

Night Visions

August 2021

Newsletter of the **Baton Rouge** Astronomical Society

Virgin Galactic's passenger rocket plane VSS Unity, carrying Richard Branson and crew to the edge of space, July 11, 2021. Still image by Reuter.
Jeff Bezos' Blue Origin capsule carrying a crew of 4, July 20, 2021, image via SpaceForce

Monthly Meeting August 9th at 7:00 PM, in person, masked!

(Monthly meetings are on 2nd Mondays at Highland Road Park Observatory)

You can also join this meeting via meet.jit.si/BRASMeet

PRESENTATION: Bruce Moore, on the fabrication of the SDSS mirror, via Jitsi

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**ARTICLES: Branson and Besos
make space history, July 11 (VSS
Unity) & July 20 (Blue Origin)**

"Billionaire space race expands industry, democratizes' space"

Observing Notes: [Vulpecula – The Little Fox \(with the Goose\)](#)

**Like this newsletter? See [PAST ISSUES](#) online back to 2009
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[BRAS YouTube Channel](#)

President's Message

Happy August. I hope everyone is enduring the current heat wave with the same aplomb they weathered last month's incessant rains. It was good to see so many familiar faces at our July meeting, and I think a lot of us were relieved to get a little face time with our curious little community (especially weird considering we spend so much of our time together out in the dark). It was particularly nice to see our illustrious former president, Melanie, fresh from her other observatory in New Mexico. If you didn't get a chance to meet her yet, you might get another chance toward the end of the year as she returns to **Baton Rouge in celebration of the 40th anniversary of the founding of BRAS**. As I write, plans are being made in order to properly commemorate the event and if you'd like to be a part of the planning (or if you just have ideas) please contact John Nagle, who is currently heading the planning committee.

Congratulations again to Ben who was finally awarded his Messier Observing award, which he actually finished at the same outreach we held earlier this week, but back in 2019: a well-deserved award that was a long time coming and I encourage everyone to attempt the same feat. The



L to R: Merrill, Craig, Roz, Natalia, Chris, Trey, Erin, Mike, Jacob, Stephen, Michele, Melanie, John, Darin (Melanie's husband), Santiago & 2 kids, Scott, Ben (Photo by Ben's camera on auto).



Astronomical League has a number of wonderful

observing programs listed on their website that are a great way to help you structure an evening of observation (not to mention you may even learn something new).

Our next meeting will also be held at HRPO only with a few slight differences. The meeting will still be held both at HRPO and online via Jitsi, but those who are attending in person will be asked to wear a mask while in the building. Our

speaker will once again be remote, so we will be doing our best to put that up for everyone to see locally.

By now, the summer **Member's Only Moon Night** should have already taken place and, with luck, we caught a break in the weather that would allow us a peek at some of these summer constellations (at last!). But if not, fear not, after the summer is the Fall, with it's nicer weather and a brand new set of fall targets—**we'll be scheduling a new MOON for that season later in the year, probably for October**. And for those who are a bit more adventurous, **our dark sky site is always open** for members: the map is listed on our website, just follow dark sky site protocols while there. But if you can't make it out to observe either at HRPO or at the DS (and even if you can), I hope everyone takes five minutes of time to go outside wherever they live and **take a reading for the Globe at Night campaign** to help us keep an eye on the changes in light pollution in the community: it's a simple citizen science project that makes a difference.

And, finally, a quick reminder that we are still trying to offload a bunch of donated astronomy equipment that BRAS has acquired over the years: of note, we still have a **16" Newtonian, a 10" Dobsonian, two 8" SCTs**, and a whole host of various plossl eyepieces. Prices for the EPs are \$10 a pop, and we'll be putting them all into a rummage bin pretty soon: in order to buy, just contact an officer.

And that's it: I hope to see some of you at our upcoming meeting and that we all find some clear skies.

MONTHLY MEETING/BARBEQUE –July 14th, 2021 in person at HRPO, and remotely via Jitsi

NO MEETING. Instead, we had an in-person, maskless barbeque/pot luck/ social. We ate brisquit and baked beans and garlic bread, watermelon, grapes, cheese, and a whole lot of desserts! The most fought-over dessert was those home made space cookies.

Here are some pics taken by Ben and Michele:



2021 Officers:

President: Scott Cadwallader
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Frederick Barnett

Business Meeting Minutes –July 28th, 2021 **in person at HRPO, and remotely via Jitsi** (meeting is the last Wednesday of the month)

The following items were discussed:

- Member meeting on August 9th – sent speaker info to Chris K and Amy N. Protocols – Hybrid meeting, in-person at HRPO must wear a mask.
- Moon Night on July 30th – after the public leaves at 10 PM until ?.
- Member educational sessions – For new members a “How To”, and for new NSN Kits were discussed.
- Equipment Sale – Looking for a moderator to list equipment on-line in forums, and to moderate the sales. All eyepieces for sale will be assembled in one place and start pricing on the larger telescopes.
- BRAS 40th Anniversary – Committee needs to start planning – if you have any ideas, contact John Nagle.
- ALCon 2023 – BRAS has tentative approval to hold the 2023 ALCon in Baton Rouge. The planning committee needs to be expanded and start having regular meetings. The dates are not set yet – sometime in June or July 2023. Excursion will be going to LIGO. LIGO is being contacted as to when tours could be given – that will determine the date.
- Chris K reported on the planned activities at HRPO for the rest of the year.
- Ben reported on outreaches past and planned.
- BRAS E-mail domain – Web Host contacted.
- BRAS Star Party for 2022 – Don W working on it. Ben T and Scott C investigating the Feliciana Retreat.
- Starting the long process to get HRPO designated an “Urban Night Sky Place” by the IDA.
- BRAS Computer update/replace being worked on by Ben T and Trey A.
- BRAS Quartermaster – proposed by Scott C. Quartermaster to regulate the BRAS Closet, check in/out equipment and library. Scott C has volunteered to fill the position next year when his term of office is over.
- Election Committee discussed.
- HRPO Keys – discussed with Chris K about more keys for BRAS.

Submitted by John Nagle for Thomas Halligan, Secretary



Here is our new banner, useful for indoor outreaches.



BRAS Outreach Report

Hi Everyone,

Hope you've been surviving the heat and rain. It's been havoc on astronomical activity, for sure! That being said, we did have a fantastic **outreach on July 27th with the Louisiana National Guard**. They do a regular Summer camp with kids of the men and women in the National Guard.



Chris R., Annette R., Craig B., Scott C. and I were on hand for much of the day doing a rotation of activities with the campers. Scale distance models (partial) of the Solar System, scale size model of the Solar System, in depth discussion of the Moon and how craters are formed, and then answering a host of questions regarding anything the kids could think of to ask about the Universe.

The day was made more exciting for us by having the **Adjutant General of the Louisiana National Guard, Brigadier General Waddell**, arrive by Blackhawk helicopter on the field. He was very gracious and made a point of thanking each of us for helping out with the camp. The whole staff there is always very helpful and happy to have us. We always have a great time and hope these camps continue into the future.



Coming up, we have the return of the Mid City Makers Market so check out those details below. We'll see what happens with the state of things as to whether we start getting requests from schools for the Fall. Keep an eye out for requests!

I was proud to award 16 Night Sky Network Star pins to Outreach participants for 2020! Here's a pic of the recipients who were in attendance at the July Barbeque. Additional recipients include: Susan M., Chris K., Annette R., Don W., James E., & Coy W.



Clear Skies,

Ben Toman



Left to right - Ben, Craig, Merrill, Roz, Chris, Trey, Michele, Stephen, John and Scott



BRAS Light Pollution Committee Report

This committee meets at 6:00, same day as the 7:00 BRAS Business Meeting
(NEW SCHEDULE: Meetings will be the last Wednesday of the month.)

Everyone is welcome to join in..

- Discussed sending an update on Light Pollution to those who have signed the LP Petition. Total signatures include 12 from BRAS or BREC personell, and 37 from HRPO Patrons, 14 of which have given e-mail addresses. It was suggested that a notice be sent out each month about the Globe-at-Night program and any update on LP.
- The 7-year plan is active again. See Chris K about the program.
- Starting the long process of getting HRPO designated as an “Urban Night Sky Place” by IDA.
- Sending information to Merrill H for the BRAS stand on LP to be incorporated into the BREC-LSU-BRAS agreement.
- Contacting Home Schooling groups about participating in the Globe-at-Night program.
- Will make an appointment to meet with a BREC Go Green Committee representative to discuss the BREC Environmental Sustainability Policy.
- To be contacted:
 - Civic Associations -Chris K and Wally P have previously contacted them,
 - LSU School of Architecture – contacted Dr. Desmond – Director of Graduate Studies at the College of Art and Design, and Professor of Architecture – he informs me that he knows of no department that might have any interest in LP. I will contact other schools at LSU about LP.
 - American Institute of Architecture (AIA) – I will contact the Baton Rouge chapter about LP.
- Will contact the Architect for the apartments being built, at Bluebonnet and Highland Road, about LP and lighting.
- New – The University Lake Project will have a second meeting on August 8th. Scott C and I will attend. Any others interested, please contact me for details.

John Nagle, LPC Chair

Globe At Night

The target for the Globe at Night program is Cygnus from July 30th through August 8th, and from August 29th through September 7th.

If you would like to participate in this citizen science program, you can find instructions at

<https://www.globeatnight.org>

P.S. The “Loss of the Night” app can be used for information and for reporting your observations.

Upcoming BRAS Meetings:

Monthly Member Meeting –

7 pm Monday, August 9th at the Observatory, and via Jitsi .

Light Pollution Committee:

6 pm Wednesday, August 25th, via Jitsi. (Open to the public), followed by.....

Monthly Business Meeting (follows the LPC mtg):

7 pm Wednesday, August 25th, via Jitsi (Members Only)

MOON (Members Only Observing Night),

TBA^h

2023 Astronomical League Convention

NOTICE: The Baton Rouge Astronomical Society has been tentatively selected to host the 2023 Astronomical League Convention (ALCon 2023). This conference includes lectures, panel discussions, workshops, an exhibition, & astronomy field trips. It will take place on a Wednesday through Saturday in late June or July 2023. This event could bring from 250 to 500 people to Baton Rouge. This is an opportunity to bring speakers to Baton Rouge. If you would like to help in the planning, please send an email to me.

Steven Tilley, ALCon Coordinator: steveareno225@gmail.com.

Billionaire space race expands industry, 'democratizes' space

[Billionaire space race expands industry, 'democratizes' space - The Daily Universe \(byu.edu\)](#)



New Shepard lifts off from Launch Site One in West Texas with four humans on board on July 20, 2021. This flight from Blue Origin was Jeff Bezos' first space flight and is part of a new push for space tourism. (Blue Origin)

Excerpts from the BYU.EDU article:

A new push for space tourism is expanding as some billionaires start a new space race with their recent flights. Opportunities for students entering the space industry are increasing while the potential for a democratization of space seems near.

The three billionaires turned space company owners in the spotlight are Blue Origin's Jeff Bezos, Virgin Galactic's Richard Branson and SpaceX's Elon Musk.

Richard Branson reached space in his rocket plane on July 11 during a 1.5 hour mission to the edge of space. Jeff Bezos completed his first space venture on July 20 with a quick, suborbital flight.

BYU electrical and computer engineering professor David Long said these flights just went high into space and could be considered "expensive joy rides." They did not go fully into orbit so they cannot be considered space exploration. Instead, flights like these are considered part of space tourism, where human space travel is for recreational purposes.

Both Virgin Galactic and Blue Origin are more focused on space tourism, but have grander plans in store. Virgin Galactic's mission is to be the world's first commercial spaceline that is "developing and operating a new generation of space vehicles to open space for everyone."

Blue Origin has a “vision of enabling a future where millions of people are living and working in space to benefit Earth. In order to preserve Earth, Blue Origin believes that humanity will need to expand, explore, find new energy and material resources and move industries that stress Earth into space,” Blue Origin’s website states. This could include putting manufacturing on the moon or mining asteroids for copper, gold and other metals.

NASA and other government space agencies focus on space exploration, such as sending people to the moon and other planets, and science regarding observing the universe, climate change and more, rather than space tourism. Vice president of the BYU Rocketry Club and mechanical engineering senior Mark Sweeney said NASA’s goals are for the public good, compared to private industries who are usually more money-driven.

SpaceX, although a private company and not a government agency, has expressed greater interest in space exploration. The company’s stated purpose is “making humanity multiplanetary” and it’s had over 127 launches, with many of them going into orbit or further.

Democratization of space

The U.S. government and NASA help fund projects for several space companies such as Blue Origin, Virgin Galactic and SpaceX, Long said. By funding private launch vehicles and private companies, access to space is increased which makes it cheaper for companies to launch payloads and other technology.

Long said NASA continues to develop more exotic technologies, but once the technologies are developed, it is easier for NASA to launch with private companies. This is because private companies do not have to worry about so many government regulations that government agencies have to follow. The private industry can then develop better and more cost-efficient technologies for launches, such as how SpaceX figured out how to reuse their rocket boosters, Long said.



More Excerpts

- ❖ This push for private space tourism is opening up a future where everyone could become an astronaut, Dunford said.
- ❖ Eventually, Long said, it could even become cheap enough that it will be common place for people to go into orbit, visit the space station or land on the moon.
- ❖ Sweeney said even though the new space race is starting with billionaires paying for themselves, it is really exciting because it is the first step in decreasing the cost of space for everyone. “I don’t think I will be going to space anytime soon, but I think by initiating that market, it’s allowing technology to develop and to become more cost effective.”
- ❖ NASA currently even has plans for a series of new lunar missions with the intention to create a permanent moon base, Dunford said.
- ❖ **Increased opportunities for students**
- ❖ Sweeney currently is working on an internship with HyPerComp Engineering Incorporated which has a contract with Blue Origin and is one of many examples of students having wider opportunities for work in the space industry.

- ❖ Dunford said recently, the BYU Spacecraft Club got a satellite on a Rocket Lab launch and there have been examples of high school robotics clubs receiving funding and sending satellites into space as well. “This is the idea behind democratizing space,” he said — making space accessible to even high school robotics clubs.
- ❖ BYU is a member of Utah NASA Space Grant Consortium. This means NASA gives money to BYU students through scholarships and fellowships for basic research and to support those going into STEM fields. Because of this, Long said BYU students have had several opportunities to build satellites, propose their own projects, conduct research and make new discoveries through the funding from NASA.

***Looking forward to booking your tourist flight?
\$250,000 per seat!!!! Not bad for the Everyman who is
willing to cash out their retirement account, sell their house,
or looks to inherit a boatload.***

[BlueJuly 11, Virgin’s maiden flight Origin and Virgin Galactic: their space... | The Planetary Society](#)

BLUE ORIGIN: NEW SHEPARD	VIRGIN GALACTIC: VSS UNITY
- SUBORBITAL ROCKET AND CAPSULE	- SUBORBITAL SPACEPLANE
- MAX ALTITUDE ~105 KM (65 MI)	- MAX ALTITUDE ~86 KM (54 MI)
- HOME BASE VAN HORN, TX	- HOME BASE SPACEPORT AMERICA, NM
- ONE SEAT AUCTIONED AT \$28 MIL	- SEAT COST \$250,000 PER SEAT
- NO PILOTS, SIX PASSENGERS	- TWO PILOTS, FOUR PASSENGERS

BLUE ORIGIN AND VIRGIN GALACTIC COMPARISON A comparison of the initial suborbital space flights offered by Blue Origin and Virgin Galactic. Image: The Planetary Society

**Spaceflight Now**

@SpaceflightNow



Richard Branson called his flight to space “the experience of a lifetime” in a radio transmission from the VSS Unity rocketplane as it glides back to landing at Spaceport America in New Mexico.

Watch live: spaceflightnow.com/2021/07/11/uni...



10:36 AM · Jul 11, 2021



“To all you kids down there, I was once a child with a dream looking up to the stars. Now I’m an adult, in a spaceship with lots of other wonderful adults, looking down to our beautiful, beautiful Earth. To the next generation of dreamers, if we can do this, just imagine what you can do.”

~ Richard Branson, broadcast from space on July 11, 2021.

Flying “Rocks” and “Dirty Snowballs”:

Asteroid and Comet News

August 2021

Volume 3, Issue 7.

JPL Close Approach Data from June 17, 2021 to July 08, 2021, Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal (LD)	H (mag)	Diameter
(2021 ME)	2021-Jun-17	0.82	29	4.3 m - 9.6 m
(2021 NA)	2021-Jul-03	0.17	28.6	5.2 m - 12 m
(2021 NU3)	2021-Jul-08	0.47	28.6	5.2 m - 12 m

As of 2021-07-01 there is

1,227 objects listed on JPL’s Sentry: Earth Impact Monitoring(JPL) (<https://cneos.jpl.nasa.gov/sentry/>)
 2,697 objects have been removed from Sentry(JPL) (<https://cneos.jpl.nasa.gov/sentry/removed.html>)

For more information read Jon Giorgini's "Understanding Risk Pages"

(<http://www.hohmantransfer.com/by/giorgion.htm>) (i.e. “A risk-page listing is not a *prediction* of impact”)

The following objects were removed from NASA JPL’s Sentry: Earth Impact Monitoring list from 2021-06-30 to 2021-07-21

Object Designation	Removed (UTC)
2016 NL56	2021-07-21 06:10:21
2021 NL2	2021-07-20 13:36:40
2021 NS5	2021-07-19 13:30:13
2021 NW1	2021-07-14 13:32:14
2021 NU1	2021-07-14 13:29:01
2012 UU68	2021-07-13 15:22:48
2021 NR2	2021-07-13 13:31:56
2021 NN1	2021-07-10 13:44:16
2021 NY1	2021-07-10 13:43:31
2010 PY49	2021-07-08 13:33:44
2021 MX	2021-07-05 13:33:18
2021 MZ1	2021-07-04 13:36:04
2021 MG1	2021-07-03 14:30:59
2021 MS1	2021-06-30 14:33:28

Useful Links:

- Guide to Minor Body Astrometry (<https://www.minorplanetcenter.net/iau/info/Astrometry.html>)
- How Are Minor Planets Named? (<https://www.minorplanetcenter.net/iau/info/HowNamed.html>)
- New- And Old-Style Minor Planet Designations (<https://www.minorplanetcenter.net/iau/info/OldDesDoc.html>)

The Tracking News

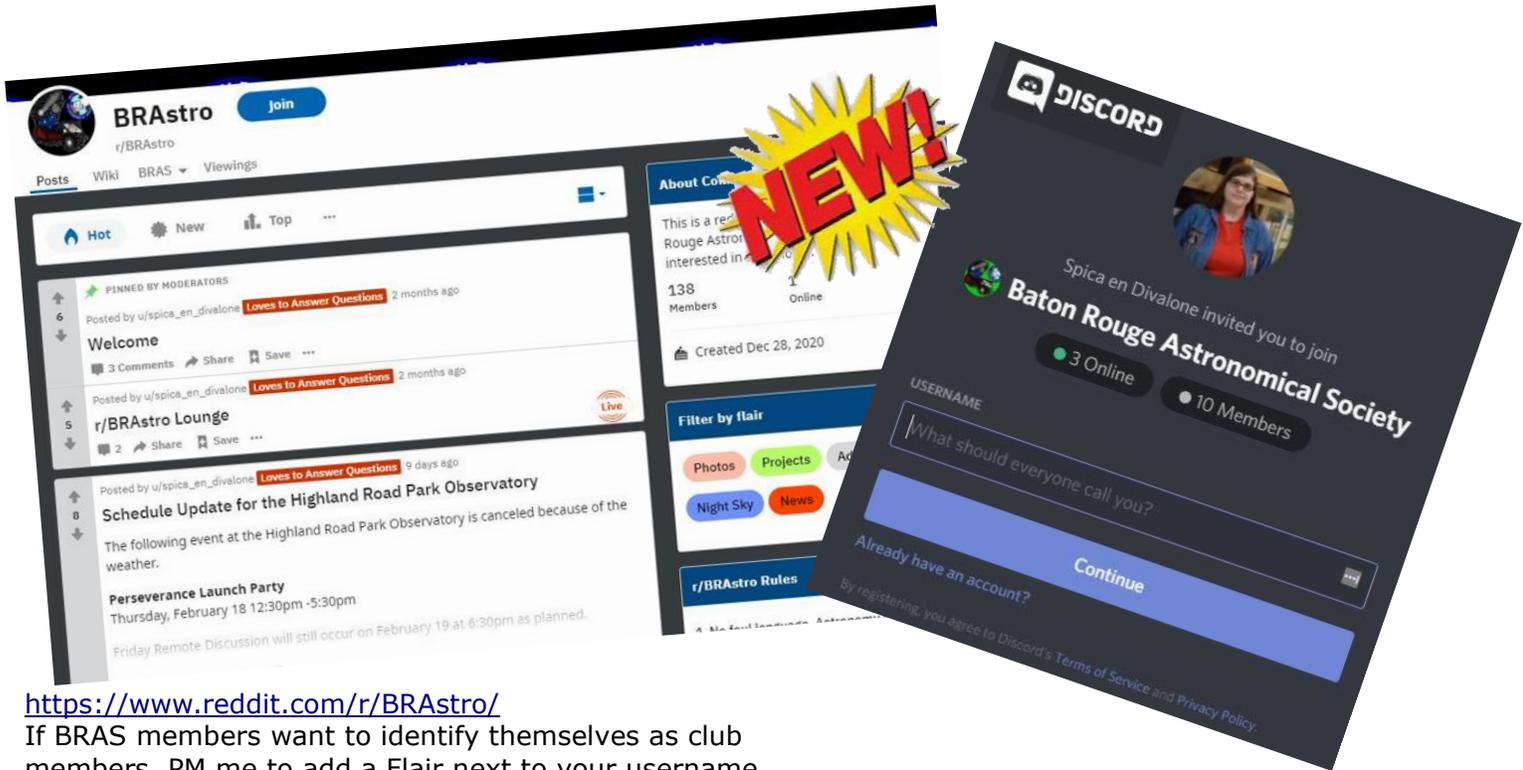
(<http://www.hohmanntransfer.com/news.htm>)

Accessible NEAs

(<https://cneos.jpl.nasa.gov/nhats/intro.html>)

BRAS subreddit and a Discord server.

From Amy Northrup: Our subreddit has been set up for us to reach out to the public. I'd love for you to join us on there.



<https://www.reddit.com/r/BRAstro/>

If BRAS members want to identify themselves as club members, PM me to add a Flair next to your username.

Our discord server is for Members only. It's a fun place for us to hang out. We've set up a channel in discord called techsupport-faq to help those who are new to Discord. If you have any problems you can message me or Justin. <https://discord.gg/6N8r8DDj> It also has voice channels so that you can speak to people through Discord. Discord requires the download of a free app.

The best part about both of these is that you can access them on your phone with the free apps. Hope to see you there.

To join the discord, please email safey2007@gmail.com with the subject **BRAS Discord.**

*Sincerely,
Amy & Justin Northrop*



OBSERVING NOTES APRIL

Vulpecula – The Little Fox (with the Goose)

Position: RA 20, Dec.+25°

Note: For six years I have been writing these Observing Notes, featuring the 60 constellations we can see before midnight from Baton Rouge, that contain objects above magnitude 10. Beginning with the February 2019 newsletter, I began to update the constellations with new and expanded material, but the Sky Happenings calendar and associated information are new each month.

Named Stars

Anser (Alpha Vul), “Lucinda Anseris”, “Lukida”, “The Goose”, mag. 4.4, 19 28 42.41 +24 39 54.6, is a red giant star, and an optical binary star with **8 Vulpeculae** – an orange giant star at magnitude 5.81. The separation between the two stars is 413.7” – the stars can be split using binoculars. Also known as **HD 183439**, **HIP 95771**, **ΣI 42**, and **6 Vulpeculae**.

Anthelm’s Star (CK Vul), mag. 20.0, 19 47 38.1, is a nova star with a magnitude that varies from 2.7 to 20.0. Also known as **11 Vulpeculae**.

Deep Sky:

M27 (NGC 6853), “The Dumbbell Nebulae”, “The Hourglass Nebulae”, “The Apple Core Nebulae”, “The Double Headshot Nebulae”, mag. 7.3, 19 59 36 +22 43 18, 480”x340” in size, is a planetary nebulae shaped like a dumbbell or hourglass with a faint outer halo; very bright and very large; central star (a cooling white dwarf star that is the largest white dwarf star known) at magnitude 13.9. With a large aperture telescope, a soft, bluish-green glow can be seen surrounding the “dumbbell”, and it is the first planetary nebulae discovered by Charles Messier, in 1764. **M27** is located 3° north of **Gamma Sagittae**, or 25’ south of **14 Vulpeculae**. Also known as “The Diablo Nebulae”, **PK 60-03.1**, **PNG 60.8-03.6**, **ARO 14**, and **He2-452**.

Cr 399, “Brocci’s Cluster”, “Al Sufi’s Cluster”, “The Coat Hanger”, mag. 3.6, 19 26 12 +20 05 53, 60’x30’ in size, is a naked eye group of 40 stars of magnitudes 5.2 to 7.2. Recorded as a “little cloud” by the Arabic astronomer al-Sufi more than 600 years before the invention of the telescope. Hipparcos’ measurements show that this is not a large cluster, but a chance alignment of stars at very different distances. The 10 brightest stars, when observed through binoculars or a low power telescope, form a distinctive star pattern like a coat hanger. The cluster includes **4**, **5**, and **7 Vulpeculae**. Also known as **OCL 113**, **OCL 113.0**, **Lund 890**, **C1923+200**, and the “4-5 Vulpeculae Cluster”.

Stock 1, mag. 5.3, 19 35 48 +25 13, 60’x60’ in size, is a cluster of 157 stars; not well detached from the surrounding star field; moderate range in brightness; magnitude of brightest star is 7.0. The center star, **HD 184928**, is at magnitude 8.1. The cluster includes **Σ 2548** (**ADS 12669**), a wide pair. Also known as **OCL 127**, **OCL 127.0**, **Lund 896**, and **C1933+251**.

Cz 40, mag. 5.42, 19 42 38 +21 09 17, 4’x4’ in size, is an open cluster of 30 stars. Also known as **OCL 118**, **King 27**, **Lund 901**, and **C1940+210**.

LeDrew 2, mag. 5.8, 20 44 00 +23 45, 47’ in size, is a cluster of 24 stars. Also known as **Alessi 12**. **NGC 6885**, “The 20 Vulpeculae Cluster”, mag. 6.0, 20 12 01 +26 28 42, 20’ in size, is an open cluster of 30 stars; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 6.0; very bright, very large cluster. The **20 Vulpeculae Cluster** totally surrounds

NGC 6885, and includes **18** and **19 Vulpeculae**. NGC 6882 is located immediately to the northwest.

Also known as **OCL 132, OCL 132.0, H8-20, h2071, Lund 935, NGC 6822, and C2009+263**.

NGC 6940, mag. 6.3, 20 34 32.3 +28 16 44, 30'x30' in size, is an open cluster of 100 stars with **FG Vulpeculae** in the center; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 9.3; very bright, very large; over 1 billion years old. Also known as **Cr 424, OCL 141, OCL 141.0, H7-08, Lund 961, Mel 232, Raab 145, PGC 65001, and C2032+281**.

NGC 6823, mag. 7.1, 19 43 12 +23 18, 12'x12' in size, is an open cluster of 30 stars; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 8.8; a slightly elongated cluster. Involved in a large (39'x30') emission nebulae, **NGC 6820**, that totally surrounds **NGC 6823**. Also known as **Cr 405, OCL 124, OCL 124.0, H7-18, Lund 903, Mrk 42, Raab 140, Sh2-86, CTB76, W55, LBN 135, [HC69]14, and C1941+231**.

Roslund 2, mag. 7.1, 19 45 24.44 +23 56 34, 20'x20' in size, is an open cluster of 20 stars. Its central star, at magnitude 7.07, is **HD 186745**. The cluster is in the **Vul OB1 Association**. Also known as **OCL 126, Lund 905, and C1943+238**.

NGC 6834, mag. 7.8, 19 52 12 +29 25, 4'x4' in size, is an open cluster of 50 stars; detached, weak concentration of stars; moderate range in brightness; magnitude of brightest star is 9.7. **NGC 6842** is 38' to the east-southeast. Also known as **H8-16**.

NGC 6830, mag. 7.9, 19 51 00 +23 06, 12'x12' in size, is an open cluster of 82 stars; detached, weak concentration of stars; moderate range in brightness; magnitude of brightest star is 9.9; a large cluster. The brightest stars are arranged in a distinct "X" shape. Located 26' north of **12 Vulpeculae**. Also known as **OCL 125, H7-09, Lund 908, Cr 406, Mel 224, Raab 141, and C1948+229**.

NGC 6882, mag. 8.1, 20 11 58 +26 40, 18'x18' in size, is an open cluster of 82 stars; detached, weak concentration of stars; moderate range in brightness; magnitude of brightest star is 11.58; a rather poor cluster. Located immediately northwest of the open cluster **NGC 6885**, with **20 Vulpeculae** on the southeast edge. Also known as **Cr 416, H8-22, and NGC 6885**.

FSR 158, mag. 8.3, 19 47 58.1 +26 01 55, 8' in size. Also known as **SAI 130**.

vdB 126, mag. 8.3, 19 26 12 +22 45, 7'x5' in size, is a magnitude 8.3 star involved in nebulosity, including stars **BD+22 3693**, and **HD 182918**. Also known as **Ced 16**.

NGC 6802, mag. 8.8, 19 30 35 +20 15 47, 3'x3' in size, is an open cluster of about 200 stars, with the brightest star at magnitude 12.93. Located on the east end of the **Coat Hanger** asterism (**Cr 399**). Also known as **OCL 114, H6-14, Lund 895, Cr 400, and C1928+201**.

FSR 154, mag. 9.05, 19 46 00.8 +23 20 53, 3' in size. Also known as **SAI 131**.

Roslund 4, mag. 10.0, 20 04 54 +29 12 54, 6' in size, is a cluster of 30 stars, with the brightest at magnitude 11.58. Located in **IC 4954/4955**. Also known as **C2002+290**.

IC 4954/4955, mag. 10.0, 20 05 39 +29 18 53, 10'x3' in size, a pair of nebulosities separated by about 3.5'. **IC 4955** is at 20 05 46 +29 15 16. Located in the southwest portion of **Roslund 4**. Also known as **Ced 175, LBN 153, Ro 4, and P2-5**.

Little Blue Fox Nebulae, 20 29 07.5 +23 11 12, 17"x13" in size, is a planetary nebulae. Also known as **Patchick 15**.

Sh2-88, 19 54 55 +25 24 35, 18'x16' in size, has an irregular shape, with 2 small bright knots southeast of the center, and about 2.4' apart, in the faint nebulae. Located 35' southwest of **10 Vulpeculae**. Also known as **P3-5**.

The following is a list of objects in Vulpeculae:

1 Messier; **21** NGC; **5** IC; **11** UGC; **14** MCG; **12** Herschel; **80** LDN; **6** LBN; **3** Radio Galaxies; **2** Cz; **5** Ced; **7** Sh2; **3** Be; **1** King; **2** Roslund; **1** Stn; **1** Sr; **1** HuDo; **1** vdB; **1** HM; **1** SSWZ94; **1** Al; **4** Kro; **3** Teutsch, **1** 2Masx; **1** AH03; **9** IRAS; **1** PC, **2** h; **2** [DB01]; **1** Stock, **1** C; **2** We; **4** FSR; **1** Mrk; **2** Mel; **1** French; **1** Outters; **1** Patchick; **1** LeDrew; **1** Alessi; **1** Ren; **2** Turner; **18** He; **4** Min; **4** Abell; **14** K; **8** Cr; **29** PNG; **33** PK; **10** PGC, **1** variable Galaxy; **3** VV; **27** CGCG; **2** SAI; **23** OCL; **3** Raab; **1** NPM1G; **15** Lund; **22** ARO; **2** W; **1** CTB; and **1** [HC69], for a total of **442** objects.

Other Stars:

12 Vul (V395 Vulpeculae), mag. 4.90, 19 51 04.9 +22 36 36.3, is a Be star. Also known as **HD 187811**, and **HIP 97679**.

HR 7556 (V379 Vulpeculae), mag. 6.29, 19 49 54.72 +28 26 22.8, is a rotating ellipsoidal variable star. Also known as **HD 187640**, and **HIP 97572**.

HIP 100963, mag. 7.09, 20 28 11.81 +22 07 44.07 44.4, is a solar twin. Also known as **HD 195034**.

HD 190228, mag. 7.31, 20 03 00.77 +28 18 24.7, has one planet in orbit. Also known as **HIP 98714**.

HD 189733 (V452 Vulpeculae), mag. 7.67, 20 00 43.71 +22 42 39.1, has a planet orbiting the primary star, an orange dwarf star that was the first discovered with carbon dioxide in its atmosphere, with a period of 2.218573 days. The secondary star is a red dwarf, and orbits the primary with a period of 3000 years. Also known as **HIP 98505**.

HD 188015, mag. 8.22, 19 52 04.54 +28 06 01.4, has one planet in orbit. Also known as **HIP 97769**.

BD+23 3912, mag. 8.93, 20 10 48.16 +23 57 54.5, is a halo star. Also known as **HD 345957**, and **HIP 99423**.

Stars of interest beyond magnitude 10 are as follows:

HAT-P-49, mag. 10.21, 20 21 46 +26 41 34, has one planet in orbit. Also known as **HD 34099**.

HD 186943 (QY Vulpeculae), mag. 10.23, 19 46 15.94 +28 16 19.1, is a Wolf-Rayet star and an eclipsing binary star at the center of a planetary nebulae. Also known as **HIP 97281**.

Wolf 1346, mag. 11.55, 20 34 21.88 +25 03 49.7, is a white dwarf star. Also known as **HD 340611**, and **HIP 101516**.

G185-32 (PY Vulpeculae), mag. 12.97, 19 37 13.7 +27 43 18.1, is a pulsating white dwarf star.

GD 385 (PT Vulpeculae), mag. 15.11, 19 52 27.88 +25 09 29.1, is a pulsating white dwarf star.

XTE J1859+226 (V406 Vulpeculae), 18 58 41.58 +22 39 29.6, is a low-mass X-ray binary star.

GS 2000+25 (QZ Vulpeculae), mag. 18.2, 20 02 49.58 +25 14 11.3, is an X-ray nova star.

The following is a list of Pulsars in Vulpeculae:

PSR B1919+21, 19 21 44.81 +21 53 02.3, is a rapidly rotating neutron star with a period of 1.3373 seconds, and a pulse width of 0.04 seconds. This is the first pulsar discovered – by **Jocelyn Bell Burnell** and **Anthony Hewist** in July of 1967. **Hewist** won the Nobel Prize in Physics for this discovery.

PSR B1930+22, 19 32 22.86 +22 20 52.1.

PSR B1937+21, 19 39 38.56 +21 35 59.1, is a milli-second pulsar – 1.557708 milli-seconds, or 642 rotations/second. This is the first milli-second pulsar discovered.

PSR B1953+29, 19 55 27.88 +29 08 43.5, is a milli-second pulsar.

PSR B2020+28, 20 22 37.07 +28 54 23.1.

PSR J2007+2722, 20 07 15.77 +27 22 47.7.

The only asterism is the “Coat Hanger” – see Cr 399.

The following is a list of stars in Vulpeculae:

28 Σ ; 6 O Σ ; 1 O $\Sigma\Sigma$; 2 Σ I; 11 β ; 27 V; 4 h; 5 A; 5 ho; 1 Str; 1 Arn; 1 Dju; 1 Es; 52 Lettered stars; 2 BD; 1 Wolf; 1 G; 1 GD; 35 Numbered stars; 1 XTE; 1 GS; 1 Wr; and 6 Pulsars, for a total of 194.

Sky Happenings: August 2021

(what follows pertains ONLY to the current month. Material above is good year after year.)

Aug. 1st - Double shadow transit on **Jupiter** starting at 1:40 AM CDT,

Mercury is in superior conjunction at 9 AM CDT.

Aug. 2nd - **Saturn** is at opposition at 1 AM CDT,

The **Moon** is at apogee (251,289 miles or 404,410 km from **Earth**) at 2:35 AM CDT,

Morning: In the predawn, on the eastern horizon, the **Moon** is roughly 4.5° from the **Pleiades**, and nearly 10° from **Aldebaran**. Best viewed at about 5 AM local time.

Aug. 4th - Asteroid **Juno** is stationary at 11 PM CDT.

- Aug. 6th** - Dawn: A razor thin lunar crescent hangs 5° to the right of **Pollux**, above the east-northeast horizon.
- Aug. 8th** - Double shadow transit on **Jupiter** starts at 5:41 AM CDT, **New Moon** occurs at 8:50 AM CDT. (Lunation 1220)
- Aug. 9th** - The **Moon** passes 4° north of **Mars** at 8 PM CDT.
- Aug. 10th** - Dusk: In the west, at sunset, the waxing crescent **Moon** and **Venus** are 5.5° apart.
- Aug. 11th** - **Venus** is 4° south of the **Moon** at 2 AM CDT, **Mercury** is 1.2 north of **Regulus** at 1 PM CDT.
- Aug. 12th** - The **Perseid Meteor Shower** peaks at 2 PM CDT.
- Aug. 15th** - Double shadow transit on **Jupiter** starts at 9:41 AM CDT, Double shadow transit on **Jupiter** starts at 10:17 AM CDT, **First Quarter Moon** occurs at 10:19 AM CDT, Triple transit on **Jupiter** starts at 10:31 AM CDT.
- Aug. 16th** - Dusk: The **Moon**, one day past first quarter, is in **Scorpio** - a little more than 4° from **Antares**.
- Aug. 17th** - The **Moon** is at perigee (229,363 miles or 369,124 km from **Earth**) at 4:16 AM CDT.
- Aug. 18th** - **Mercury** is 0.1° south of **Mars** at 11 PM CDT.
- Aug. 19th** - Asteroid **Ariadne** is at opposition at 2 AM CDT, **Jupiter** reaches opposition at 7 PM CDT, **Uranus** is stationary at 11 PM CDT.
- Aug. 20th** - **Saturn** is 4° north of the waxing gibbous **Moon** at 5 PM CDT, on the southeast horizon.
- Aug. 21st** - Dusk: The almost full **Moon** and **Jupiter** rise together in the east-southeast, separated by 5°.
- Aug. 22nd** - Midnight: **Jupiter** is 4° north of the almost full **Moon**, **Full Moon** occurs at 7:02 AM CDT, Double shadow transit on **Jupiter** starts at 1:42 PM CDT, Evening: The now full **Moon**, **Jupiter**, and **Saturn** are arranged in an arc above the southeast horizon.
- Aug. 23rd** - The **Moon** passes 4° south of **Neptune** at 9 PM CDT.
- Aug. 25th** - Asteroid **Julia** is at opposition at 6 AM CDT.
- Aug. 28th** - **Uranus** is 1.5° north of the **Moon** at 4 AM CDT.
- Aug. 29th** - Double shadow transit on **Jupiter** starts at 5:43 PM CDT, The **Moon** is at apogee (251,096 miles or 404,100 km from **Earth**) at 9:22 PM CDT.
- Aug. 30th** - **Last Quarter Moon** occurs at 2:13 AM CDT, Dawn: High in the east, the last quarter **Moon** is 5° from **Aldebaran**, with the **Pleiades** to its above right.

Planets:

Mercury – **Mercury** is in superior conjunction at 9 AM CDT on August 1st, and will then move to the evening sky. On the 9th, the planet, on the west horizon, will be 9° west of the **Moon**, setting 30 minutes after the **Sun**. At magnitude -1.1, the planet will be only 2° above the horizon, 15 minutes after the **Sun** sets. On the 18th, the planet will be only 0.1° south of **Mars** at 11 PM CDT.

Venus – **Venus**, at magnitude -3.9 early in the month at only 8° high, will be 5.5° to the left of the **Moon** (only 2½ days past new) on the evening of August 10th. On the 13th, the planet is 7' northeast of the star **Beta Virginis** (3.6 magnitude), and about 8° above the horizon 45 minutes after sunset. On the 11th, at 2 AM CDT, the planet is 4° south of the **Moon**. On the 1st, the planet is 82% illuminated and has a 13" wide disk – by month's end, the planet is 73% illuminated and has a disk measuring 15". At the end of the month, the planet and **Spica** are low in the west, less than 7° apart (**Venus** is now at magnitude -4.0).

Mars – **Mars** (at magnitude 1.8), on the 1st of August, will be 11° west of **Venus**, and is 2° from **Regulus** – 5° above the west horizon 30 minutes after sunset. **Mars** is in conjunction with **Mercury** (0.1° to the south) at 11 PM CDT on the 18th.

Jupiter – **Jupiter** has 6 double shadow transits, a triple transit, and 2 mutual events this month. The first double shadow transit occurs on August 1st. It starts with **Ganymede**'s shadow starting ingress at 1:40 AM

CDT, and starts its own transit at 3:30 AM CDT. **Europa's** shadow starts ingress at 5:08 AM CDT, with **Ganymede's** shadow egress at 5:19 AM CDT. **Europa** starts transit at 6:04 AM CDT, with **Ganymede** exiting transit at 7:11 AM CDT. **Europa's** shadow egress occurs at 7:58 AM CDT, with **Europa** exiting transit at 8:52 AM CDT.

On the 8th is the second double shadow transit on **Jupiter**. It starts at 5:41 AM CDT with **Ganymede's** shadow starting ingress, and the moon starting transit at 6:6:54 AM CDT. **Europa's** shadow starts ingress at 7:42 AM CDT, and **Europa** starts transit at 8:18 AM CDT. **Ganymede's** shadow egresses at 9:19 AM CDT, with **Ganymede** exiting transit at 10:29 AM CDT. **Europa's** shadow egresses at 10:33 AM CDT, and **Europa** exits transit at 11:06 AM CDT.

On the 15th, there are 2 double shadow transits and one triple transit on **Jupiter**. It starts with the first shadow transit. **Callisto's** shadow starts ingress at 5:10 AM CDT, with **Callisto** starting transit at 6:25 AM CDT. **Ganymede's** shadow starts ingress at 9:41 AM CDT, with **Callisto's** shadow egress at 9:51 AM CDT. **Ganymede** starts transit at 10:10 AM CDT, with **Europa's** shadow's ingress at 10:17 AM CDT. **Europa** starts transit at 10:31 AM CDT, while **Callisto** exits transit at 10:47 AM CDT. **Europa's** shadow will egress at 1:07 PM CDT, and **Europa** will exit transit at 1:19 PM CDT. **Ganymede's** shadow will egress at 1:20 PM CDT, with **Ganymede** exiting transit at 1:45 PM CDT.

On the 19th, **Jupiter** reaches opposition at 2 AM CDT. On the 21st, The planet will be 5° north of the almost full **Moon**.

The next double shadow transit is on the 22nd. It starts with **Europa** starting transit at 12:41 PM CDT, and its shadow starting ingress at 12:52 PM CDT. **Ganymede** starts transit at 1:25 PM CDT, and its shadow starts ingress at 1:42 PM CDT. **Europa** exits transit at 3:33 PM CDT, and its shadow egresses at 3:42 PM CDT. **Ganymede** exits transit at 5:46 PM CDT, while its shadow egresses at 6:17 PM CDT.

On the 29th, the last double shadow transit occurs. **Europa** starts transit at 2:57 PM CDT, with its shadow starting ingress at 3:27 PM CDT. **Ganymede** starts transit at 4:41 PM CDT, and its shadow starts ingress at 5:43 PM CDT. **Europa** exits transit at 5:46 PM CDT, with its shadow's egress at 6:17 PM CDT. **Ganymede** exits transit at 8:17 PM CDT, with its shadow's egress occurring at 9:21 PM CDT.

There are 2 mutual events (moon eclipsing moon) with **Jupiter** this month. On the 8th, from 10:37 PM CDT to 11:45 PM CDT, **Ganymede** will eclipse **Europa**. On the 16th, from 5:03 AM CDT to 5:35 AM CDT, **Ganymede** will eclipse **Europa**.

Saturn – **Saturn** is at opposition on August 2nd at 1 AM CDT, when it will be 8.935 au (74 light minutes) from the **Sun**, at magnitude +0.2, with the north side of the ring plane exposed at an 18° tilt. The rings span nearly 42', with the disk spanning 18.6". On the 20th, the planet will be 4° north of the waxing gibbous **Moon** (on the southeast horizon) at 5 AM CDT. On the 22nd, in the evening above the southeast horizon, the full **Moon**, **Jupiter**, and **Saturn** are arranged in an arc. **Titan** will be north of the planet on the 3rd and 19th, and south of the planet on the 11th and the 26th/27th. **Iapetus** reaches eastern elongation (about 9° due east of the planet) on the 12th, and reaches inferior conjunction with the planet (50" separation) on the 31st.

Uranus – **Uranus** is in a dim part of southern **Aries**, rising soon after local midnight on August 1st, at magnitude 5.8, and displaying a 4" wide greenish-blue disk. The planet will be stationary on the 19th at 11 PM CDT, with its highest declination (nearly 16°) since the early 1960's. It will then start its retrograde loop down the ecliptic. On the 1st, the planet will be 5° east of the waning **Moon** ½ hour before sunrise. On the 28th, the planet is 1.8° northwest of the **Moon** 1 hour before sunrise, with **Sigma Arietis** less than 1° from the **Moon's** northern limb.

Neptune – **Neptune**, moving retrograde in **Aquarius** as it approaches opposition on September 14th, rises 2 hours after sunset in early August, and is 20° high in the east by local midnight, glowing at magnitude 7.7. The planet is just over 5° east of **Phi Aquarii**, and due south of the **Circlet of Pisces**. On the 25th, the planet, showing a bluish 2" wide disk, is midway between 2 brighter field stars.

Pluto – **Pluto**, on the 15th of August, will be at 19 47 24 -22 47, at magnitude 15.0, having a disk 0.1" wide. **Pluto's** positions, *by my estimates*, are as follows: On August 4th – about 2.1' west and a little north of the star **SAO 188612**, or about 19 48 50 -22 40 in **Sagittarius**; on the 8th – about 2.2' west and a little north of **SAO 188612**, or about 19 48 00 -22 43 in **Sagittarius**; on the 12th – about 2.5' due west and a little north of **SAO 188612**, or about 19 47 40 -22 40 45 in **Sagittarius**; on the 16th – about 2.6' east and a little north of **SAO 188509**, or about 19 47 20 -22 47 00 in **Sagittarius**; on the 20th – about 2.3' east and a little north of **SAO 188509**, or about 19 46 55 -22 50 00 in **Sagittarius**; on the 24th – about 2' east and a touch north of

SAO 188509, or about 19 46 40 -22 52 00 in **Sagittarius**; and on the 28th – about 1.8' east of SAO 188509, or about 19 46 20 -22 54 00 in **Sagittarius**.

Moon – The **Moon** is at apogee at 3 AM CDT on August 2nd. **New Moon** occurs on the 8th, with the 1st **Quarter Moon** occurring on the 15th. On the 17th, the **Moon** is at perigee. **Full Moon** occurs on the 22nd. The **Moon** is at apogee again on the 29th. The 2nd **Quarter Moon** occurs on the 30th.

Favorable Librations: **Piazz Crater** on the 4th; **Hayn Crater** on the 19th; **Compton Crater** on the 21; and **Boss-F Crater** on the 22nd.

Greatest North declination is on the 6th (+25.6°)

Greatest South declination is on the 19th (-25.8°)

Libration in Longitude: East limb most exposed on the 24th (+5.4°)

West limb most exposed on the 9th (-4.9°)

Libration in Latitude: North limb most exposed on the 23rd (+6.6°)

South limb most exposed on the 10th (-6.6°)

Asteroids / Minor Planets **Asteroid 1 Ceres** – Ceres positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 03 59.95 +14 03.4, at magnitude 9.0, in **Taurus**; on the 14th – 04 11.03 +14 35 06, at magnitude 8.9, in **Taurus**; and on the 24th – 04 20.98 +15 01.06, at magnitude 8.8, in **Taurus**.

Asteroid 2 Pallas – Pallas's positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 23 31.97 +06 37.7, at magnitude 9.4, in **Pisces**; on the 14th – 23 27.96 +05 15.8, at magnitude 9.2, in **Pisces**; and on the 24th – 23 22.2 +03 32.6, at magnitude 8.9, in **Pisces**.

Asteroid 6 Hebe – Hebe's positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 19 23.04 -13 24.7, at magnitude 8.6, in **Sagittarius**; on the 14th – 19 16.11 -15 12.6, at magnitude 8.7, in **Sagittarius**; and on the 24th – 19 12.03 -16 55.3, at magnitude 8.9, in **Sagittarius**. Hebe's positions, *by my estimates*, are as follows: On August 4th – about 3° north and a touch east of **Upsilon Sagittarii**; on the 8th – just over 2° north and a touch west of **Upsilon Sagittarii**; on the 12th – about 1.8° northwest of **Upsilon Sagittarii**; on the 16th – just under 2° west and a touch north of **Upsilon Sagittarii**; on the 20th – about 2.5° west and a touch south of **Upsilon Sagittarii**, or 3° northwest of **Rho¹ Sagittarii**; on the 24th – about 3° west-southwest of **Upsilon Sagittarii**, or 3° west and a little north of **Rho¹ Sagittarii**; and on the 28th – about 3.3° southwest of **Upsilon Sagittarii**, or 3° west of **Rho¹ Sagittarii**.

Asteroid 43 Ariadne – Ariadne's positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 21 59.36 -05 55.1, at magnitude 9.8, in **Aquarius**; on the 14th – 20 50.26 -06 21.18, at magnitude 9.5, in **Aquarius**; and on the 24th – 21 40.84 -06 59.5, at magnitude 9.6, in **Aquarius**.

Asteroid 80 Sappho – Sappho's positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 21 23.25 +03 245.24, at magnitude 9.9, in **Equuleus**; on the 14th – 21 15.1 +02 50.0, at magnitude 9.8, in **Equuleus**; and on the 24th – 21 07.23 +01 46.8, at magnitude 9.8, in **Aquarius**.

Asteroid 89 Julia – Julia's positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On August 4th – 22 23.47 -02 31.5, at magnitude 9.3, in **Aquarius**; on the 14th – 22 13.63 -01 21.5, at magnitude 9.0, in **Aquarius**; and on the 24th – 22 02.39 -00 25.4, at magnitude 8.9, in **Aquarius**. Julia's positions, *by my estimates*, are as follows: On August 1st – about 2° southeast of **Gamma Aquarii**; on the 5th – about 1° south-southeast of **Gamma Aquarii**; on the 10th – about 1° south-southwest of **Gamma Aquarii**; on the 15th – about 2° due west and a touch north of **Gamma Aquarii**, or about 1.5° east-southeast of **Alpha Aquarii**; on the 20th – about 0.3° southeast of **Alpha Aquarii**; on the 25th – about 1° due west of **Alpha Aquarii**; and on the 30th – about 2.5° due west and a little north of **Alpha Aquarii**.

Comets – Comet **4P/Faye** – is a morning object - Faye's positions, according to *ALPO*, are as follows: On August 10th – 03 47 48 +18 35, at magnitude 11.0, in **Taurus**; on the 20th – 04 15 48 +18 56, at magnitude 10.8, in **Taurus**; and on the 30th – 04 43 18 +18 53, at magnitude 10.6, in **Taurus**. Faye's positions, *by my estimates*, are as follows: On August 1st – about 4° south-southeast of **Zeta Arietis**; on

the 5th – about 6° southeast of **Zeta Arietis**; on the 10th – about 6° due south of **Eta Taurii** and the **Pleiades**; on the 15th – about 4° southwest of **Omega Taurii**; on the 20th – about 2° due south of **Omega Taurii**, or about 1° southwest of **NGC 1554/1555**; on the 25th – about 0.3° due east of **Epsilon Taurii**; and on the 30th – directly south of **NGC 16747**, or about 4° northeast of **Aldebaran**.

Comet **6P/d'Arrest** – an evening object - **d'Arrest's** positions, according to **ALPO**, are as follows: On August 10th – 16 27 48 -01 59, at magnitude 13.7 in **Ophiuchus**; on the 20th – 16 43 48 -07 29, at magnitude 13.0 in **Ophiuchus**; and on the 30th – 17 04 54 -13 00, at magnitude 12.4 in **Ophiuchus**.

Comet **6P/Tuttle** is the parent of the **December Ursid Meteor Shower**. The comet will reach perihelion (1.03 au) on August 27th. **Tuttle's** positions, according to **ALPO**, are as follows: On August 10th – 07 45 00 +18 49, at magnitude 10.1 in **Gemini**; on the 20th – 08 17 12 +11 33, at magnitude 9.5 in **Cancer**; and on the 30th – 08 49 12 +03 49, at magnitude 9.0 in **Hydra**.

Comet **15P/Finlay** – a morning object – **Finlay's** positions, according to **ALPO**, are as follows: On August 10th – 05 36 00 +25 23, at magnitude 10.0 in **Taurus**; on the 20th – 06 12 36 +26 25, at magnitude 10.3 in **Gemini**; and on the 30th – 06 45 48 +26 53, at magnitude 10.9 in **Gemini**.

Comet **6P/Churyumov-Gerasimenko** – is a morning object, and a contact binary comet – **Churyumov-Gerasimenko's** positions, according to **ALPO**, are as follows: On August 10th – 01 59 2 +07 25, at magnitude 13.3 in **Pisces**; on the 20th – 02 26 36 +09 56, at magnitude 12.7 in **Cetus**; and on the 30th – 02 56 54 +12 37, at magnitude 12.1 in **Aries**.

Comet **C/2021 A1(Leonard)** – **Leonard's** positions, according to **ALPO**, are as follows: On August 10th – 10 40 06 +44 40, at magnitude 16.2 in **Ursa Major**; on the 20th – 10 46 16 +43 08, at magnitude 15.9 in **Ursa Major**; and on the 30th – 10 52 48 +41 42, at magnitude 15.6 in **Ursa Major**.

Meteor Showers – There are 2 major (Class I) meteor showers active in August. The **Southern Delta Aquariids**, active from July 17th through August 12th, peaked on July 30th. The **Perseids**, active from July 22nd through August 23rd, peaks on the mornings of August 12th and 13th, with the **Moon** setting after 10:30 PM local time, with a maximum zenith hourly rate (mzhr) of 110 meteors. Note: comet **109P/Swift-Tuttle** is the parent of these meteors.

There are 3 minor (Class II) meteor showers active in August. The **Alpha Capricornids**, active from July 12th through August 12th, peaked on July 30th. The **Kappa Cygnids**, active from July 28th through September 2nd, peaks on August 18th, with a mzhr of 3. The **Aurigids**, active from August 26th through September 4th, peaks on September 1st, with a mzhr of 6.

There is one variable (Class III) meteor shower active in August. The **Beta Hydusids**, active from August 15th through August 19th, peaks on August 16th.

There are 11 weak (Class IV) meteor showers active in August, all with a mzhr <2. The **49 Andromedids**, active from July 16th through August 14th, peaked on July 20th. The **July Gamma Draconids**, active from July 22nd through August 2nd, peaked on July 28th. The **Eta Eridanids**, active from July 22nd through September 2nd, peaks on August 6th. The **Piscis Austrinids**, active from July 28th through August 18th, peaks on August 7th. The **August Xi Draconids**, active from July 28th through September 2nd, peaks on August 15th. The **August Beta Piscids**, active from August 2nd through September 2nd, peaks on August 21st. The **August Draconids**, active from August 15th through September 5th, peaks on August 26th. The **August Gamma Cepheids**, active from August 17th through September 6th, peaks on August 29th. The **Daytime Zeta Cancrids**, active from August 13th through September 10th, peaks on September 2nd. The **Mu Eridanids**, active from August 31st through September 21st, peaks on September 10th. Lastly, the **September Lyncids**, active from August 30th through September 20th, peaks on September 10th.

When to View the Planets:

Evening Sky

Mercury (west)
 Venus (west)
 Mars (west)
 Jupiter (east)
 Saturn (southeast)
 Neptune (east)

Midnight

Jupiter (south)
 Saturn (south)
 Uranus (east)
 Neptune (southeast)

Morning Sky

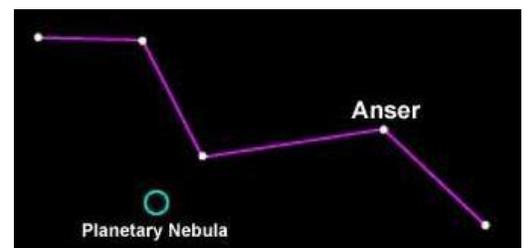
Jupiter (southwest)
 Saturn (southwest)
 Uranus (southeast)
 Neptune (southwest)

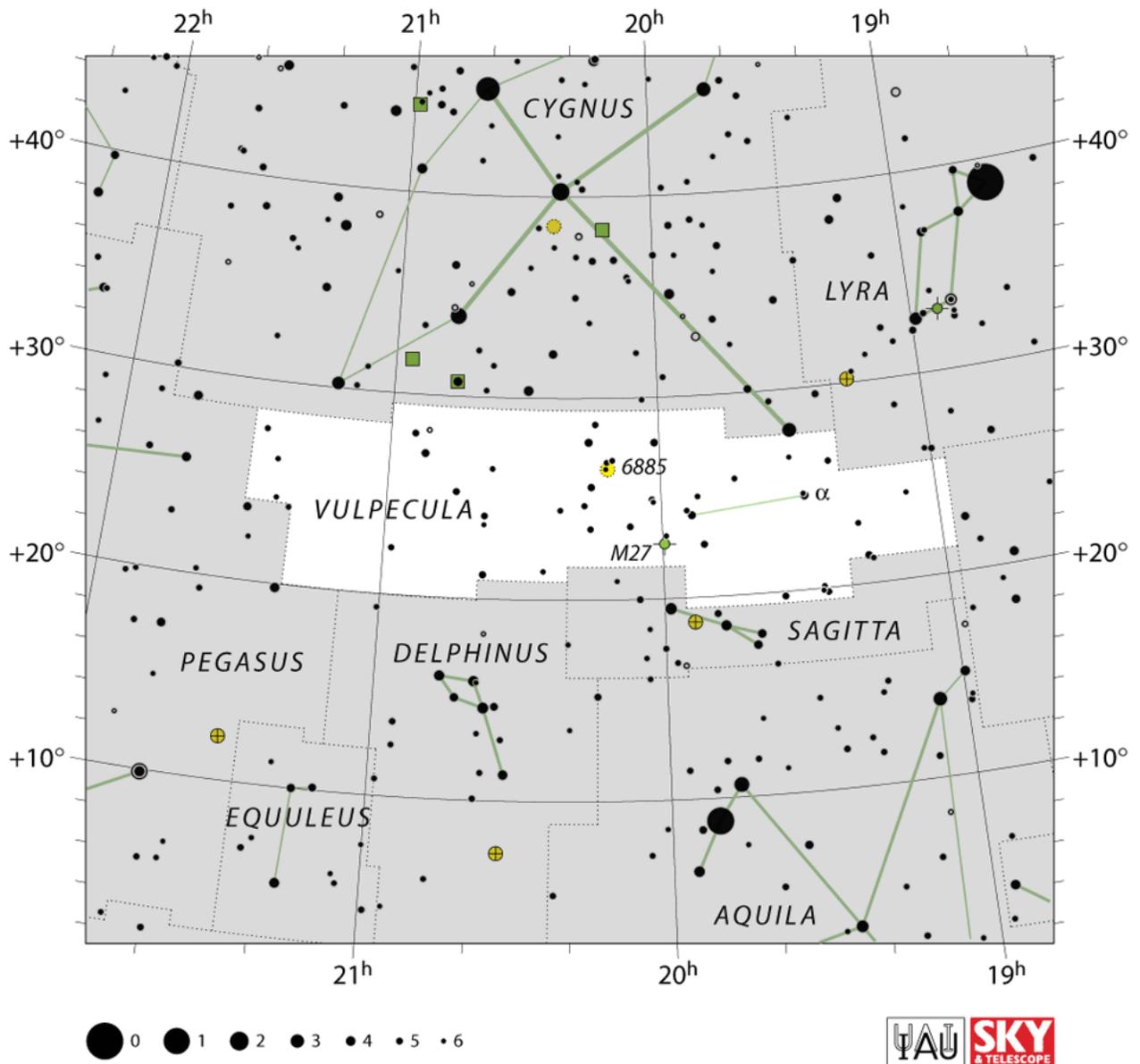
mythology:

Vulpecula – The Little Fox with the Goose

This constellation was introduced in 1687 by the Polish astronomer Johannes Helvetius, who depicted it as a double figure of a fox, Vulpecula, carrying in its jaws a goose, Anser. Since then the goose has flown (or been eaten), leaving just the fox. Helvetius is said to have placed the fox near two other hunting animals, the eagle (Aquila), and the vulture (an alternative identification of Lyra). Vulpecula contains no named stars (Anser is all that is left of the missing goose), and has no legends. Although its brightest stars are only 4th magnitude, it is notable for “The Dumb-bell Nebula”, reputedly the most conspicuous of the class of so-called planetary nebulae. The Dumb-bell Nebulae consists of gas thrown off from a dying star; it takes its name from the double-lobed structure, like a bar-bell, as seen on a long exposure photograph.

Editor’s Note: This pin is no longer available for purchase, but I thought it was very cute to look at, and might help us remember the constellation!!!! See, you pet the fox across his back, and get an upsidedown W, like this:





The End