

The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society

<https://lvaas.org/>

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

January, 2020

Volume 60 Issue 1



ad astra *****

Happy New Year, everybody! By the time you read this, it will be 2020 and we will all, hopefully, be looking at our world (and our sky) with fresh optimism, revitalized by our celebrations of the Winter Solstice.

Writing this, Christmas is still a few days in my future, and the memories of the LVAAS Holiday Party are still fresh. I hope everybody had as good a time as I did! Da Vinci Science Center turned out to be a great place to have our meeting, and for me, it was a big relief for the party to be an accomplished fact. A success, I even dare to claim, though not without some unexpected hurdles

A Visit From Saint Murphy

I think that the typical formulation of Murphy's Law, "anything that can go wrong will go wrong," is actually too pessimistic. A more realistic statement would be, "if anything can go wrong, for sure something will," and that is pessimistic enough because there is always something that can go off the rails. Wanting everything to go perfectly means spending a lot of time thinking of problems that might happen, and trying to do something about it. Sometime what gets you is something you didn't think of but sometimes it's just that your countermeasures are too little or too late.

A case in point was the procurement of prizes for our Trivia Contest. With just less than a week to go, I involved Gwyn Fowler and Blaine Easterwood in a mission to come up with some ideas, and we ended up with a plan that required ordering some stuff on-line.

Now, I happen to have Amazon Prime with free two-day shipping, but it was also the holiday season. So. I didn't wait until Thursday to order stuff I needed on Saturday. Instead, I got our order in on Tuesday with delivery promised on Thursday, figuring that was sufficient margin to allow for Murphy-ish mischief. That calculation turned out to be wrong by at least a couple of hours.

I know it's a tough time of year for UPS, but I still felt like taking it personally. They had my stuff, in Bethlehem, on Thursday morning, but still could not get around to dropping it off on my front porch until Saturday, after I was already at the party! I panicked Friday night and yelled for help, and Gwyn stepped up to offer the backup I needed. We decided that Gwyn would round up a few "girlie" prizes, and I would go to the hardware store for a few more "guy" things, and then she would organize the collection into the First, Second, and Third Prize collections, for each winning team of 6 to 8 contestants to divide up as they saw fit. The prizes were not all the cool "space-oriented" trinkets that we had in mind, but I think they still brought some delight to the winners.

No Coffee For You!

I had my Jeep crammed full of supplies for the party, with the plan to pick up ice, and then stop by Ace Hardware. I calculated that I had about 30 minutes before I had to leave, but I was antsy. So I decided to embark early, figuring it would give me a chance to scope out the venue and start getting stuff ready.

Well, I should have taken a breath and looked around more carefully before I left. After I got to Da Vinci and got the ice and beverages into the coolers, I realized that I had left the Official LVAAS Collection of Old Spoons and Spatulas at home, on my counter. (I had brought them home from the Red Shift and revitalized them in my dishwasher.) Oh well, I figured, hopefully everyone brought a serving utensil with their Pot Luck contribution, or we would be able to improvise where they had not.

Then I thought, what's next, coffee. And I realized, with a sinking feeling, that the coffee urn was at home, right next to the bin of utensils. Shoot! Well, it was still only 4:15. I could go home and get it, and still be back by 5.

Just about everybody had arrived by then, itching to get the party started, so I filled the urn with water, added filters and coffee, and attached the power cord. Then I looked at the power strip on the counter, with about 6 crock pots already plugged in to it. Well, there was nothing to do but plug it in and hope for the best.

That was the last I thought of it until we were cleaning up.

Here's a big Thank You to everyone who helped with the event, but I have one last special mention for Paula Dahlenburg, who helped a bunch with the clean up. She emptied the urn and washed it out, and gave me the news that it had never heated up. I hope it's OK, but I haven't re-tested it yet. I hope that power strip is OK. I'm not sure who that belongs to. And, for everyone that really wanted a cup of coffee that evening, I'm really sorry. I tried.

The Website Lives

After the party, I still had one major item on the LVAAS to-do list for this month, which was the website upgrade. There was just not enough time for me to make it go as smoothly as I would have liked; I was hoping to have everything lined up so that I could take it down for a couple of hours, put the upgrade in place, and be back online well in advance of the deadline. Instead, the deadline came as promised, on the afternoon of the 18th, and down we went. It was not until the following evening that I was able to complete the work.

There are still some rough spots that need attention, but it's up and it's usable and I'm taking a break. I don't know who was the first to say "perfection is unattainable," but I always hear it in the voice of Kevin Costner as Roy McAvoy in *Tin Cup*. Like just about everything else in LVAAS' asset inventory, the site is something that will always have room for a little more polishing.

So, another busy month has gone by with nothing happening on the 40", and again there will be no Schlegel Report in this issue. That changes for next month, I promise. I am looking forward to a fruitful 2020, in which we'll all choose our priorities wisely, apply our efforts gainfully, and enjoy the satisfaction of improving our lives, our organization, and the welfare of our astronomical community. Happy New Year! Ad Astra!

— Rich Hogg

LVAAS General Meeting - Public Welcome!

Sunday, January 12, 2:00 p.m.

Trumbower Hall, Muhlenberg College, Allentown, PA

"CubeSats, PocketQubes, and More: Designing, Building, and Operating a Small Satellite"

featuring **Joe Latrell, Founder of Mini-Cubes**



What does it take to build a satellite? With the current trends in smaller powerful electronics, it is easier than ever to build one for yourself. We'll explore the science and engineering that goes into making a functional satellite step by step. In addition, we'll cover the headaches and challenges that come with designing space hardware from concept to launch to on orbit operations.

Joe Latrell is a recovering rocket scientist and founder of Mini-Cubes, a company working to build and operate a new class of Earth Observation satellites called PocketQubes. In addition to satellites, he has worked at his own rocket company, worked in IT, and programmed video games. He is an active member of Teachers in Space, a non-profit that brings space technology into the classroom helping teachers and students learn more about spaceflight. You can follow his adventures on YouTube and at Mini-Cubes.com.

Torturing the Latest AI by Rich Hogg

There was a [news article](#) in February about GPT-2, an AI program that some guys at OpenAI had developed. A neural network, which they "trained" by feeding it a bazillion or so books and news articles, it was capable of generating eerily real-sounding -- um, nonsense, mostly. They announced that the potential for misuse made this "too dangerous" to release to the public.

In early November they changed their minds. With a shrug and an eye-roll, they not only made this menacing Skynet clone available, they even created an easy-to-use [website](#) so that any fool (like me) could do their worst with it. Why not? I fed it the same "seed text" and sampled some of its responses:

The Pleiades are high in the evening sky. That means it's time to renew your membership in LVAAS!

LVAAS is the Long-Awaited Lunar and Asteroid Awareness and Tracking Association of America. It was formed in 1991 by a group of astronomers who had become increasingly concerned about the dangers to the public of NASA's failed plans to study the far side of the Moon, an area that contains millions of dollars worth of valuable resources. NASA now says it's going to study the Moon's far side in the 1980s and 1990s, but LVAAS is still the only group of astronomers who have had a chance to study the far side.

Seriously, you can't make stuff like this up. It takes a sophisticated AI program to do that.

The Pleiades are high in the evening sky. That means it's time to renew your membership in LVAAS!

LVAAS is a professional organization devoted to the study of astronomy. We have a membership of amateur and professional astronomers from around the world. Each month, LVAAS holds an open night, during which we give presentations on astronomy topics, and invite people to come see the stars. Our meetings are held on Saturdays and Sundays at 2:30 p.m. at The Temple of the Pleiades.

The LVAAS Observatory is a small observatory near the city of Tucson. It offers public access to skywatching, including telescope viewing, in a safe and friendly atmosphere. Our observatory has a 30" f/2.8 Newtonian reflector, two 80" f/4 Schmidt-Cassegrain telescopes, and a 10" Newtonian Reflector.

Maybe we should rename South Mountain "The Temple of the Pleiades." I like the "safe and friendly atmosphere." But come on, who needs TWO 80" f/4 SCTs?

The Pleiades are high in the evening sky. That means it's time to renew your membership in LVAAS!

LVAAS (the Pleiades and Arcturus Association of Solar Observers) is a volunteer organization of amateur astronomers, led by a board of directors who are professional astronomers. LVAAS offers education, events, and opportunities for membership. The organization is also an active observer and host of a number of public events for the public, and hosts a website with a calendar of all public events and the opportunity for the public to join and/or purchase a "day pass". LVAAS is a 501c3 organization.

Some of those are actual facts. That's the scary part, I guess. It all sort of sounds real, but a lot of it is just cottage cheese.

The Pleiades are high in the evening sky. That means it's time to renew your membership in LVAAS!

If you're a member, why not renew your membership now?

Now we're talking! Download your renewal form [here](#) and get your check in the mail right away!



**Lehigh Valley
Amateur Astronomical Society, Inc.
(LVAAS)**
620 B East Rock Road
Allentown, PA 18103-7525
Phone 610-797-3476



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AmazonSmile is a website operated by AMAZON that lets customers enjoy the same wide selection of products, low prices, and convenient shopping features as on AMAZON.com

The difference is that when customers shop on AmazonSmile (smile.amazon.com) the AmazonSmile Foundation will donate 0.5% of the price of eligible purchases to the charitable organization selected by customers.

The Lehigh Valley Amateur Astronomical Society is on Amazon's list of such organizations. There is no cost to the customer or the organization.

When shopping through AmazonSmile, you can choose a charitable organization to which you'd like to donate, and we are hoping you will consider LVAAS.

Happy Shopping & Many Thanks!!



**Lehigh Valley Amateur Astronomical
Society, Inc.**
620 B East Rock Road
Allentown, PA 18103-7525
Phone 610-797-3476



Minutes for the LVAAS General Meeting - December 14, 2019

The December LVAAS December General Meeting was held on Saturday, December 14, at 5:00 p.m. at the Da Vinci Science Center in Allentown, PA. This was the annual General Meeting and Holiday Party Pot Luck Dinner.

Director Rich Hogg opened the meeting at 5:30 p.m. There was a brief Board of Governors Meeting prior to the start of the General Meeting and Holiday Party.

There was no speaker for the meeting. In place of a speaker was an Astronomy Trivia Contest, hosted by David Melman. The trivia contest consisted of teams of six who were challenged to answer five rounds of questions prepared by Rich. Congratulations to the winning teams!

After the trivia contest was over and everyone enjoyed delicious treats from the dessert table, three new members had their first readings. Michael (Mike) Salter and Madison Salter had their first readings. Miley Salter was also there but she could not talk due to pain from getting braces recently. It was also announced that Jenny Craig was relocating out of the area and would discontinue her membership.

In addition to the first readings, Gwyn also reminded everyone that it's now time to renew memberships. Renewal can be done in person at a meeting, or by mail. The revised renewal form is on the website.

Rich announced that the January, February, and March meetings would be held at Trumbower Hall, Muhlenberg College in Allentown, PA. It was also noted that the meetings would start at 2:00 p.m.

It was decided that a formal introduction of the newly elected and re-elected 2020 officers would be skipped and that just the names would be announced. The new and returning officers are as follows: Rich Hogg-Director, Tom Duff-Assistant Director, Scott Fowler-Treasurer, and Kelly and Dennis Decker-Secretary.

The meeting was unofficially adjourned at 8:00 p.m. Hopefully everyone left quite full.

Happy New Year!

Submitted by Dennis Decker, Secretary



LVAAS Holiday Party photos courtesy of Cindy Kunkel



**LVAAS Holiday Party photos
courtesy of Cindy Kunkel**





From the LVAAS Archives:

"Rodger Gordon's 1970 Predictions"

by Sandy Mesics

In his January 1970 "Observer's Corner" article for The Observer, LVAAS member, regular columnist, and avid amateur astronomer Rodger Gordon made these predictions for the next 10 years (1980.)

1. Life (low forms) will be found on Mars

The January 2020 issue of Sky & Telescope has an article on whether life forms have evolved below the surface of Mars. This remains a theory, however, so we will give Rodger an incorrect on this one; but check back in a year or two...

2. More efforts (similar to Project OZMA) to detect extraterrestrial intelligence will be forthcoming.

The objective of Project Ozma was to search for signs of life in the universe through interstellar radio waves. This pioneering SETI (Search for Extraterrestrial Intelligence) experiment started in 1960 by astronomer Frank Drake of Cornell University. For four months in 1960, for six hours each day, Project Ozma's 85-foot National Radio Astronomy Observatory radio telescope in Green Bank West Virginia was tuned to the 21-centimeter emission wavelength in the region of Tau Ceti and Epsilon Eridani, looking for patterns of pulses that would indicate an intelligent message. None were found.

In 1984, the SETI Institute was formed to carry on this work. Today, the SETI Institute uses a specially designed instrument for its efforts – the Allen Telescope Array (ATA) located in the Cascade Mountains of California. The ATA is embarking upon a two-year survey of tens of thousands of red dwarf stars, which have many characteristics that make them prime locales in the search for intelligent life. As of this date, ET has not yet phoned us, but Rodger was correct on this prediction.

3. The UFO controversy will gradually swing over to the extra-terrestrial hypothesis, but direct proof for or against will be still lacking.

UFO hunting has been a popular pursuit in the United States since the mid-20th century, when Kenneth Arnold, a businessman piloting a small plane, filed the first well-known report in 1947 of a UFO over Mount Rainier in Washington. The Mutual UFO Network (MUFON) has been investigating and researching the UFO phenomenon since 1969, after the Air Force ended Project Blue Book. The group's analysis of over 100,000 UFO reports over the past five decades has shown three things to be true, according to MUFON: UFOs are real; UFOs represent extremely advanced technology; and tremendous breakthroughs will happen if scientists and engineers could "study this phenomenon unimpeded."

A secretive Government Agency, AAIP (Advanced Aviation Threat Identification Program) was started in 2007, and shut down in 2012, because it was not producing any results. We will give Rodger partial credit on this one: Direct proof of UFOs being extra-terrestrial is still lacking, but some are not convinced that UFOs are of extra-terrestrial origin.

4. The origin of the universe question will be settled in favor of the oscillating universe theory.

The oscillating universe theory briefly considered by Albert Einstein in 1930 theorized a universe following an eternal series of oscillations, each beginning with a Big Bang and ending with a Big Crunch; in the interim, the universe would expand for a period of time before the gravitational attraction of matter causes it to collapse back in and undergo a bounce.

The evidence suggests that the expansion of the universe is accelerating. If an oscillating universe theory ruled that out then this would, in turn, dismiss this theory. As it is, it does strongly indicate that the idea that gravitational attraction would eventually slow the expansion of the universe and then send the expansion into reverse, is a false one.

We will mark this one wrong: while the oscillating universe theory is still evolving to meet the new findings of dark matter and dark energy, the question is still unsettled, and does not seem to favor this theory.

5. Jupiter's red spot will still be unexplained.

The Great Red Spot has been observed continuously for almost 200 years. We now know that it is a persistent high-pressure region in the atmosphere of Jupiter, producing an anticyclonic storm, the largest in the Solar System. The spot — which is red for reasons not fully understood — has become smaller in recent decades.

Currently, the Great Red Spot's diameter could hold two Earth-sized planets. The storm itself is structured like a wedding cake, with an upper layer extending more than three miles higher than its surrounding clouds, according to NASA. Theory suggests that the red coloring is due to a colorless ammonium hydrosulfide layer interacting with cosmic rays or UV radiation from the sun.

We will give Rodger partial credit. We know a lot about what the Great Red Spot is, but we are not certain as to what gives it its distinctive color.

6. Most (but not all) quasars will be found to be truly red-shift objects at billions of light years distance.

Quasars are believed—and in many cases confirmed—to be powered by accretion of material into supermassive black holes in the nuclei of distant galaxies, as suggested in 1964. More than 200,000 quasars are known, most from the Sloan Digital Sky Survey. All observed quasar spectra have redshifts between 0.056 and 7.54 (as of 2017.) Using Hubble's law to explain these redshifts would indicate that quasars are between 600 million and 29.36 billion light-years away.

We aren't sure why Rodger put the qualifier in this statement, but the consensus is that Quasars are extremely red-shifted objects at great distances. We will give him partial credit.

7. Neutron stars (hypothetical at present) will be discovered.

When Rodger made this prediction, astronomers were already aware of Pulsars, which were discovered in 1967. However, astronomers didn't have a complete understanding of their nature, and that they were actually the product of neutron stars. There are now over 1,300 neutron stars known and about 105 predicted to exist in the disk of the Milky Way. We will give Rodger full credit for this one.

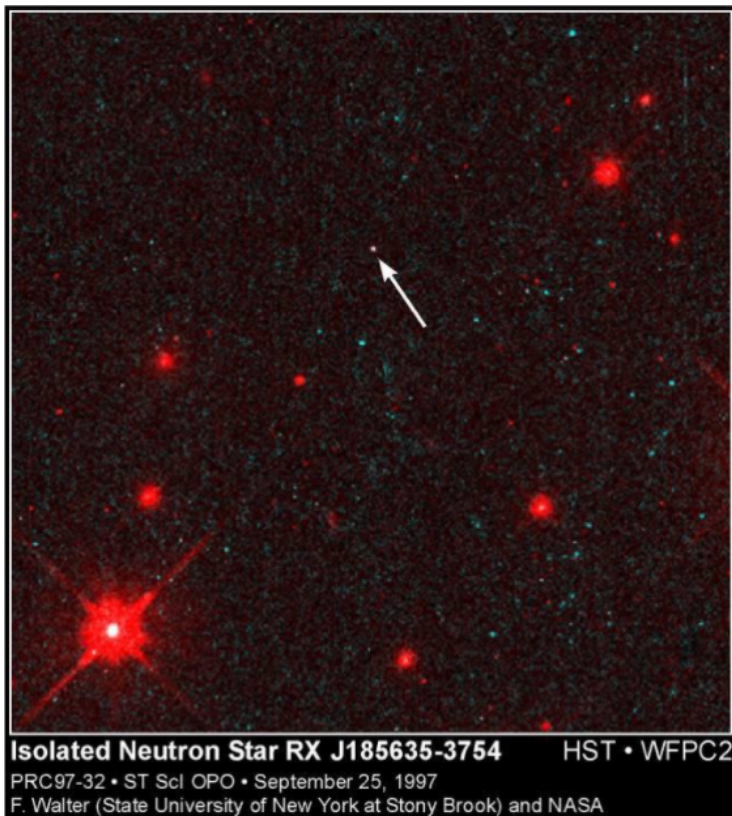


Figure 1. The first direct observation of a neutron star in visible light.

<http://astronomy.swin.edu.au/cosmos/N/Neutron+Star>

8. The first unmanned interstellar probe will be on the drawing board to be launched in the early 1980s.

Perhaps Rodger was referring to one of the plans for interstellar exploration that were popular at the time: the Enzmann starship was a concept for a manned interstellar spacecraft proposed in 1964 by Dr. Robert Enzmann. A three-million ton ball of frozen deuterium would fuel nuclear fusion rocket engines contained in a cylindrical section behind that ball with the crew quarters. The craft would be twice as long as the Empire State Building. There was also Project Daedalus, which proposed a 50-year trip to Barnard's Star using a fusion rocket.

Voyager 1, launched on September 5, 1977, went interstellar in August 2012. Voyager 2, launched on August 20, 1977, went interstellar in 2018.

Neither spacecraft was designed to be an interstellar probe: they were designed to explore the outer planets, at which they were very

successful. Pioneer 10 & 11 will also go interstellar, but there has been no contact with these probes for many years. New Horizons will also go interstellar at some point in the fairly near future. A true dedicated interstellar probe has yet to be launched.

We will give Rodger partial credit: an interstellar probe wasn't launched by 1980, but two probes did reach interstellar space, and a few more will follow.

Rodger got 2 correct, 4 partially correct, and 2 wrong. Not bad!

DSLR Astroimaging---easy and fun!

by Mike Waddell

Astroimaging is a fascinating hobby that gives an observer the opportunity to capture images in whatever medium s/he is comfortable using. I prefer DSLR imaging which has both advantages and disadvantages, with the biggest advantages to me being portability and spontaneity in shooting options. The shots that follow are an example of both. On Monday, November 25, 2019 I saw on my Astrospheric app that the skies would be clear that evening and that the International Space Station (ISS) would be visible for several minutes going WSW to NE around 6:55 p.m. I know from experience that that trajectory is easily visible from my back patio so I set up my camera with the 17-55 mm lens at 17mm at f2.8 for 3 seconds for each image and started the interval timer around 6:50 p.m. I let it run for about an hour and collected roughly 300 images which creates some nice star trails and in this case Polaris at the center of the trails.

I first downloaded all of the images in StarStax to create image 0 and see what I had. Most importantly I saw that I had the ISS going from left to right in the middle of the image (yay!) but there were also lots of other lines I didn't want and the image was very dark. I then imported all the images to StarStax three more times and deleted the frames with the extraneous lines or bright lights (my neighbor's security light came on just as I started shooting!) until I got images I wanted which I tweaked in Google photo editor to get to image three as my final image.....total time blending and editing was about 30 minutes.

I haven't gotten into Photoshop or Lightroom yet so I used the Google photo editor to change the brightness in the three blended shots. One of the downsides of this type of simple editing is that I couldn't erase the light flare in the lower right corner because it was in all of the images.

The portability of this type of shooting is important to me at this time. I have a 102mm refractor and AVX mount that takes much more time to set up and the field of view is much smaller than the nightscape shooting I'm doing now. This also leads to the spontaneity of being able to shoot something on very short notice as I did that night. Questions-- email me at mgwaddx@gmail.com

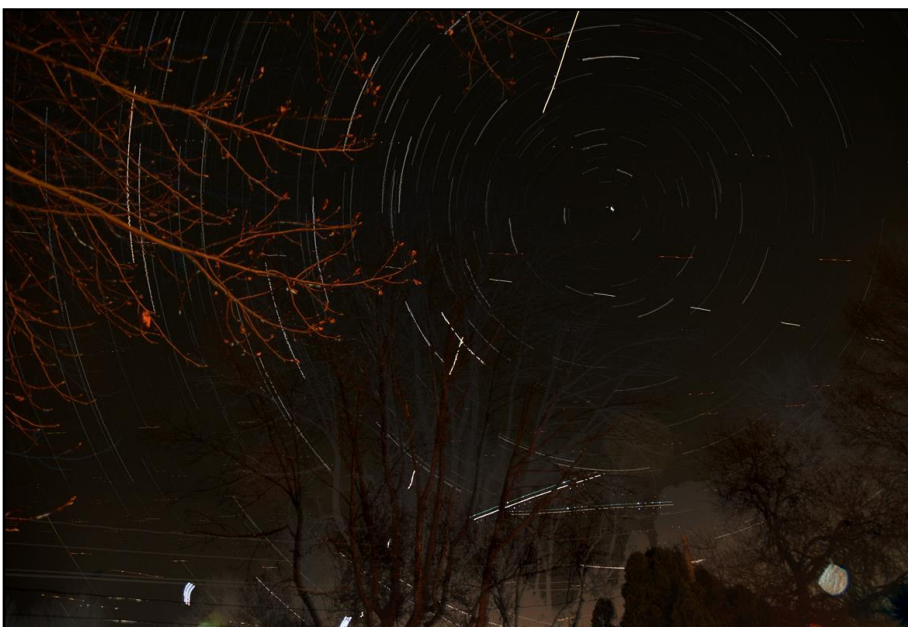


Image 0 Original image with all 300+ images

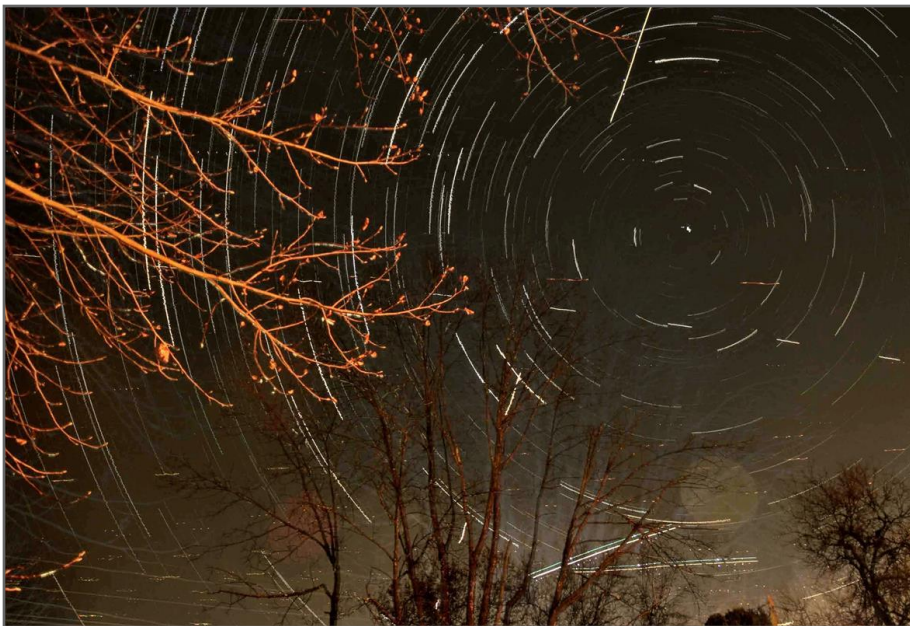


Image 1



Image 2

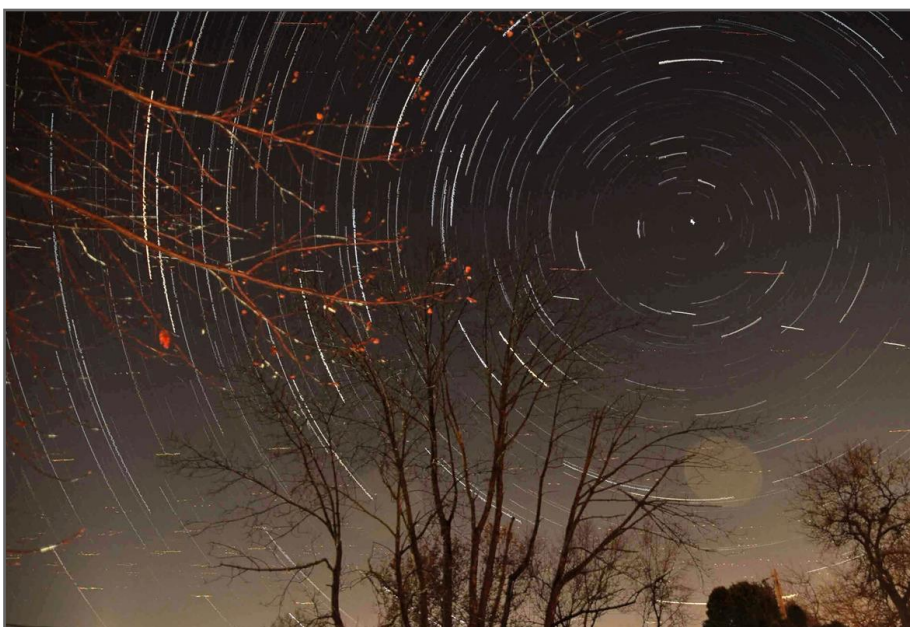


Image 3

by Gary A. Becker

© Gary A. Becker – beckerg@moravian.edu or garyabecker@gmail.com
Moravian College Astronomy - astronomy.org
Facebook at facebook.com/StarWatchAstro/



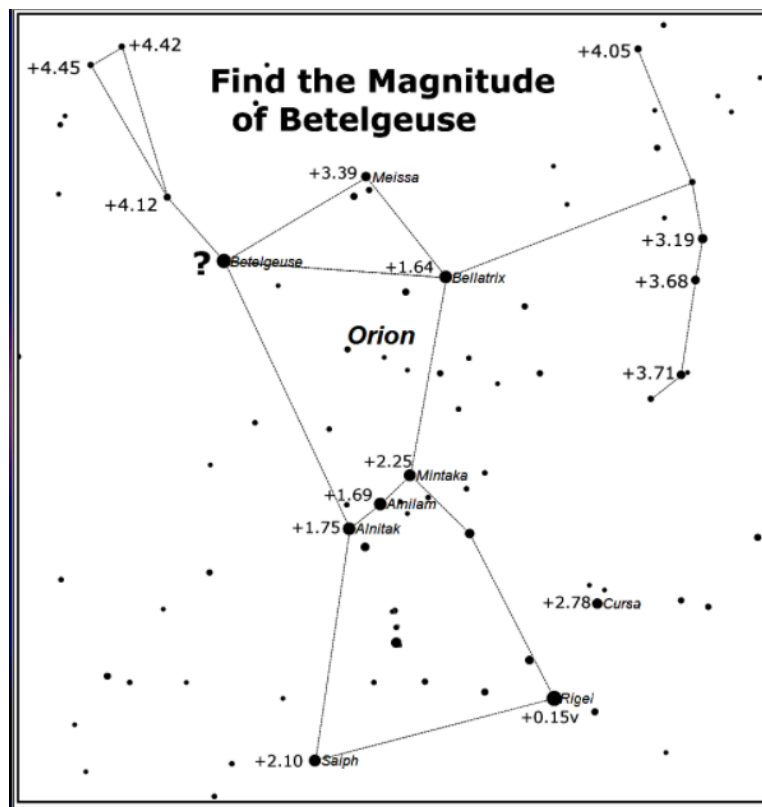
Betelgeuse—Where Have You Gone?

Friend, Adam Jones, e-mailed me the other day saying I should write an article about Betelgeuse because its brightness has significantly diminished since October. I went out with binoculars to check Adam's observations, and he was correct. Where have you gone, Betelgeuse, the Alpha star of Orion the Hunter? Like Stevie Nicks' popular hit, "Edge of Seventeen," red Betelgeuse, a supergiant star plagued with congestive heart failure, is on the "edge of going supernova," and its variability is part of the opening act before the main event which astronomers are anticipating could occur between now and one million years into the future.

If you face Orion the Hunter with its three belt stars, mid-sky in the south around 11 p.m., Betelgeuse is the bright—well not so bright right now—red shoulder star found on the Hunter's right side. It should be about as vivid as the luminous blue supergiant, Rigel, which represents the foot of Orion, but looks more like his knee and is catty-corner from Betelgeuse. Betelgeuse is a semiregular variable star. When it was first cataloged by the German lawyer and astronomer, Johann Bayer (1572-1625) in the early 17th century, it was brighter than Rigel, and thus, became the Alpha star of Orion (Alpha Orionis) in his star atlas, *Uranometria*, published in 1612. Betelgeuse varies in brightness by about two magnitudes, from being the sixth brightest star of the night to somewhere around the mid-forties. When I observed it recently, it may have well been fainter than that. I judged its brightness similar to Saiph's, actually the tip of Orion's sword, but looking more like the other knee across from bright Rigel. That put Betelgeuse at about +2.1 magnitude, still very easy to see with the unaided eye, but out of place with the way Orion normally appears. Magnitude, or the way that astronomers classify the brightness of stars, is a counterintuitive concept.

First, the fainter the star, the more positive the magnitude. Betelgeuse at magnitude +2.1 is much fainter than Rigel at approximately +0.2. Since +0.2 is a more negative number than +2.1, Betelgeuse is the fainter star right now. The other challenge in understanding magnitude is that the difference between one magnitude represents an intensity variation of 2.51. A difference of five magnitudes corresponds to an intensity change of 100. The dissimilarity in magnitude between Rigel and Betelgeuse, if my magnitude estimate is reasonably correct, is 1.9, corresponding to an intensity difference of nearly 6, and perhaps putting Betelgeuse at the point of an historic low.

If you want to try to make a brightness estimate of Betelgeuse, use the map with star names and magnitudes indicated at <https://astronomy.org/StarWatch/January/index-1-20.html#1-5-20>. Use binoculars, but defocus them so that Orion's stars look like large disks and find the luminary which most closely matches the brightness of Betelgeuse. If you don't own binoculars, but wear glasses to correct for far vision—myopia, observe without them, noting which diffuse star blob in Orion is about the same brightness as Betelgeuse. Feel free to e-mail me your results. It's a lot of fun, and you'll be contributing to science in the meantime. On New Year's Day, I estimated the magnitude of Betelgeuse at +1.9. Clear skies!





Night Sky Notebook for January

by

Pete Detterline

Night Sky Notebook

Peter Detterline

JAN 20

 Mars

 JAN 21

Jupiter will join the party on January 24.

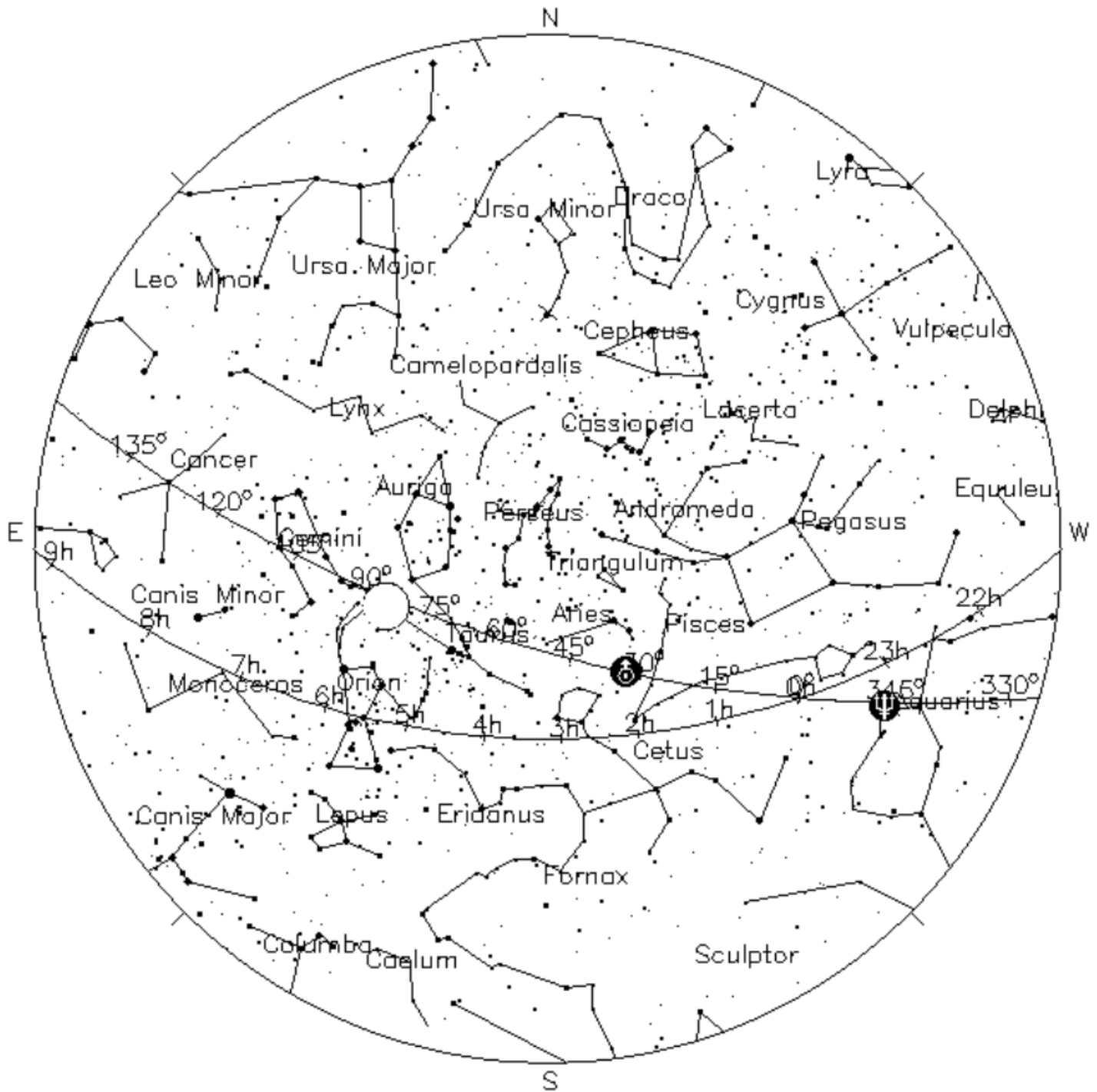
Moon and Mars

The Moon and Mars make a pretty pair in the eastern sky before sunrise.

Space exploration will be going in the direction of those two objects. First back to the Moon to test equipment, and then onward to Mars. NASA 'looking at the first people to the Red Planet in the 2030's. Elon Musk's company Space-X is looking at 2028.

January 20-21 6:00 AM SE

Sky above 40°33'58"N 75°26'5"W Thurs 2020 January 09 1:00 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

Copyright © 1989 by Jef Poskanzer.

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

JANUARY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			01	First Quarter Moon 02	03	04
05	06	07	08	09	Full Moon 10	11
General Meeting - 2:00 PM Muhlenberg 12	13	14	15	16	Last Quarter Moon 17	18
Deadline for submissions to the Observer 19	20	21	22	23	New Moon 24	25
LVAAS Board of Governors Meeting 26	27	28	29	30	31	

FEBRUARY 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						First Quarter Moon 01
02	03	04	05	06	07	08
Full Moon 09	10	11	12	13	14	Last Quarter Moon 15
General Meeting - 2:00 PM Muhlenberg						
Deadline for submissions to the Observer 16	17	18	19	20	21	22
New Moon 23	24	25	26	27	28	29
LVAAS Board of Governors Meeting						

2020 LVAAS Event Calendar

2020 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	12 Muhlenberg	26	19	16	no mtg		no camping	24	2	10	17
February	2:00 PM	9 Muhlenberg	23	16	13	no mtg		no camping	23	1	9	15
March	2:00 PM	8 Muhlenberg	29	22	12	7		6 – 7 – 8	24	2	9	16
April	7:00 PM	5 S.M.	26	19	18	4		10 – 11 -12	22	1 30	7	14
May	7:00 PM	3 S.M.	31	24	16	2		8 – 9 – 10	22	29	7	14
June	7:00 PM	14 S.M.	28	21	13	27		5 – 6 – 7	21	28	5	13
July	5:00 PM	11 S.M.	26	19	18	25		3 – 4 – 5 31	20	27	5	12
August	7:00 PM	8 Pulpit	30	23	15	22		1 – 2	18	25	3	11
September	7:00 PM	13 S.M.	27	20	12	26		4 – 5 – 6	17	23	2	10
October	7:00 PM	11 S.M.	25	18	15	24		2 – 3 – 4 30 – 31	16	23	1 31	9
November	7:00 PM	8 S.M.	29	22	12	21		1	15	21	30	8
December	**	12	27	20	10	no mtg		no camping	14	21	29	7

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 ** check website for time

NEAF
 Cherry Springs S.P.
 Stellafane
 Black Forest S.P.
 MegaMeet

April 4 – 5
 June 18 – 21
 Aug 13 – 16
 Sept 18 – 20 (not confirmed)
 May 22-24

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.

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