	Nm	03 46 52.85	-38 05 46.3	234.2490	-17.1266	21. 9.3587856308E+05	-11.4463799
2019-Apr-20 00:30	Nm	03 47 09.59	-37 59 58.5	235.5626	-18.5895	21. 9.2821264394E+05	-11.4389319
2019-Apr-20 00:40	Nm	03 47 26.71	-37 54 05.2	236.8602	-20.0739	21. 9.2135108717E+05	-11.4318363
2019-Apr-20 00:50	Am	03 47 44.22	-37 48 06.4	238.1431	-21.5806	21. 9.1449368133E+05	-11.4250926
2019-Apr-20 01:00							-11.4186931
2019-Apr-20 01:10							-11.4130471
2019-Apr-20 01:20							-11.4073430
2019-Apr-20 01:30							-11.4016489
2019-Apr-20 01:40							-11.3959548
2019-Apr-20 01:50							-11.3902607
2019-Apr-20 02:00							-11.3845666
2019-Apr-20 02:10							-11.3788725
2019-Apr-20 02:20							-11.3731784
2019-Apr-20 02:30							-11.3674843
2019-Apr-20 02:40							-11.3617902
2019-Apr-20 02:50							-11.3560961
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2019-Apr-20 03:10							-11.3447079
2019-Apr-20 03:20							-11.3390138
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2019-Apr-20 04:10							-11.3105433
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2019-Apr-20 16:00							-10.9062522
2019-Apr-20 16:10							-10.9005581
2019-Apr-20 16:20							-10.8948640
2019-Apr-20 16:30							-10.8891699
2019-Apr-20 16:40							-10.8834758
2019-Apr-20 16:50							-10.8777817
2019-Apr-20 17:00							-10.8720876
2019-Apr-20 17:10							-10.8663935
2019-Apr-20 17:20							-10.8606994
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2019-Apr-20 22:30							-10.6841823
2019-Apr-20 22:40							-10.6784882
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2019-Apr-20 23:40							-10.6443236
2019-Apr-20 23:50							-10.6386295
2019-Apr-21 00:00							-10.6329354

As you can see, there is a lot of densely-packed data, and on the website I find I'm constantly scrolling back and forth to check the column headings. Here, I've excised the unneeded rows so that we can see exactly what we need.

First, I look at the right-most column, deldot. This is the rate of change of our distance to the target, in kilometers per second. That's right, at the beginning of the day (UT) the asteroid is approaching us at 11 km/sec! I scan down this column until the negative numbers switch to positive, which indicates the moment of closest approach.

In the case of 2019 HE, that was at around 21:15 UT, or about 5:15 p.m. EDT. So, unless it was actually passing through our atmosphere, it would not be visible from here.

But I don't actually need to see it at closest approach! I just want to see it when it is closer than the moon, which is always at least 363,104 (3.63104E+05) km away. The asteroid is still within that range for a few hours after the close approach. (This is the "delta" column, which has a lot of digits after the decimal point. Apparently, Horizons thinks it knows the range to the target down to the centimeter.)

The next thing to determine is whether it is above the horizon. This is the "Elev" column, which shows it at over 70 degrees at midnight UT. It looks like it would still be up after it got dark enough (extending the table into the next day would confirm this.)

Finally, we take a look at the APmag column. Roughly magnitude 16 is the estimate for observing window. This is close to the maximum capability of our biggest scope, the 18" in the Schlegel-McHugh Observatory. If observing conditions were really good (no moon, no clouds, good transparency and seeing) and if I was in the mood, I might have decided to give it a try. Of course, in this case I didn't know about it until too late, so it didn't matter.

If I did decide to try it, the next step would be to set up Stellarium on my laptop, for use as an on-site observing guide. I would make sure that Stellarium had all of the stars down to Mag. 16 or 17, plus the target asteroid. (It is able to load them directly from the JPL database.) Once this is done, it is very happy to show you where the asteroid sits amongst the stars, with the view corrected for your exact observing location. Here, we can see that it was off the tip of the Big Dipper at 11:00 on the night in question.



And if I decided not to go out, or I was too late as in this case, Stellarium can at least allow me to pretend. It is trivial to set up a simulated eyepiece view, and watch the tiny dot drift among the fixed background stars the minutes tick by. Ad Astra!

— Rich Hogg



David M. Moll ©2016

15X2-min, 15X1-min, 15X30-sec, SBIG8300C, AT65EDQ, Nebulosity capture & pre, PhotoshopCC post, imaged 2/20/2016 from North Whitehall Twp., PA © DMM photo

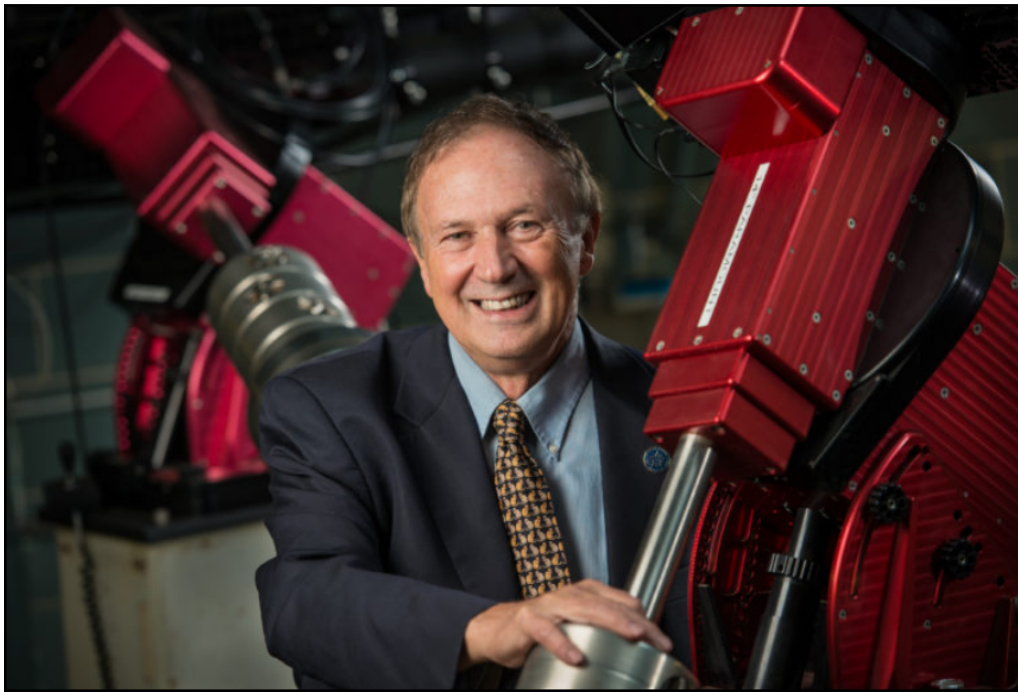
LVAAS General Meeting - Open to the Public

Sunday, May 5, 7:00 p.m.

South Mountain Headquarters

620B East Rock Road -- Allentown, PA 18103

"Preparing for Martian Colonization: Mars Gardens- Growing Vegetables in Simulated Martian Soil"



Professor Edward F. Guinan, Villanova University

Within the next two decades NASA and private enterprise missions such as SpaceX-Mars plan to send human missions to Mars with the ultimate aim to establish a permanent human presence on this nearby planet. For a self-sustaining colony on Mars it will be necessary to provide food by growing plants in heated/sheltered greenhouses. As part of an undergraduate student project in Astrobiology at Villanova University, experiments are being carried out, testing how various plants grow in the Martian regolith (soil.) The plants are being grown and tested in Mars iron-rich regolith simulant commercially available from The Martian Garden (TheMartianGarden.com.) Since Mars is further than Earth from the Sun, the surface solar light insolation is about ~43% Earth.

A wide variety of plants and vegetable are being grown and tested. These include carrots, spinach, dandelions, kale, soy beans, peas, onions, garlic, Jerusalem artichokes, and of course potatoes and sweet potatoes. Barley and hops have been planted in the Mars soil in larger quantities with the hope of making Martian beer. Also earthworms have been introduced to test their viability. The worm castings (excrement) are being used to enrich the Martian soil. The results of this project will be discussed from an educational viewpoint as well as from usefulness in Martian botany research.

Minutes for the LVAAS General Meeting - April 14, 2019

The April 2019 LVAAS General Meeting was held on April 14th at the LVAAS facility on South Mountain in Lower Saucon Twp. There were about 45 people in attendance. The meeting was opened by Rich Hogg, Director, at 7:00 p.m. He announced that the club had received the donation of a new telescope, a 12" Meade LX200R, which was set up on its tripod at the front of the room.

He then introduced the speaker, Richard Hanes, who is currently a fifth year physics graduate student at Lehigh University studying spectroscopic parameters of massive stars with his advisor, Professor Ginny McSwain. Richard received his Bachelor's degree in Astronomy and Astrophysics from the Pennsylvania State University in 2014 and his Master's degree in Physics from Lehigh University in 2016. He has presented his research at several conferences and meetings, including at the 229th AAS meeting in Grapevine, Texas.

His talk began with an introduction to spectroscopy of stars, beginning with the assumption that stars can emit and absorb all wavelengths of radiation in all directions, and that the peak wavelength of a star's spectrum is related to its temperature. The spectra of a star consists of many lines against the continuum of colors. These lines represent the photons that are emitted or absorbed as electrons in the gaseous atoms transition from one energy level to another. He used the Balmer series (transitions of hydrogen electrons from higher states down to the second level) in massive stars, mostly because their spectra are cleaner and, therefore more interpretable, as examples.

He determines information about the stars by observing broadening of the lines due to natural, thermal Doppler pressure, and rotational Doppler effects. Natural broadening results in an inherent "fuzziness" of the lines in the spectra. Temperature distribution results in some parts of the surface of the star moving toward us, while other parts move away, imparting a Doppler shift on the spectra. Pressure creates "collisional broadening" which mostly affects the tails of the peaks. In rotational broadening, one side of the star is moving toward us, while the other side is moving away, resulting in peaks that are less pointy. Spectral modeling sorts out all these effects and allows estimation of the physical properties of the star, using helium lines to determine the star's rotation, and hydrogen lines for mass, temperature, and gravity.

His work in the Carina nebula allowed him to plot the stars on the H-R diagram to determine their age, radii, and absolute luminosity, and therefore, their distance. He also determined that the stars are moving in many different directions, suggesting that the stars in the nebula have not "settled down" yet. He can also use the spectra to identify double stars by the effect on the lines, even if only one of the stars in the pair is visible. The presentation was followed by a question and answer period, which ended at 7:55 p.m., and was followed by a break.

Rich called the meeting back to order at 8:12 p.m., and made another plea for help with the Red Shift, and for someone to volunteer for the post of Member Services Director.

Membership (Gwyn Fowler):

Second Readings: Francis Borso, Joe Zitarelli, Keenan Vitale, and Dan Jackson are now full members of LVAAS and are entitled to, among other things, obtain keys to the facilities and be trained on and use club equipment.

First Readings:

- Jose Baez - looked us up on the internet
- Francis Kuklis - heard about us from Prof. Jackson (PSU, LV) and Tom Applebach
- Rose Bachik - has been coming to star parties for some time and decided to join

Treasurer's Report (Scott Fowler):

Income since last general meeting	\$ 1827.58
Expenses since last general meeting	\$ 2212.10
Net	\$ -384.52
YTD NET	n.r.

The main expenses were \$440 for member services (patches), \$460 for heating oil, and \$640 for the 40" and observatories.

MegaMeet (Tom Duff): MegaMeet is scheduled for May 3-5. This is a new moon weekend. ***Check the website and look for e-mails regarding weather-related changes.*** The club probably won't supply coffee and sodas, so be sure to bring your own. We will need volunteers to man the gate. People will be setting up their own telescopes or using club scopes. This is also an opportunity for members to get training on club scopes, obtain keys, and check out the progress on the 40" (redesign to improve structural stiffness.)

Library (Dave Raker): There are still books for sale in the Red Shift and in the South Mountain Library in cardboard boxes; prices as marked.)

Pulpit Rock Maintenance Director Ron Kunkel will be giving a presentation at the DaVinci Science Center's "Beer: The Final Frontier" event on May 4th (same date as MegaMeet.) We will be setting up a couple of telescopes. Anyone wishing to attend can purchase tickets on their website for \$19.95 (\$29.95 at the door!) Beer tasting included. Food available for purchase. In addition, Ron will be giving presentations at two UACNJ Star Parties at their site in Jenny Jump State Park on April 27 and Aug 31.

South Mountain Maintenance Director Bill Dahlenburg reminded new members that we have quite a collection of rental scopes available and anyone wishing to see them can stay after the meeting.

Astroimaging (Tom Duff): Mike Waddell will give a presentation at the Astroimaging meeting this Thursday (4/18/19) on "What I Wish I Had Known Before I Started." Bring your DSLR (or other camera) and tripod for a brief tutorial on how to get started. Weather permitting, we will take some pictures of the stars!

Development (Mike Waddell): If anyone knows of funding opportunities we could pursue, please contact him. Tom Duff mentioned that he saw Preston Smith at NEAF who discussed his interest in creating a 5-year plan for the club; he also knows about grants.

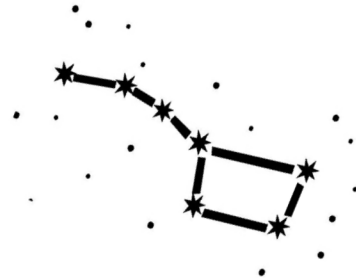
Rich Hogg announced that a non-member was selling a **Celestron PowerSeeker 127EQ Newtonian**, asking \$75 (\$200 new, with accessories) in Palmerton. Contact Rich if interested.

Future meetings: as of now, we have no speaker for June, so if anyone is interested in giving a presentation, please contact Sandra Mesics or Rich Hogg. For July, we will have Ginny McSwain. For August, Rich Hogg will give an update on the 40" project (meeting to be held at Pulpit Rock.) In September we will be taking a road trip to East Stroudsburg University to see their new planetarium.

The next General Meeting will be May 5, 7:00 p.m., at South Mountain. Ed Guinen, Professor of Astronomy and Astrophysics at Villanova, will be the speaker. The next Star Party was scheduled for Saturday, May 11.

The meeting adjourned at 8:33 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 |



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From the LVAAS Archives:

LVAAS Goes Virtual Ballooning

by Sandy Mesics



Figure 1. Eleanor Vadala from
<http://www.rittenhouseastronomicalsociety.org/>

The speaker at the April 1969 meeting was 45 year-old Miss Eleanor Vadala, Secretary of Philadelphia's Rittenhouse Astronomical Society (RAS). According to the Observer, her lecture "covered the history of the basket balloon right up to the modern methods of ballooning as practiced by members of clubs that are devoted to this activity. Miss Vadala illustrated her presentation with many color slides. One of her series of slides showed her ascending in the basket of a balloon and these were followed with pictures taken by her during free flight. Miss Vadala noted the use of high altitude balloons for special astronomical observing and explained the feasibility of this application. Most thorough in its presentation, this lecture was tastefully sprinkled with humor and concluded with an appropriate poem." We don't have a record of the poem, unfortunately.

Eleanor Vadala was born at National Park, N.J., on September 8, 1923. Her early schooling was obtained in Atlantic City, Cardiff, N.J. and Philadelphia. Vadala graduated from Juniata College in Huntingdon, PA in 1947 with a B.S. degree in nutrition and a minor in Chemistry. She went to work for the Franklin Institute, but while she "loved the work, (she) just couldn't afford it at \$40 a week." Nevertheless, she volunteered there for another ten years. She also worked for the Naval Air Development Center in Warminster, PA developing light weight material for use in aircraft.

Eleanor obtained her airman license on July 13, 1963, becoming one of fewer than 15 licensed balloon pilots in the U.S. She was one of only three female gas balloonists in the U.S. One of her early solo flights was photographed and covered in the December 24, 1962 issue of Sports Illustrated.

In addition to her talk at LVAAS, Vadala also gave presentations to youth groups and school classes about her experiences.



Figure 2. Eleanor Vadala, 1962, From:
http://www.tonyfairbanks.org/?page_id=3079

In later years she taught English as a Second Language classes to immigrants. At the age of 63, she married Ed Bailey, an astronomer for the Franklin Institute. When asked why she didn't marry earlier, Vadala replied, "Well, I was just too busy and I liked my life as it was!" At the age of 93, she was asked if she would go up again for a balloon flight. Vadala did not hesitate, "Yes! Just give me a hand and a push from the back!"

Vadala also had an interest in amateur astronomy, and built her own 6-inch telescope. In the 1950s and 1960s, she was a lecturer at The Franklin Institute and a member of the Moonwatch Team. She began serving the RAS, first as Treasurer in the mid-1950s, later as Secretary, and eventually as President. She also served two terms as Secretary of the Middle East region of the Astronomical League.

David Brown, a longtime member of the RAS, was also a longtime friend of Ms. Vadala. He wrote that she was "a very intelligent, genuine, and interesting person: someone of weight but without being heavy: Someone with whom it was just a pleasure to talk to."

Brown credits Vadala with the RAS's survival. At about the time Vadala spoke at LVAAS, she was mending a rift between the Franklin Institute and the RAS. Since 1929, the RAS met in the Franklin Institute. In 1967, the RAS invited Immanuel Velikovsky to speak at one of their meetings at the Franklin Institute, but the Franklin Institute regarded Velikovsky as a controversial pseudoscientist, and denied the RAS use of their rooms. In response, the RAS moved their meetings to the Philadelphia Public Library. But as a result, there was a precipitous drop in RAS membership. The group implored Vadala to take the helm and rebuild the group, because she had cordial relations with old members and a long history of leadership in the RAS. Vadala agreed, and was elected President by the membership. The rift was mended, the RAS resumed meeting at the Franklin Institute, where the group continues to this day.

There is a YouTube video of Miss Vadala speaking about her first balloon flight: https://youtu.be/SFd_A9j2lqM

References

David Brown recollections. Retrieved from:

<http://www.rittenhouseastronomicalsociety.org/Downloads/RAS%20History/RAS%20-%20History.pdf>

Adventures in Gas Ballooning "Heirs to the Great Tradition of Venture" by Carris Kocher Pennsylvania Pilot, www.aeroclubpa.org Volume 28, Number 2, Summer, 2017.

The Rittenhouse Astronomical Society, Philadelphia, Pennsylvania. A History of the Society from 1888-1960, by Cecil M. Billings. Retrieved from <http://www.rittenhouseastronomicalsociety.org/>

The Observer, May 1969.



NEAF: An Astronomy Adventure

by **Thomas Duff**

Did you know there was an adventure you could go on that would take you from Fink's BBQ and Cheesesteak Roadhouse or the Mt. Fuji Japanese Steakhouse to the far reaches of the universe? This is an adventure that Bill Dahlenburg, Ron Kunkel, Barry Huett, and I take every year. This adventure is called NEAF. Annually the Rockland Astronomy Club hosts a two-day forum at the Rockland Community College called the Northeast Astronomy Forum (NEAF.) This event hosts astronomy professionals,

manufacturers, vendors, and amateur enthusiasts from around the world. This year Bill, Ron, Barry, and I met up with Earl Pursell, Blaine Easterwood, Preston Smith, and other LVAAS members to see what this adventure would behold. We were not disappointed.

This year's speakers included speakers **Jean Wright**, NASA Space Shuttle Thermal Protection Specialist; **Chris Go**, Renowned Astro Imager; **Kevin Schindler**, from the Lowell Observatory; **Bill Ayrey**, The Apollo Space Suits & Beyond; **Jim Green**, NASA Chief Scientist; **Don Pettit**, NASA Astronaut; **Alan Stern**, NASA Principal Investigator, The Ultima Thule fly by; **Dylan O'Donnell**, Celestron A Tour of the Southern Skies; **James Hansen**, Neil Armstrong biographer; and **Walt Cunningham**, Apollo 7 Astronaut, The Golden age of Space Exploration. There was so much going on I was only able to sit in on the talks by Chris Go, Don Pettit, and Alan Stern. Don's humorous presentation on how he spent his spare time on the ISS and ended up submitting multiple papers for just goofing around was most amusing. I had heard Alan Stern speak before and his talk on Ultima Thule was very interesting.

The manufacturers included many major brands like ADM, ATIK, Celestron, Ioptron, Stellarvue, Televue, and many others. The forum gives you the rare opportunity to see and speak with them directly and ask questions. It also allows them to hear what the people want from their products. If you want to get an education fast, ask one of the manufacturers why they build what they do and how you can use it. The vendors included many of the ones you see in the astronomy magazines offering products at a discount - vendors like Camera Concepts, High Point Scientific, Oceanside Photo and Telescope (OPT,) and Woodland Hills to name a few. Many people save up all year long just to come there and buy. If you come, make sure to hang onto your wallet because you can easily spend thousands and thousands of dollars.

Last, I would like to mention the time spent with friends thoroughly enjoying their company. I look forward to this event just to hang out and tell the many astronomy stories. This happens throughout the event and especially during Saturday night dinner. In years past we went to the Mt. Fuji Japanese Steakhouse, but this year Rich Hogg found a new place, Fink's BBQ and Cheesesteak Roadhouse. As always, the food was excellent and the stories out of this world. We talked about families and how to solve the worlds problems. It is amazing to me how people of such diverse backgrounds and careers can get together and just have fun. I wouldn't miss it for the world. So even though this year's NEAF is past, put it on your calendar for next year. You won't be disappointed!



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It's that time of year again, to update your membership with LVAAS! Don't even think about it. Just whip out the checkbook and get your dues in the mail

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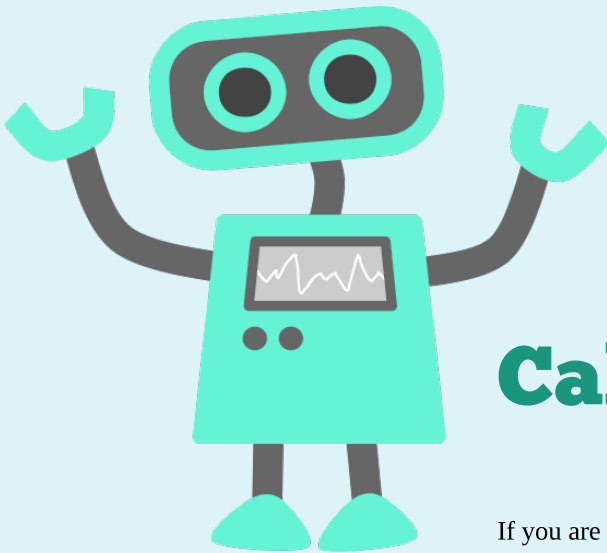
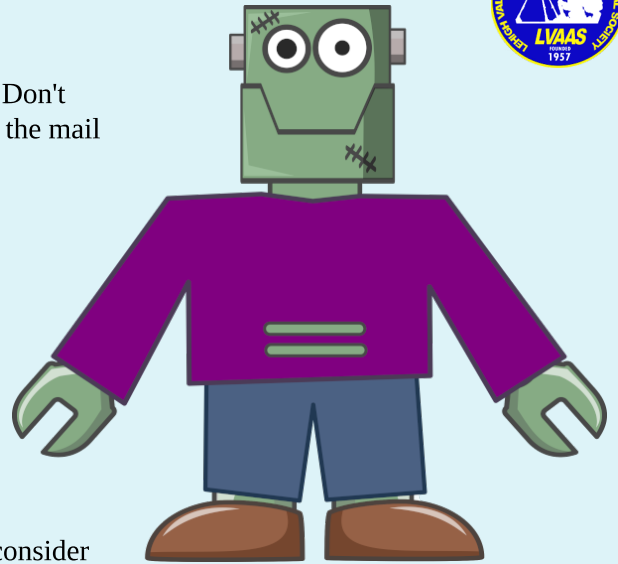
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<i>Regular/Associate</i>	\$45
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And if you need to think about it, it should be an easy decision! Just consider not only the great benefits you receive (access to top-notch facilities and locations) but also the tremendous programs that you support (superb public events, Scouting programs, and educational outreach!)

Please include the renewal form found at

http://lvaas.org/filemgmt_data/files/2019_Membership_Renewal_Form.pdf



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Please include the the form at:

https://lvaas.org/filemgmt_data/files/2017_LVAAS_New_Member_Application_Form.pdf

by Gary A. Becker

Leo Riding High



I had my Monday/Wednesday astronomy class over to Shooting Star Farm, north of Quakertown, this past Wednesday (April 24) for their dark sky field experience. If you recall, midweek turned out to be an absolutely spectacular spring day with the forecast of a mostly clear evening to follow. Too late to call retreat, clouds rolled in as my astronomy buddies taunted, “Just as you arrived,” creating one of those evenings where we saw the heavens between large breaks in the clouds. Still, my students had the opportunity of viewing Mars, double stars, and numerous deep sky objects that would have been much less spectacular to witness from center city Bethlehem where the Sky Deck on the rooftop of the Collier Hall of Science is located.

My students ran the protocols which operated my telescope and instructed it to slew to certain objects in the sky. That was fun to witness, the culmination of several lessons using our own computer-driven scopes in my lab. Unfortunately, for the third spring in a row, clouds and rainy conditions have thwarted our use of the telescopes on the Sky Deck. Back outside at Shooting Star, I remember having a really good view between the parted clouds of a favorite spring constellation—Leo the Lion. In a more passive way, Leo is like Orion the Hunter of the spring sky. The seven stars which composed the torso of the Hunter are unmistakable; everyone sees him. Likewise, but in a more subtle manner, the nine stars which create the Lion fashion an appropriate likeness of the King of the Beasts resting under the shade of a tree on the African savanna. Also appropriate would be a likeness of the sphinx because, after all, Leo was originally an Egyptian constellation.

A backwards question mark composed of six stars called the sickle forms the head of Leo and the front part of his body. Where the “dot” of the question mark would go is the brightest star

of the constellation, first magnitude Regulus, which comes from the Latin and means “the little king.” Regulus, at 78 light years distant, is a bluish luminary that would be considerably brighter than the sun if placed in the center of our solar system. Its distance is equivalent to the expanse that light, traveling at the speed of 186,000 miles per second, would journey over the timespan of 78 years.

Making your hand into a fist, thumb out, hold it at arm’s length next to Regulus. Two fists to the left of the Little King star will be found three relatively bright luminaries that form a triangle which completes the rump of the Lion. In that general area between Regulus and the triangle and particularly to the upper left of Leo’s rear is galaxy city, home to many smaller galactic assemblages like the Leo cluster, and more importantly, the Coma supercluster to which the Leo cluster is a member. They are all invisible to the unaided eye. One elliptical galaxy of the Leo cluster, NGC 3842, contains a 9.7-billion solar mass black hole, larger than the 6.5 billion solar mass black hole measured recently through its image in M87.

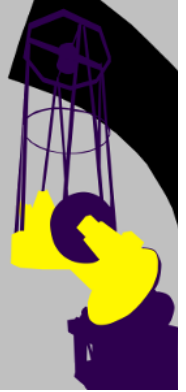
To find Leo, first locate the Big Dipper high in the NE right after dark. If you follow the two pointer stars (highest stars and located at the top of the Dipper) Dubhe and Merak, down and towards the left, the North Star, Polaris, will be found. Travel in the opposite direction, and Leo will be bisected. It’s as simple as that. You’ll be viewing one of my favorite constellations of the spring and a herald of the warmer weather of summer which will follow.

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Moravian College Astronomy - astronomy.org

Now on Facebook at facebook.com/StarWatchAstro/

Schlegel Observatory Report

by Rich Hogg – May 2019



This month's Schlegel Report will be brief, since what with Easter Weekend and other LVAAS and personal activities, there has not been too much progress on the 40".

We did temporarily re-assemble the truss, and succeeded in getting it aligned pretty well using the laser alignment system I set up, as well as a plain old tape measure. Ron Kunkel, Frank Lyter, and Maurice Connor worked with me on this activity. Frank set up his welder and used it to tack-weld the fittings so they can be finished at the correct angle for the new structure.

And, we did a very satisfying structural test! With the laser turned on, Ron vigorously shook the telescope assembly side-to-side by tugging on the front of the truss, while we watched the laser spot where it impinged on the target. It appeared very steady, with no visible movement, proving that the new truss has excellent rigidity, even though the assembly is not completely fastened.

In fact, we were so pleased with the results of this test that we are planning to "back off" from welding all of the joints solid, in case we ever want to disassemble the truss again. Instead, the top joints will be fastened with 1/4" set screws, as they were in the test. Frank has welded nuts to the outside of the fixtures to give the set screws more thread to tighten with, and he and Ron are fashioning hardwood plugs to prevent the tubes from collapsing from the pressure of the screws.

Once the truss is reassembled, we'll need to start disassembling the mirror cell so that we can clean it and give it a fresh coat of paint. Stay tuned.

The Fabra Observatory: A Trip Back in Time by Mike Waddell

Do you believe in coincidence, fate, karma, chance, providence? I'm getting older so I'm not sure about these things but I do recognize them when I see them. For example, I saw an article in the December, 2018 Sky and Telescope magazine (pp. 70-73) about the Fabra Observatory in Barcelona and knew that we were going there in March to visit our daughter and grandson so that couldn't be ignored! First, I Google-Earthed "Fabra Observatory" and compared it to where our daughter lives and it was close enough to make it doable by taxi. Second, I reread the Sky and Telescope article and decided that it had to be a go-to visit for me and third, I made it happen on Sunday, March 10.



Getting to Fabra is an interesting, winding taxi ride up the mountain above Barcelona for about 25 euros. I walked through the gate, looked at the view but didn't see anyone around. Fortunately, I heard voices inside the Observatory so I bided my time until the 12:30 tour. Again, serendipity was on my side because the tour was conducted in Catalan but the tour guide had studied at Cal Tech so she did some executive summarizing for me and then I met an American carpenter on the tour from Colorado who spends six months in BCN with his girlfriend who speaks Catalan and English so she also translated for me...coincidence?

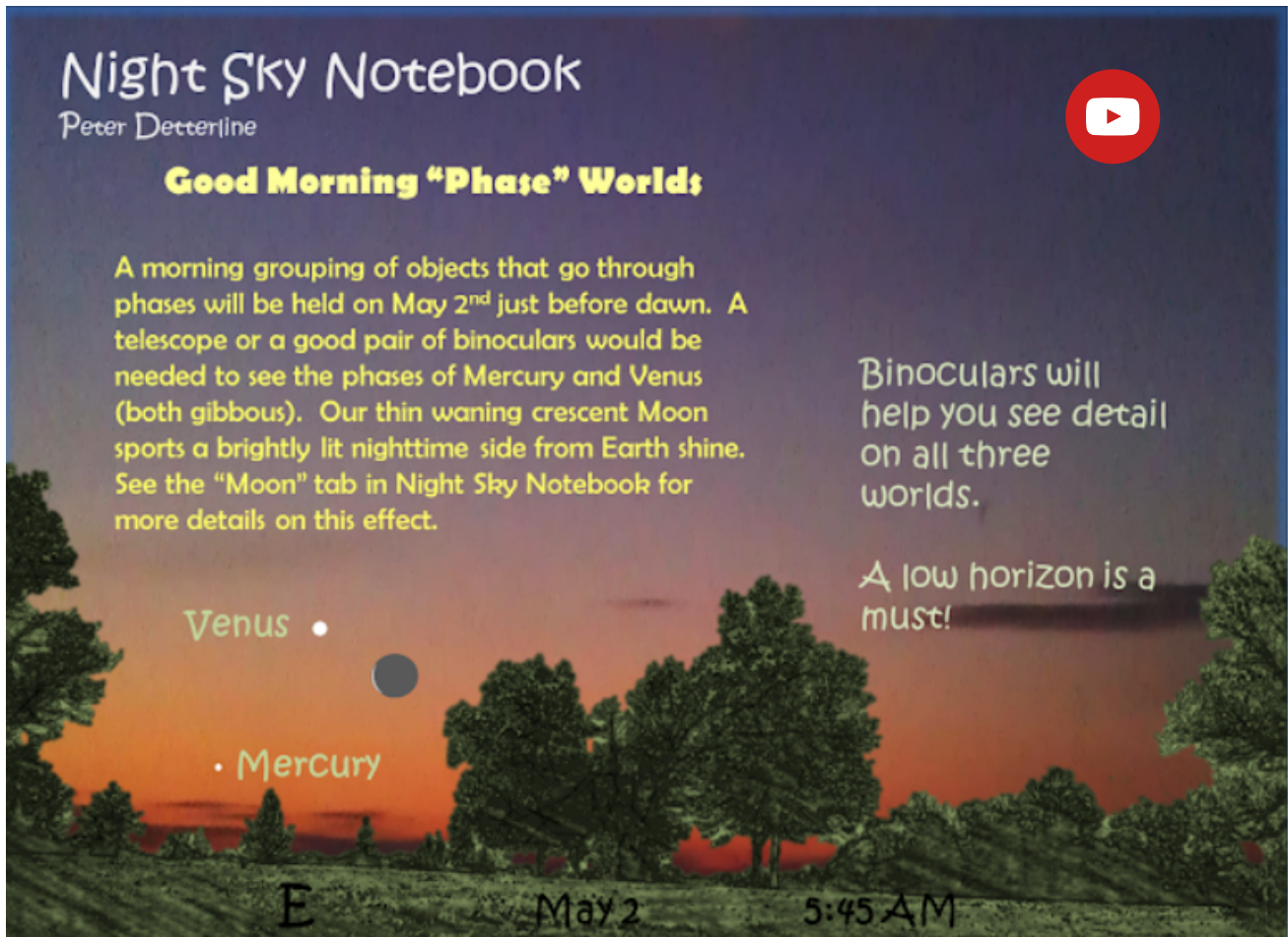
The observatory was fun to visit and learn about. It was built in 1904 and belongs to the Royal Academy of Science and Arts of Barcelona and is the fourth oldest observatory in the world that is still a working observatory. The double refractor was built by [Mailhat](#), Paris, in 1904. The visual instrument (the lower of the two tubes) has an aperture of 38 cm and a focal length of 6 meters (f/15.8.) The photographic instrument also has an aperture of 38 cm, but a shorter focal length of 4 meters (f/10.50) according to Wikipedia. It is 415 meters above sea level, looking out over the city below and its main function is the study of asteroids and comets and it was in this observatory that astronomer Josep Comas Solà discovered the comet 32P/Comas Solà, in 1926.



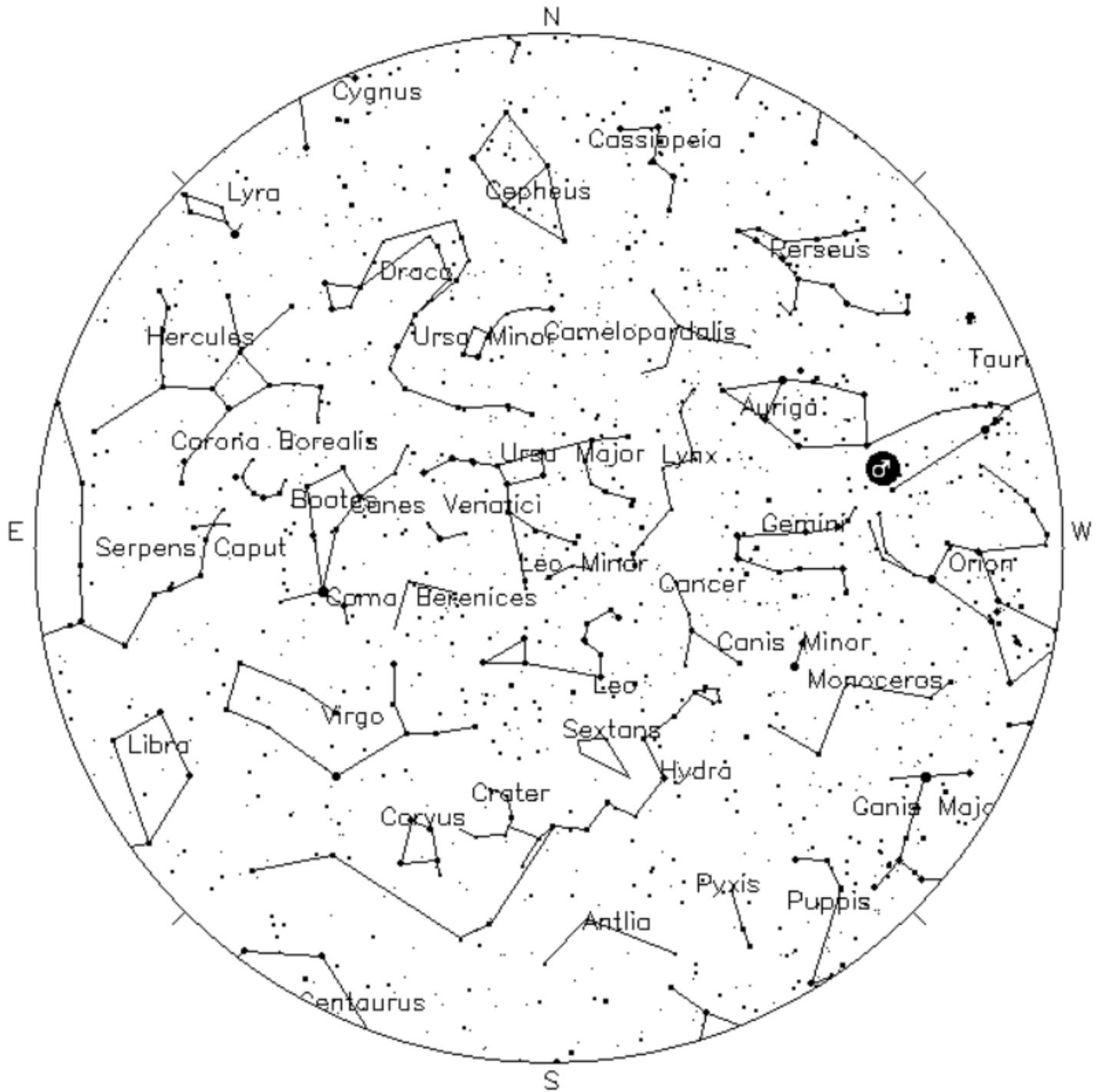
So, the moral of this story is don't ignore those things that seem coincidental...they may turn out to be an interesting opportunity for an unforeseen, or perhaps a predetermined adventure.

Night Sky Notebook for May

by
Pete Detterline

The image is a cover for a 'Night Sky Notebook' for the month of May. It features a dark blue background with a subtle starry pattern. In the top left corner, the title 'Night Sky Notebook' is written in a white, serif font, with 'Peter Detterline' in a smaller font below it. In the top right corner, there is a red circular icon with a white play button symbol. The main title 'Night Sky Notebook' is repeated in a larger, bold, yellow font. Below it, the subtitle 'Good Morning "Phase" Worlds' is written in a smaller, bold, yellow font. The central text, in a yellow serif font, describes a morning grouping of objects (Mercury, Venus, and the Moon) visible just before dawn on May 2nd. It mentions that a telescope or binoculars would be needed to see the phases of Mercury and Venus, and that the Moon's nighttime side is brightly lit by Earth shine. To the right of this text, another yellow serif font text states 'Binoculars will help you see detail on all three worlds.' and 'A low horizon is a must!'. At the bottom, there is a stylized illustration of a landscape with green trees and a red-orange sky. The text 'E May 2 5:45 AM' is written in a white, serif font at the bottom center.

Sky above 40°33'58"N 75°26'5"W Tuesday May 7 2019 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

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

MAY 2019

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

JUNE 2019

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

2019 LVAAS Event Calendar

2019 LVAAS Event Calendar												
	<u>Sundays</u>				<u>Thursday</u>	<u>Saturday</u>	<u>Mondays</u>	<u>Multi-Day Weekends</u>	<u>Moon Phase</u>			
	General Meeting time	Date/location	Board meeting	Observer submission deadline	Astro Imaging	Star Parties	Scouts at S. Mountain	Scouts at Pulpit R.	New	First	Full	Last
January	2:00 PM	13 Muhlenberg	27	20	24	no mtg		no camping	5	14	21	27
February	2:00 PM	10 Muhlenberg	24	17	21	no mtg		no camping	4	12	19	26
March	2:00 PM	10 Muhlenberg	31	24	21	16		22-23-24	6	14	20	28
April	7:00 PM	14 S.M.	28	21	18	13		no camping	5	12	19	26
May	7:00 PM	5 S.M.	19	19	16	11		17-18-19	4	11	18	26
June	7:00 PM	9 S.M.	30	23	no mtg	8		14-15-16	3	10	17	25
July	5:00 PM	13 S.M.	28	21	no mtg	6		19-20-21	2 31	9	16	24
August	7:00 PM	10 Pulpit	25	18	no mtg	3		16-17-18	30	7	15	23
September	7:00 PM	8 S.M.	29	22	12	7		13-14-15	28	5	14	21
October	7:00 PM	13 S.M.	27	20	17	5		11-12-13	27	5	13	21
November	7:00 PM	10 S.M.	24	17	14	2		no camping	26	4	12	19
December	2:00 PM	15	29	22	12	no mtg		no camping	26	4	12	18

July, Aug & Dec are Saturday meetings with rain date on Sunday
 Jan, Feb & March meetings are at Muhlenberg College
 August meeting is at Pulpit Rock
 December meeting / Holiday Party is at

NEAF
 Cherry Springs S.P.
 Stellafane
 Black Forest S.P.
 Mega Meet

April 6 – 7
 May 30-June 2
 Aug 1 – 4
 Sept 27 – 29
 see website

Publishing images is a balancing act!

When preparing your images for publication in The Observer, please consider the following guidelines:

Put the quality in:

- ▶ Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- ▶ Use a reasonably good quality for the JPEG compression ratio.

But watch the "waistline"!

- ▶ Don't go too much above 200 pixels/inch max.
- ▶ Use the lowest JPEG quality that still looks good!
- ▶ Shoot for <300KB for a 1/2 page image or <600KB for a full page.

Tip: If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as:

<https://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx>. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

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.

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