

Night Visions

March 2021

Newsletter of the Baton Rouge Astronomical Society

From NASA website, Perseverance Rover Landing On Mars, February 18, 2021 (see more on Page 10)

Monthly Meeting March 8th at 7:00 PM, via Jitsi

(Monthly meetings are on 2nd Mondays at Highland Road Park Observatory,
temporarily during quarantine at meet.jit.si/BRASMeet).

PRESENTATION: by Steven M. Tilley, on “Using Find_Orb for Orbit determination Checking, Recovery, Finding a Risk Corridor, and Identifications”

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REMOTE DISCUSSION

Nano Days

Observing Notes: Auriga - The Charioteer

Like this newsletter? See PAST ISSUES online back to 2009
Visit us on Facebook – Baton Rouge Astronomical Society

BRAS YouTube Channel

President's Message

Welcome to March. February flew by so fast it pretty much took my breath away—or was that the cold. Hopefully, everybody has thawed out by now and, maybe, just maybe, that which is in control of the weather will cut us some slack and give us some nice, cloudless and moonless nights without the sub-zero temps so we can go out and enjoy some winter sky viewing or imaging without risking our toes before the dreaded return of daylight saving time—which, unfortunately, is in March.

Even though the month went by pretty quickly, we did manage to get in our Winter members observing night on the 7th of February. Our apologies for the conflicting nights listed in the last newsletter, this was mainly due to our trying to outsmart the weather and making changes to the date at the last minute and accidentally running the minutes from the December meeting instead of those for the January meeting. In order to try to fix that problem, we've decided to pick a date for the Spring MOON early, and let you know to look for changes the week-of just in case we have to make a weather correction. SO, tentatively, we've scheduled the next members night for 12 April, immediately after the meeting. Look for updates on the timing: it's scheduled for early enough in the spring that we should be able to have a second crack at it if needs be.

Some general reminders: we still have an **inventory surplus sale** going on, as we have for a while now. The catalog, I'm told, just needs the suggested prices added. Despite rumors to the contrary, the **16" and the 10" reflectors are still available** on an as-is basis. The optics are still pretty good on both of them, even if the push-pull focuser on the 10" requires a little bit of finesse and the 16" might require a ladder—though you could, I believe, just park your car right next to it and stand on the roof to view. Recently, we added a refurbished **6" reflector** to the list thanks to the tireless efforts of Jacob DesRoches giving the mirror a good soak and light scrub (a great recounting of which can be found on our new (see Page 7) **Reddit and Discord pages**-- for those interested). The method he used is the same one that was described to us by uncle Merrill during our February meeting, so you can also check out the YouTube video of the February meeting to hear his description of the method. I'm actually inspired to clean my old 8" myself. We've got another talk coming up on how to remove and clean the corrector plate of an SCT set for later in the year, so, since that technique also works for refractors, we should have covered our bases on basic telescope maintenance after that one is done.

Because I've received a few questions about this, for people interested in doing the **AL awards**, our awards director right now is Merrill Hess. So you should email merrillhess@gmail.com or give him in person any of the work you've completed on these awards so he can evaluate it and send it in in order for you to receive recognition for your hard work. If you're unaware of the AL observing programs, they're a great way to learn cool things about astronomy. You can find out more by going to <https://www.astroleague.org> and looking for observing programs section. If you need help finding one that looks good, come talk to us and we can help narrow things down for you.

We do have a few events coming up that want attention. Even though it's still a few months out, it's never too early to start thinking about helping out with International Astronomy Day in May. And if you should find yourself at the observatory any time soon, you can check on the list of available outreach opportunities at HRPO on the back of the door to the BRAS room. These require being cleared by BREC, but that's an easy enough thing to get started on, just ask Chris K how.

And, for two last notes: just to make things slightly easier to remember, **we've moved the business meetings to the last Wednesday of every month—and we're asking for all submissions to the newsletter for the upcoming month be submitted by the Friday after that** in hopes of having it be able to be sent out by that Monday. And, finally, even though Steven has been a real champ for the first few months of the year filling the VP spot, he's unable to continue in that role after March. If you have about two hours of time a month you can spare to help out the club, please consider offering yourself in **filling the VP position**, at least for a month. And that's all I have. Please take the time to enjoy this newsletter and I hope to see each of you in good health in good time.

February Member Meeting Minutes

Secretary was not in attendance, this is what Scott remembers from the meeting:

- Merrill gave his presentation on polishing lenses (available on our YouTube).
- Mention was made of the new social media platforms (see Amy's announcement on Page 7), including links to a Discord post demonstrating the mirror cleaning technique discussed earlier.
- A request was made for volunteers for Vice President and Public Information Officer.
- Chris updated us on events at HRPO—reminder that IAD is fast approaching.
- Mention was made that BRAS had donated an 8" reflector for the IAD raffle.
- Ben said that in-person outreaches were still on hold, but that members could set up their own outreaches, either in person or virtually, and if they told him beforehand, he would list it as an official event.
- Ben updated us on Oak Grove's annual STEAM night, which will be pre-recorded this year.
- Members spent a good deal of time socializing, then the meeting was adjourned.
- Meeting was closed.

Submitted by Scott D. Cadwallader, for Thomas Halligan, Secretary



A Message from our Webmaster

BRAS Members Only Forum

We have a special section of our online forum that is just for BRAS members. If you would like access to it, send an email to fred@eatel.net, or on the forum itself, send a Private Message (PM) to fred8615. Include your forum username and your real name. You MUST be registered for the forum before I can grant you access to the Members Only section.



2021 Officers:

President: Scott Cadwallader
Interim VP: Steven Tilley
Secretary: Thomas Halligan
Treasurer: Trey Anding

BRAS Liaison for BREC:
 Chris Kersey
BRAS Liaison for LSU:
 Greg Guzik

Committees/Coordinators:
 AL Awards
 Merrill Hess
 Light Pollution:
 John Nagle
 Newsletter:
 Michele Fry
 Observing:
 John Nagle
 Outreach:
 Ben Toman
 Webmaster:
 Frederick Barnett



BRAS Business Meeting Minutes –February 24th, 2021 remotely via Jitsi

(This meeting is now scheduled to come early enough to be included in each monthly newsletter.
See President's Message)

- Scott opened meeting by stating that all items for newsletter need to be sent in as soon as possible – by Friday after the business meeting.
- Scott stated that any officer can accept membership forms and payments, and that they will be held in the locked file cabinet until Trey can collect it.
- Stephen to give the March program on impact locations
- The Spring MOON night will be on April 12th after the BRAS meeting
- Ben had nothing new to report on Outreach
- The New Member Kit - any suggestions/material should be sent to Scott
- Equipment for sale – there is some interest in the red Dobsonian. Pricing needs to be marked in the sale book in the BRAS closet
- Light Pollution Petition – New binder to be put together
- BRAS 40th Anniversary is coming up. There will be a party of some type.
- Chris K. gave an update on HRPO. Most Friday Remote Discussions will be medically oriented. NANO Days is scheduled for March 27th. New dehumidifier is coming – old one damaged. Professor Penny will do a 1 hour public viewing on Saturday the 27th. HRPO had no power for days after the ice storm, and no internet access for days after power restored. Any and all outages will now be reported to BREC, LSU, and BRAS. Chris can now solicit bids on the hydraulic cylinders for the drop-out. Summer camp going strong.
- The BRAS all-sky monitor and the SQM meter (both not installed yet) will need a surge protector on their power lines. Need to talk to Dr. Guzik about using the LSU internet access for these instruments.
- Need to start thinking about a new Dark Site.
- Meeting ended at 8:11 PM with 6 participants.
-

Submitted by Thomas Halligan

Upcoming BRAS Meetings:

Monthly Member Meeting: **7:00 Monday, March 8th**, via Jitsi remote access (open to the public).

Light Pollution Committee Meeting: **6 pm Wednesday, March 31st**, via Jitsi. (Open to the public), followed by.....

Monthly Business Meeting: **7 pm Wednesday, March 31st**, (via Jitsi (Members Only)

MOON (Members Only Observing Night), **Sunday, April 12th, immediately after the meeting.**



BRAS Outreach Report

Hi Everyone,

With no new updates since the message last month, I thought I'd just take a moment to talk about why we even do outreach as a club. Sure, you hear about us doing all kinds of events and you're always getting pestered to volunteer, but

Why do we do outreach as a club? What's the deal?

I think the number one goal of our outreach efforts is to initiate a spark of interest with people in our community. You never know. The person you just showed the Moon to for the very first time could very well be a future club President. (It was an outreach event that first got my attention after we had moved to town. I jumped in with both feet and was Vice-President 6 months later!)

Yes, people can look at pictures of the Moon and night sky objects on their computers at home, but actually seeing the telescopes (and sometimes astro cameras) in action can be a much more tangible experience. Often, people ask questions and realize it's much more affordable than they thought to get a decent telescope and get into stargazing.



It's also important to try to ignite the imaginations of the younger kids. We are planting seeds. Sometimes those seeds will take many years to grow, but the more we plant, the more return we'll see over the years. Again, this is part of my story. I remember family members trying to teach a few constellations when I was little and I remember school field trips to the planetarium. I didn't rush right out and buy a telescope, but it always remained a positive and interesting thing in my mind. When the time was right, I jumped in!

Finally, and along the same lines, we want to show people that don't know, or remind people that may have forgotten, that our night sky is full of wonders that really are within the reach of almost anyone. The more people we interact with and leave them with positive thoughts about our club and astronomy the better. Even if they don't get into the hobby themselves, they will likely have an open mind and be supportive of our endeavors in the future because they will remember our interactions. Maybe some of those people will think twice about installing some poorly designed outdoor lighting in their yards, or maybe they will vote yes and support some efforts to curb light pollution.

We WILL get back out there with the public. They haven't gone anywhere and they are ready to be amazed once again!

Clear Skies,
Ben Toman

Picture top right: Scott C. improvises some telescope views of the "Moon" on a cloudy day

Picture lower left: Craig B. with a group of campers at the National Guard's Youth Camp at the Feliciana Retreat Center



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 Wednesday before the 1st Monday of the month.)
Everyone is welcome to join in..

Meeting called to order by Chairperson John Nagle
3 members present, no new members
February minutes were published in February newsletter

Old Business:

- Have not heard from Thomas if there has been any response from BREC about his conversation with Mr. Hughes about any updates to the BREC Environmental Sustainability Policy, and if it is being followed. Updates are needed quarterly for public consumption.
- Chris not able to request/obtain testimonials from parents of previous program participants due to the power outage (5 days) and lack of internet access for days after power restored.
- Due to outages, the Multi-Year Natural Sky Reclamation Project is now slightly behind schedule. Springfield did not receive letter, second letter sent.
- Update from Chris on HRPO – multiple requests on work orders for the flashing on the dome, sagging gate, and other requests- still no updates from BREC on the work orders.
- Light Pollution Petition – Need to print out new and also sign-up sheets.
- Scott wants any and all paperwork for HRPO to obtain an IDA Urban Dark Sky Park to be filled out and submitted.
- BRAS website and forum threads need to be updated on the Multi-Year Natural Sky Reclamation Project.

New Business:

- Susan Miller and John Nagle attended the NSN (Night Sky Network, NASA and ASP sponsored) webinar on Light Pollution “Darkness In Distress” on January 28th.

Submitted by John R. Nagle, Chairperson

Globe At Night

The target for the Globe At Night program is **Orion and Leo from March 5th through the 14th**.
If you would like to participate in this citizen science program, you can find instructions at
<https://www.globeatnight.org>

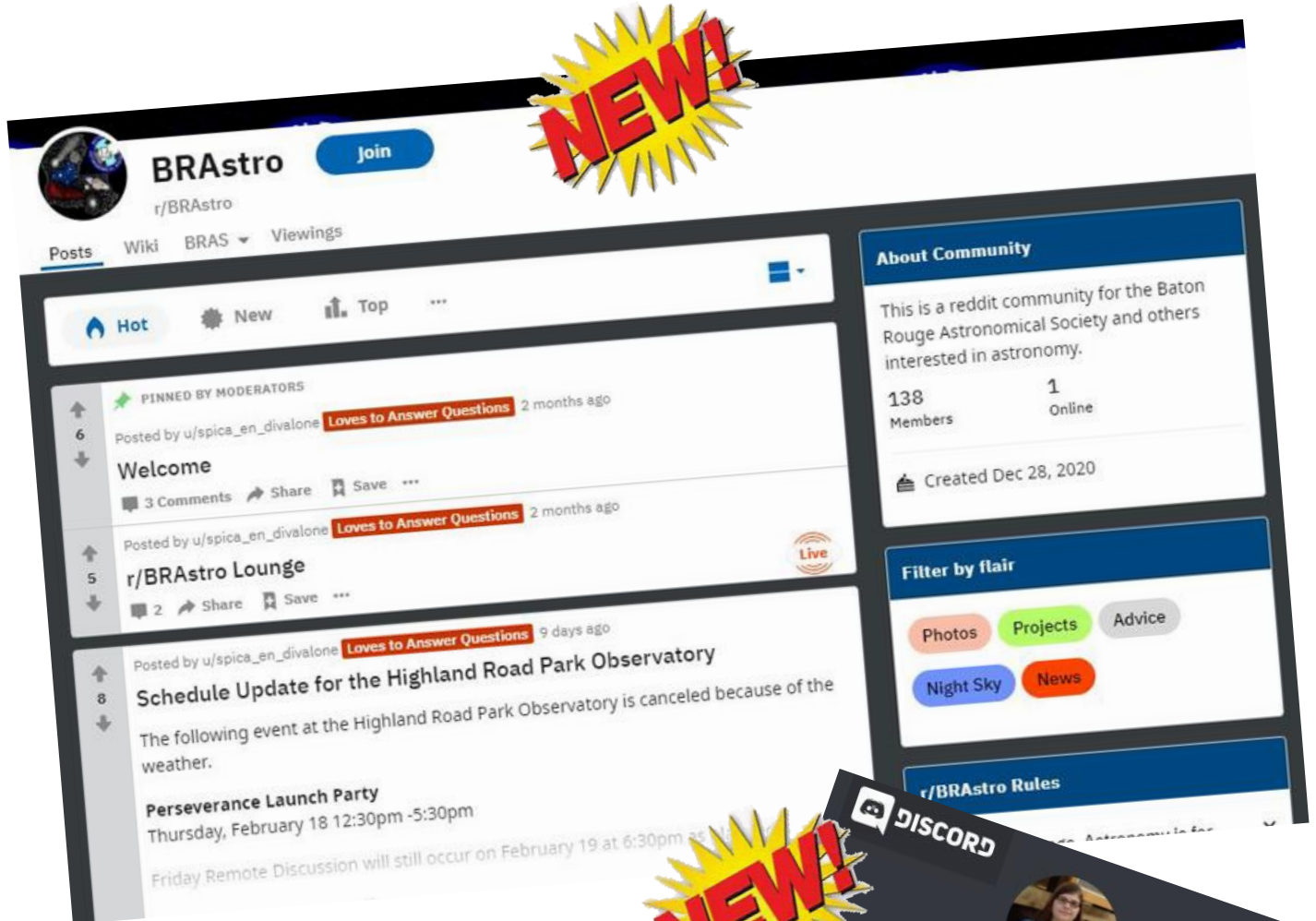
P.S. The “Loss of the Night” app can be used for information and for reporting your observations.

BRAS now has a 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/>

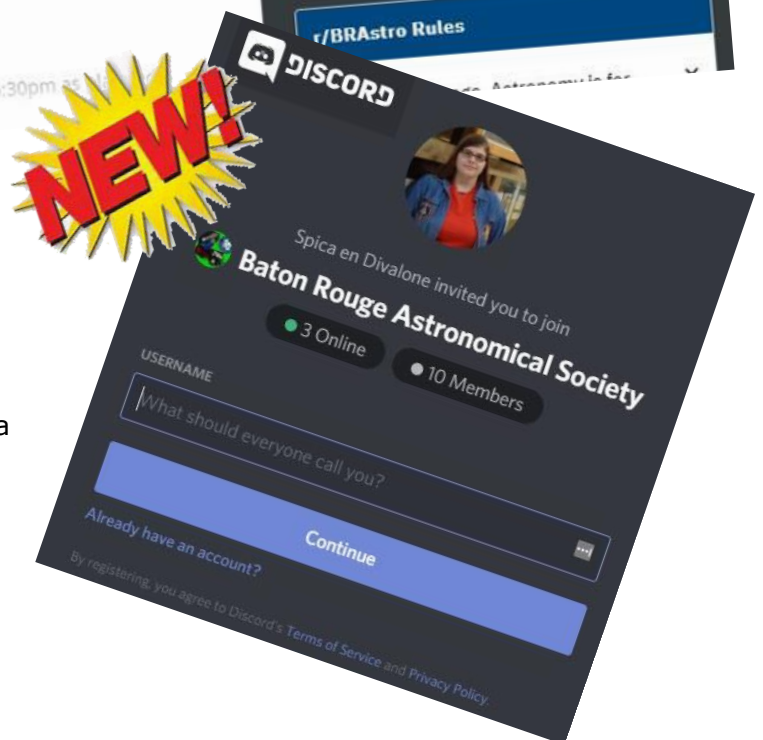
If BRAS members want to identify themselves as club members, PM me to add a Flair next to your username.



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.

Amy Northrop



Flying “Rocks” and “Dirty Snowballs”:

Asteroid and Comet News

March 2021
Volume 3, Issue 3.

[JPL Close Approach Data](#) from Jan 20, 2021, to Feb 21, 2021, Distance Nominal < 1 Lunar Distance

| Object | Close-Approach (CA) Date | CA Distance Nominal (LD) | CA Distance Nominal (Earth Radii) | H (mag) | Estimated Diameter |
|------------|--------------------------|--------------------------|-----------------------------------|---------|--------------------|
| (2021 BO1) | 2021/01/20 | 0.65 | 39.17 | 29.2 | 3.8 m - 8.6 m |
| (2021 CV) | 2021/02/04 | 0.52 | 31.33 | 28.9 | 4.4 m - 9.9 m |
| (2021 CZ3) | 2021/02/09 | 0.06 | 3.62 | 30.9 | 1.7 m - 3.8 m |
| (2021 CO) | 2021/02/11 | 0.94 | 56.64 | 25.3 | 23 m - 52 m |
| (2021 CQ5) | 2021/02/11 | 0.46 | 27.72 | 28.6 | 5.1 m - 11 m |
| (2021 CC6) | 2021/02/12 | 0.44 | 26.51 | 30.1 | 2.5 m - 5.5 m |
| (2021 CC7) | 2021/02/12 | 0.84 | 50.61 | 29.8 | 3.0 m - 6.7 m |
| (2021 CA6) | 2021/02/13 | 0.43 | 25.91 | 28.5 | 5.3 m - 12 m |
| (2021 CS6) | 2021/02/14 | 0.39 | 23.50 | 27.8 | 7.3 m - 16 m |
| (2021 CW7) | 2021/02/14 | 0.07 | 4.22 | 31.2 | 1.5 m - 3.4 m |
| (2021 DN1) | 2021/02/18 | 0.88 | 53.02 | 28.1 | 6.3 m - 14 m |
| (2021 DG) | 2021/02/18 | 0.43 | 25.91 | 30.4 | 2.2 m - 4.9 m |
| (2021 DA2) | 2021/02/21 | 0.51 | 30.73 | 29.2 | 3.9 m - 8.8 m |

As of 2021-02-25 there is

1,134 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL) (<https://cneos.jpl.nasa.gov/sentry/>)
2,635 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.hohmanntransfer.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 2021-01-30 to 2021-02-25

| Object Designation | Removed (UTC) |
|--------------------|---------------------|
| 2021 DH2 | 2021-02-25 14:21:41 |
| 2021 DS | 2021-02-25 14:05:48 |
| 2021 CD6 | 2021-02-25 14:00:17 |
| 2021 CD8 | 2021-02-24 14:25:16 |
| 2021 CJ6 | 2021-02-24 14:07:22 |
| 2021 BL3 | 2021-02-21 14:02:13 |

| | |
|------------|---------------------|
| 2021 DE1 | 2021-02-20 14:46:06 |
| 2021 CP7 | 2021-02-17 14:34:36 |
| 2021 CF6 | 2021-02-15 15:53:48 |
| 2021 CB1 | 2021-02-15 15:30:22 |
| 2015 ME131 | 2021-02-11 18:13:46 |
| 2021 CU4 | 2021-02-11 14:23:17 |
| 2021 CF2 | 2021-02-10 14:24:02 |
| 2021 CV1 | 2021-02-09 14:39:08 |
| 2021 CW1 | 2021-02-09 14:30:35 |
| 2021 BA2 | 2021-02-08 14:00:04 |
| 2021 CY | 2021-02-07 14:19:52 |
| 2021 BK3 | 2021-02-04 14:19:48 |
| 2021 AL6 | 2021-02-04 14:00:03 |
| 2010 JA43 | 2021-02-01 21:25:25 |
| 2021 AY5 | 2021-02-01 15:37:27 |
| 2021 BW | 2021-02-01 15:29:49 |
| 2021 AS7 | 2021-01-31 15:48:57 |
| 2021 AS2 | 2021-01-30 15:31:21 |

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>

Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum, which has reached 7000 posts.



- Request for Assistance with [Backyard Observatory](#)
- [GLOBE at Night 2021](#) Dates Posted
- [HRPO Perseverance Event](#) Canceled Due to Power Outage
- Reports from Attempted Views of [Lunar Occultation of Eta Leonis](#)
- Clarification Regarding [Future Approach of Apophis](#)
- Information on [Planetoid "Farfarout"](#)
- Is [Venusian Phosphine](#) Actually Sulfur Dioxide?

NASA Perseverance Rover Lands On Mars – February 18, 2021

Watch the Livestream landing here:

<https://www.motor1.com/news/489008/nasa-perseverance-rover-lands-mars/>

This video captures the excitement in the JPL Control Room, from the leadup to atmospheric entry beginning at about 1 hour 20 minutes, to touchdown at about 1:40, with shouts and celebrations, high fives and sighs of relief thereafter.



I gotta say, these girls were just rockin' this show!!!! I'm so elated when I compare their involvement here to when I worked for NASA at Stennis back in 1966-67, and all us girls could do was be receptionists and secretaries, direct visitor traffic, give tours, and pass out coffee and sandwiches to the engineers on the con during the Apollo rocket engine test firings. --- Michele Fry, Editor



Messages from HRPO

Highland Road Park Observatory



REMOTE DISCUSSIONS

All are for ages fourteen and older.

Fridays at 6:30pm.

5 March: "A New Medical Physics Patent"

19 March: "Nuclear Physics in Medicine"

26 March: "Protecting the Power Grid"



NanoDays

Saturday 27 March from 3pm to 7pm

For ages eight and older. No admission fee.

Big things in the Universe take a backseat to all things tiny. Children and adults alike will be able to see how big they are compared to nanoscale objects; understand how a Scanning Probe Microscope explores the nanoworld; try to pour water out of a nano-cup; learn about nanomaterials used stain-free clothes; have a chance to build models of nanoscale structures; play with liquid crystals; make fluids part in the middle by applying magnets to them.



OBSERVING NOTES FEBRUARY

by John Nagle

Auriga – The Charioteer Position: RA 06, Dec. +40°

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

Capella (Alpha Aur), “The Little She-goat”, from the Arabic “al-‘Ayyug”, also “The Goat”, from the Sumerian “mul.’AS.Kar”, and also called “The Goat Star”, mag. 0.08, 05 16 41.30

+45 59 56.15, is the sixth brightest star in the night sky, a known source of X-rays, a quadruple star, and a spectroscopic binary star. **Capella** consists of two binary pairs of stars. The primary and secondary, both yellow giant stars, at magnitude 0.18, are a spectroscopic binary with a separation of 70 million miles and has an orbital period of 104.022 days. The third component, called **Capella H**, is a pair of red dwarf stars, both at 10th magnitude, and having a separation of 2.7”, and are separated from the primary by about 12’. These stars mark the **Charioteer’s** left shoulder, or the goat he is carrying, representing **Amalthea**, the goat that suckled **Zeus**. Also known as **HD 34029**, **HIP 24608**, **SAO 40186**, and **13 Aurigae**.

Menkalinan (Beta Aur), from the Arabic “Al Mankib dhi’l ‘Inän”, “The Shoulder of the Rein-holder”, also called **Menkalina**, mag. 1.90, 05 59 31.77 +44 56 50.8, is a triple star system. The two main components are both white sub-giant stars and form an eclipsing spectroscopic binary star – one of the first spectroscopic double stars found. They have a separation of about 7.5 million miles with a period of 3.96 days. The third component, a 14th magnitude red dwarf star, has a separation from the primary of 12.6” (350 au). There is a fourth optical component at magnitude 10.5 and has a separation of 184”, but is unrelated to the star system. Also known as **HD 40183**, **HIP 28360**, **SAO 40750**, **112 β**, and **34 Aurigae**.

Al Nath (Gamma Aur) = **Beta Taurii**, from the Arabic “Al Ka’b dhi’l ‘Inän”, “The Heel of the Rein-holder”, mag. 1.65, 05 26 17.5 +28 36 28.3, is a white giant star that is now assigned to the **Taurus** constellation. Also known as **HD 35497**, **HIP 25428**, **SAO 77168**, **HR 1791**, and **112 Taurii**.

Praja-päti (Delta Aur), from the Sanskrit for “The Lord of Created Beings”, mag. 3.72, 05 59 31.55 +54 17 05.9, is an orange giant star with three widely spaced optical components. One is a double star at magnitude 11.0 and having a separation of 2’ from the primary, and the third component is a magnitude 10.0 star at a separation of 3’ from the primary. Located on the head of the **Charioteer**. Also known as **HD 40036**, **HIP 28358**, and **33 Aurigae**.

Almaaz (Epsilon Aur), from the Arabic “Al Ma’az”, “The He-goat”, also called “Al Maz”, “Al Anz”, and **Haldus**, mag. 3.03, 05 01 58.13 +43 49 23.9, is a long period eclipsing binary variable star. It is a white supergiant star, with the secondary possibly being a binary star within a large dusty disk. It is the longest period eclipsing binary known (27.1 years orbital period), with a separation of 3”. There is a faint 14th magnitude visual companion at a separation of 28.6”. It is still not known if there is a star, or a binary star, or even a proto-star contained within the eclipsing dusty disk around the primary star. This star is part of “The Kids” asterism. Also known as **HD 31964**, **HIP 23416**, **SAO 39955**, and **7 Aurigae**.

Sadatoni (Zeta Aur), from the Arabic “Al Said al Thani”, “The Second Arm”, or “Al Jadyain”, “The Two Young He-goats”, also called “Saclateni”, and “Haedus I”, mag. 3.69, 05 02 28.68

+41 04 33.2, is an orange super-giant star and an eclipsing binary star – a spectroscopic double star with a period of 972.176 days (2.66 years), at a separation of about 500 million miles. The secondary is a main sequence blue dwarf star (**Eta Aurigae**), with **Zeta Aurigae** being the proto-type of a class of super-giant stars that eclipse their main sequence companions. It is also one of “**The Kids**” asterism (the westernmost star), and is located at 2.75° south of **Epsilon Aurigae**. Also known as **HD 32069**, **HIP 23453**, and **8 Aurigae**.

Haedus II (Eta Aur), from the Latin for “a kid” (goat), also called “**Mahasim**” from the Arabic for “**Wrist**”, mag. 3.18, 05 06 30.87 +41 14 04.7, is a blue-white main sequence dwarf star. It is the third star in “**The Kids**” asterism, and forms a naked-eye pair with **Zeta Aurigae** – with a separation of 0.75°, with **Eta Aurigae** being the eastern star of the pair. Also known as **HD 32630**, **HIP 23767**, and **10 Aurigae**.

Mahasim (Theta Aur), from the Arabic “**Maha-Sim**”, “**The Wrist**”, sometimes called “**Bogardus**”, mag. 2.62, 05 59 43.24 +37 12 46.0, is a double star. The primary is a blue-white main sequence dwarf variable star, and the secondary is a yellow main sequence dwarf star at magnitude 7.2, and a separation of 3.5” and a period of 1.37 days in an orbital period of 11 to 12 centuries. There is a second optical companion, a yellow main sequence dwarf star at magnitude 9.2 and having a separation of 130.7”. The primary is a chemically peculiar star with a strong magnetic field and a strong strontium, silicon, and chromium spectral lines – hence it is called a silicon star. Located at the eastern vertex of the constellation’s pentagon. Also known as **HD 40312**, **HIP 28380**, and **37 Aurigae**.

Kabdhilinan (Iota Aur), from the Arabic “**al-Kab dhi’l Inän**”, “**The Ankle of the Rein-holder**”, also called “**Hassqleh**”, or “**Al Kalb**”, and “**Columbae**”, mag. 2.69, 04 56 59.62 +33 09 58.1, is an orange luminous bright giant hybrid star – an X-ray producing giant star. Also known as **HD 313987**, **HIP 23015**, and **3 Aurigae**.

Al Hurr (Lambda Aur), from the Arabic for “**The Fawn**”, or “**Al Hibā**”, “**The Tent**”, also called **Al Hiba I**, mag. 4.82, 05 19 08.08 +40 06 02.4, is a double star, with the primary being an intermediate between a sub-giant and a main-sequence star, with weak emissions in the infra-red spectrum. It is reaching the end of its hydrogen fusing lifespan, and has a rotational period of 26 days. There are several optical companions – the brightest are at magnitude 10.0 with separations of 175” and 203” from the primary, with the dimmest companions at magnitudes 13.0 and 14.0, having separations from the primary of 87” and 310”. Also known as **HD 34411**, **HIP 24813**, and **15 Aurigae**.

Al Hiba II (Mu Aur), from the Arabic for “**The Tent**”, mag. 4.82, 05 13 25.73 +38 29 04.8. Also known as **HD 33641**, **HIP 24340**, and **11 Aurigae**.

Al Hiba III (Sigma Aur), from the Arabic for “**The Tent**”, mag. 5.02, 05 24 39.14 +37 23 07.4. Also known as **HD 35186**, **HIP 25292**, and **21 Aurigae**.

Dolones (Psi¹ to Psi⁹ Aur), from the Latin for “**Goats**” (or Whips):

Psi¹ Aur, Primus, mag. 4.92, 06 24 53.9 +49 17 16.4. Also known as **HD 44537**, **HIP 30520**, and **46 Aurigae**; **Psi² Aur, Secundus**, mag. 4.80, 06 39 19.83 +42 29 20.4. Also known as **HD 47174**, **HIP 31832**, and **50 Aurigae**; **Psi³ Aur, Tertius**, mag. 5.34, 06 38 49.19 +39 54 09.3. Also known as **HD 47100**, **HIP 31789**, and **52 Aurigae**; **Psi⁴ Aur, Quartus**, mag. 5.04 06 43 05.01 +44 31 28.3. Also known as **HD 47914**, **HIP 32173**, and **52 Aurigae**; **Psi⁵ Aur, Quintas**, mag. 5.24, 06 46 44.34 +43 34 37.3. Also known as **HD 48682**, **HIP 32480**, and **56 Aurigae**; **Psi⁶ Aur, Sextus**, mag. 5.22, 06 47 39.58 +48 47 22.1. Also known as **HD 48781**, **HIP 32562**, and **57 Aurigae**; **Psi⁷ Aur, Septimus**, mag. 4.99, 06 50 45.96 +41 46 53.6. Also known as **HD 49520**, **HIP 32844**, and **58 Aurigae**; **Psi⁸ Aur, Octavus**, mag. 6.46, 06 53 57.07 +38 30 18.3. Also known as **HD 50204**, **HIP 33133**, and **61 Aurigae**; **Psi⁹ Aur, Nonus**, mag. 5.85, 06 56 32.06 +46 16 26.4. Also known as **HD 50658**, **HIP 33377**, and **61 Aurigae**; and a tenth, **Psi¹⁰, Decimus**, mag. 4.90, now located in the constellation **Lynx (16 Lyncis)**.

Schaeberle’s Flaming Star (AE Aur), mag. 5.99, 05 16 18.54 +34 18 44.0, is a blue main sequence dwarf eruptive variable star that illuminates the **Flaming Star Nebula (IC 405)**. It is likely that the star has entered the nebula only recently - because it is a “runaway” star that is suspected of coming from a young cluster in the **Orion Nebula (M 42)** at around 2.5 million years ago. It is suspected that two binary star systems in **Orion** were involved in a collision, ejecting **AE Aurigae** and **Mu Columbae**.

Iota Orionis and its spectroscopic companion would be the surviving binary system. Both stars in the **Iota Orionis** system, **AE Aurigae**, and **Mu Columbae** all have similar space velocities of 100 km/second. Note: **AE Aurigae** and **Mu Columbae** are moving in opposite directions from each other. Also known as **HD 34078**, **HIP 24575**, and **SAO 57816**.

Andrew's Star (HIP 26712), mag. 6.04, 05 40 35.91 +31 21 29.6, is an unpredictable flare star with magnitude variations of 4.0 to 6.04, with a rise or fall time of 300 seconds, and a duration of $\geq 4,000$ seconds (in 1989, astronomer **Bradley Schafer** compiled a list of normal stars he deemed as "flashers"). To find, look 2.4° southwest of **M 37**, or 1.5° southeast of the magnitude 4.6 star **Chi Aurigae**. The star will be bracketed by two strings of mostly 10th and 12th magnitude stars. Also known as **HD 37519**, **BD +31° 1048**, **HR 1938**, **GC 7006**, and **NSV 2537**.

Lucilinburhuc (HD 45350), mag. 7.88, 06 28 45.7 +38 57 46.7, has one planet in orbit at a separation of 1.92 au with a period of 890.76 days. Also known as **HIP 30860**.

Nervia (HD 49674), mag. 8.10, 05 51 30.52 +40 52 03.9, has one planet in orbit at a separation of 0.058 au with a period of 4.94 days. Also known as **HIP 32916**.

Teval (HAT-P-9), mag. 12.34, 07 20 40.479 +37 08 26.17, has one transiting planet at a separation of 0.053 au and a period of 3.92 days.

Deep Sky:

M36 (NGC 1960), "**The Pinwheel Cluster**", "**The Frog**", mag. 6.0, 05 36 06 +34 08, 12' in size, is an open cluster of 60 stars; detached, weak concentration of stars; large range in brightness; bright, very large; magnitude of brightest star is 8.9. Has a 10' wide knot of bright stars in its center, that is anchored by Σ 737, a double star with its components separated by 10.9" (**ADS 4194**). **M36** is located about 5° southwest of **Theta Aurigae** and 2.3° from **M38**. About 1° west and slightly north is **NGC 1931 (The Fly Cluster)**. A nebulous object with a star and tail-like structure with a high velocity bi-polar outflow was discovered in the southwest portion of **M36** in 1995. It is named "**Holoea**", which is Hawaiian for "flowing gas". The object is coincident with an infra-red source (**IRAS 05327+3404**), and optical spectroscopy shows it to be a strong emission-line source, and also indicates the velocity of the bi-polar outflow to be about 650 km/second. Recent sub-millimeter radio observations indicate the presence of at least two partially embedded young stellar objects (**YSO**), and one pre-stellar condensation within the nebula. These observations suggest that at least two of the budding stars are in the process of making the transition to partially exposed pre-main sequence stars, while the third may still be a collapsing proto-star. Also known as **Cr 71**, **Lund 191**, **OCL 445**, **Raab 27**, **Mel 37**, **Sh2-237**, **C0532+341**, **RAFGL 5144**, **WB89 653**, and **C0528+342**.

M37 (NGC 2099), "**The Auriga Salt and Pepper Cluster**", mag. 5.06, 05 52 19 +32 33.12, 28' in size, is an open cluster of 150+ stars; detached, weak concentration of stars; small range in brightness; has a dark area near the center; magnitude of brightest star is 9.2. The central star is **HD 39183**. The cluster contains at least 21 white dwarf stars that have a hydrogen-rich atmosphere, which contrasts with stand-alone field white dwarf stars whose atmospheres are typically helium-rich. Located 4.5° south and 1° west of **Theta Aurigae**. Also known as **Cr 75**, **Lund 115**, **Mel 36**, **OCL 451**, **Raab 28**, and **C0549+325**.

M38 (NGC 1912), "**The Starfish Cluster**", mag. 6.4, 05 28 43 +35 51 18, 20' in size, is an open cluster of 160 stars; detached, no concentration of stars; moderate range in brightness; very large and bright; magnitude of brightest star is 9.5. The brightest stars in the cluster form a distorted "X" shape, or an oblique cross shape, or a Greek letter **Pi (π)** shape. **NGC 1907** is 0.5° to the south-southwest. Also known as **Cr 67**, **Mel 36**, **Lund 181**, **OCL 433**, **Raab 26**, **OCL 433.0**, and **C0525+358**.

Cr 62, mag. 4.2, 05 20 53 +41 04 51, 35' in size, is an open cluster of 15 stars; not well detached; large range in brightness. Also known as **Lund 161**, **OCL 423**, **OCL 423.0**, and **C0519+409**.

NGC 2281, "**The Broken Heart Cluster**", mag. 5.4, 06 49 18 +41 04 42, 15' in size, is an open cluster of 119 stars in a crescent shape; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 7.3. There is a four star diamond shape in the center of the

cluster. One pair of the stars are at magnitudes 9.0 and 10.6, with a separation of 7.7", and the northeast pair are at magnitudes 10.1 and 10.6 with a separation of 8" (ADS 5482 A and B). The cluster is located 3.4° south-southwest of **Phi² Aurigae**. Also known as **H8-71, OCL 446, Cr 116, Lund 259, Mel 51, Raab 39, and C0645+411**.

NGC 1857, mag. 7.0, 05 20 12 +39 21, 6' in size, is an open cluster of 45 stars; detached, weak concentration of stars; moderate range in brightness. A telescope will show a hazy patch surrounding a magnitude 7.4 orange star (SAO 57903). Located 0.8° south-southeast of **Lambda Aurigae**. Also known as **H7-33, Cr 61, Mel 32, Lund 159, OCL 428, OCL 428.0, Raab 23, Cz 29, and C0516+393**.

IC 410, "The Tadpole Nebula", mag. 7.5, 05 22 36 +33 28 48, 40'x30' in size, is a very faint, large emission nebula surrounding the large (10' in size) open cluster **NGC 1893**, that is embedded within a clearing in the dusty emission nebula. There are two dramatic tadpole shaped streamers of cool gas near the cluster catalogued as **SIM 129** and **SIM 130**. This is one of the youngest clusters observed in the optic range. Located 2.4° west-northwest of **Chi Aurigae**, in the **Aur OB2 Association**, with **Sh2-236** (5 stars, 05 22 36 +33 21) to the south. Also known as **Ced 43, CTB 17, LBN 807, LBN 173.58-01.75, Min 2-59, OCL 438, and C0519+334**.

NGC 1893, "The Letter Y Cluster", mag. 7.5, 05 22 42 +33 24 42, 12' in size, is an open cluster of 60 stars; detached, weak concentration of stars; moderate range in brightness; magnitude of brightest star is 9.3. Embedded within **IC 410**, a dusty emission nebulae located in the **Aur OB2 Association**, and illuminates the nebula **IC 410**. Located 1.5° southwest of **Phi Aurigae**. Also known as **Cr 63, Mel 33, Raab 24, OCL 439, OCL 439.0, Lund 166, and C0519+333**.

SsS, mag. 7.5, 05 57 47 +37 07 47, 50'x509' in size.

NGC 1664, "The Kite Cluster", mag. 7.5, 04 51 06 +43 40 16, 18' in size, is an open cluster of over 100 stars; detached, no concentration of stars; small range in brightness; pretty large; magnitude of brightest star is 10.0. Located 2° west of **Epsilon Aurigae**. Also known as **H8-59, Mel 27, Cr 56, Lund 143, OCL 411, OCL 411.0, Raab 19, and C0447+436**.

NGC 1778, mag. 7.7, 05 08 06 +37 01 24, 8' in size, is an open cluster of 112 stars; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 10.1. The cluster is located 4° to the south of **Eta Aurigae**, or 2° east-southeast of **Omega Aurigae**. On the north end of the cluster is a triple star (**h3265**) with magnitudes of 10.2 and 13.0, with the separation being 15". Also known as **Cr 58, Lund 152, OCL 429, OCL 429.0, H8-61, and C0504+369**.

NGC 1907, mag. 8.2, 05 28 00 +35 19 30, 7' in size, is an open cluster of 40 stars; detached, weak concentration of stars; small range in brightness; irregularly round; involved in nebulosity; magnitude of brightest star is 11.2. Located about 30' south of **M38**. Also known as **H78-39, Mel 35, Cr 66, Lund 179, OCL 434, Raab 25, and C0524+352**.

Stock 8, mag. 9.0, 05 28 06 +34 25 42, 5'x5' in size, magnitude of brightest star (**BD+34° 1054**) is 8.9. Located 10' east-southeast of **Phi Aurigae** – and surrounds the star, with all of it inside **IC 417**, in the **Aur OB1 Association**. **Sh2-234** is to the south. Also known as **Lund 178, OCL 436, and C0524+343**.

Basel 4, mag. 9.1, 05 48 58 +30 11 23, 7' in size; 15 stars; magnitude of brightest star is 12.18. Also known as **Cz 22, Lund 194, OCL 455, and C0545+302**.

IC 405, "Schaeberle's Flaming Star Nebula", "Flaming Star Nebula", "Flying Minnow Nebula", mag. 10.0, 05 17 24 +34 22 46, 90'x66' in size; very large, very faint; use an O III or H-beta filter if possible; illuminated by **AE Aurigae** (magnitude 5.99) which is totally surrounded by the nebula. Located in the **Aur OB2 Association**. Also known as **C 31, LBN 795, Mel 31, Ced 42, and Sh2-229**.

NGC 1724, mag. 10.0, 05 03 33 +49 29 30, 1' in size, includes **GSC 3352-08901/ 01096/ 01031**. Also known as **Lund 1121, OCL 405, and C0459+494**.

NGC 1798, mag. 10.0, 05 11 40 +47 41 42, 6' in size, 50 stars; magnitude of brightest star is 13.0. Located 50' north of a magnitude 5.5 star. Also known as **Be 16, Lund 155, OCL 410, and C0508+475**.

NGC 1931, "The Fly Cluster", mag. 10.0, 05 31 24 +34 13 59, 5'x5' in size, is an emission and a reflection nebula. The nebula surrounds a faint star (**h367**) at magnitude 11.5, with four companions.

The nebula is “peanut” shaped, and is located 0.8° east-southeast of **Phi Aurigae**, in the **Aur OB1 Association**. Also known as **H1-261**, **Ced 49**, **Cr 68**, **LBN 810**, **Lund 182**, **OCL 441**, **OCL 441.0**, **St 9**, **Sh2-237**, and **IRAS 05281+3412**.

Palomar 2, mag. 13.0, 04 46 05.9 +31 22 51, 2.2' in size, is incorrectly identified as a galaxy with the designation of **MCG+05-12-001 = PGC 15963**. Also known as **MGC+05-12-001**, **PGC 15963**, **EQ 0443+313**, and **C0443+313**.

CRL 618, “**Westbrook Nebula**”, mag. 17.9, 04 42.88 +36 06.8, 12” in size. Also known as **PK 166-06.1**, and **IRAS 04395+3601**.

Auriga’s Wheel, mag. 18.2, 06 47 02 +45 54 02, 0.2’x0.1’ in size, is a ring galaxy.

IC 417, “**The Spider**”, 05 28 06 +34 25 12, 13’x10’ in size, is a very large, diffuse, and faint nebula, including wedge-shaped filaments. It is involved with **Stock 8**. The nebula is located 8’ southeast of **Phi Aurigae**. Also known as **Ced 46**, and **LBN 804**.

Aur OB1 Association, 05 25 00 +33 00, 12°x8° in size, is an area of gas, in both the **Orion Arm** and the **Perseus Arm** of the **Milky Way**. Contains **IC 417**, **NGC 1931**, **Stock 9**, **NGC 1985**, **Sh2-235**, **Chi Aurigae**, **M36**, and other objects.

Aur OB2 Association, 05 25 00 +34 00, 3°x3° in size, is an area in the **Perseus Arm** of the **Milky Way Galaxy**. It contains **IC 410**, **NGC 1893**, **Phi Aurigae**, **IC 405**, and other objects.

Asterisms:

False Kids, mag. 4.0, 05 50 +38 00, 2’x0.5’ in size, consists of **Nu**, **Tau**, and **Upsilon Aurigae** – forming a triangle.

Herschel’s Telescope, mag. 4.0, 06 40 +42 00, 7’x2’ in size, consists of the stars **Psi²** thru **Psi⁹**, including **NGC 2281**.

The Kids, mag. 4.0, 05 03 52.26 +42 01 44.8, 2.5’x1’ in size, consists of **Epsilon (Almaaz)**, **Eta (Haedus II)**, and **Zeta (Sadotoni) Aurigae**.

The Flying Minnow, or **The Little Fish**, mag. 5.0, 05 19 +33 40, 60’x45’ in size, includes **16**, **18**, and **19 Aurigae**. Located between **IC 405** and **NGC 1893**. **Mel 31** is 2’ to the south.

The Smily Face, or **The Cheshire Cat**, mag. 6.0, 05 27 +35 00, 80’x40’ in size, is a curved chain of stars and objects 30’ south of **M38**, includes **Phi Aurigae**, **NGC 1907**, and involvement with **Stock 8**.

The Goats, mag. 4.8 to 6.46, consists of **Psi¹** thru **Psi⁹ Aurigae**.

Al ‘Ināz, “**The Group of Goats**”, consisting of **Alpha**, **Zeta**, and **Eta Aurigae**.

Al Tawābi’ al ‘Ayyük, “**The Goat’s Attendants**”, or “**The Two In The Ankle**”, consists of **Gamma** and **Iota Aurigae**.

Choo, “**The Pillar**”, consists of **Nu**, **Tau**, **Upsilon**, **Phi**, **Chi Aurigae**, and another unidentified star.

Pakuh, “**The Eight Cereals**”, consists of **Xi**, **h**, **k**, and **i Aurigae**, and other stars near **Cassiopeia**.

Tseen Hwang, “**The Heavenly Pool**”, consists of **Mu**, **Rho**, and **Sigma Aurigae**.

Objects in Auriga: 25 NGC; 8 IC; 54 UGC; 49 MCG; 8 Radio Galaxies; 2 Quasars; 58 CGCG; 48 OCL; 5 SAI; 35 Lund; 20 Sh2; 43 LDN; 11 LBN; 5 Cz; 4 Do; 13 Herschel; 4 King; 11 Mel; 9 B; 1 Basel; 9 Be; 1 C; 8 Ced; 14 Cr; 1 Abell; 8 Teutsch; 1 Al-Teu; 5 FSR; 5 A; 3 St; 2 Min; 2 Leda; 2 EQ; 1 ARO; 1 SsS; 1 Webb; 3 Kp; 1 Ren; 1 Pat; 3 Kro; 1 Töpler; 3 Hu; 1 DG; 1 Sk; 1 Pp; 1 GM1; 1 Pal; 1 Simies; 1 CRL; 1 GN; 1 WB89; 1 Waterloo; 1 CTB; 1 [DB01]; 2 ZwG; 12 Teutsch; 2 Skiff; 6 IRAS; 1 Al; 3 NPM1G; 1 RAFGL; 10 Raab; 4 vdB; 3 ASCC; 19 PGC; 2 K; 11 PNG; 10 V-V; 2 Variable Galaxies; 15 PK; 2 SNR; and 1 Wein for a total of 605 objects.

Other Stars:

Omega Aur, mag. 4.93, 04 59 15.38 +37 53 25.7, is a binary star. The primary, a pale yellow star, is separated from the secondary, an orange magnitude 8.0 star, by 5.4”. The binary is associated to **EUVE J0459+37.8** – a UV emission source. Also known as **Σ 616**, **ADS 3572**, **HD 31647**, **HIP 23179**, and **4 Aurigae**.

26 Aur, mag. 5.40, 05 38 38.1 +30 29 32.8, is a quadruple star. The primary, at magnitude 6.0, is a yellowish star, and the secondary is a blue star at magnitude 6.3. The “C” star, magnitude 8.0, and the

“D” star is at magnitude 11.5. AB is a wide pair at 0.2’ separation, while the AB-C separation is 12.4’, with the AB-D separation is 33.1’. Also known as **HD 37269**, **HIP 26536**, **ADS 4229**, and **Σ 1240**, with the C component = **Σ 753**, and the D component = **β 90**.

RT Aur, mag. 5.75, 06 28 34.09 +30 29 35.1, is a super-giant Cepheid variable star, varying in magnitude from 5.0 to 5.82 with a period of 3.72849 days. Also known as **HD 45412**, **HIP 30827**, and **48 Aurigae**.

HD 35519, mag. 6.17, 05 26 54.33 +35 27 26.3, is a star in two star clusters – **NGC 1907** and **NGC 1912**. Also known as **HIP 25476**.

HD 40979, mag. 6.74, 06 04 29.94 +44 15 37.6, has one planet in orbit at a separation of 0.83 au, and a period of 263.1 days. Also known as **HIP 28767**.

AB Aur, mag. 7.06, 04 55 45.84 +30 33 04.29, is a variable star that has a dust disk in which planets or brown dwarf stars may be forming. The star is located in **vdB 31**, and is totally surrounded by **IC 405**. Also known as **HD 31293**, **HIP 22910**, and **HBC 78**.

V420 Aur, mag. 7.45, 05 22 35.23 +37 40 33.629, is a high-mass X-ray binary Be type variable star. Also known as **HD 34921**, and **HIP 25114**.

HD 43691, mag. 8.03, 06 19 34.68 +41 05 32.3, has one planet in orbit at a separation of 0.24 au, and a period of 36.96 days. Also known as **HIP 30057**.

HD 42012, mag. 8.44, 05 27 52.4 +34 46 58.25, has one planet in orbit. Also known as **HIP 29242**.

KELT-2A, mag. 8.77, 06 10 39 +30 57 25, has a transiting planet in orbit with an orbital period of 4.11 days. Also known as **HD 42176A**, and **HIP 29301A**.

Stars of interest beyond magnitude 10:

WASP-12, mag. 11.69, 06 30 33.0 +29 40 20, has two planets in orbit.

NX Aur, mag. 14.1, 05 23 04.262 +33 28 46.43, is a PMS star in **NGC 1893**.

GD 66, mag. 15.56, 05 20 38.31 +30 48 24.1, is a white dwarf star possibly with a planet in orbit.

Stars in Aurigae: 52 Σ; 18 OΣ; 69 V; 4 β; 2 Sei; 2 Ho; 5 Hu; 2 HBC; 4 GSC; 3 A; 3 h; 2 ES; 1 GC; 1 Sk; 32 Greek; 75 Lettered; 68 numbered; 1 FRK; 3 ADS; and 2 SAO for a total of 347.

Sky Happenings: March, 2021

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

Mar. 1st - The **Moon** is at perigee (227,063 miles or 365,423 km from **Earth**) at 11:18 PM CST.

Mar. 2nd - Dawn: Look southwest to see the waning gibbous **Moon** in **Virgo**, less than 5° above **Spica**.

Evening: **Mars** glides past the **Pleiades** the next three evenings, with about 2° separating the

planet from the **Seven Sisters**.

Mar. 4th - Asteroid **Vesta** is at opposition at 12 Noon CST

Mar. 5th - **Mercury** passes 0.3° north of **Jupiter** at 1 AM CST,
Last Quarter Moon occurs at 7:30 PM CST.

Mar. 6th - **Mercury** is at greatest western elongation (27°) at 5 AM CST.

Mar. 9th - The **Moon** passes 4° south of **Saturn** at 5 PM CST.

Mar. 10th - The **Moon** passes 4° south of **Jupiter** at 10 AM CST,
Neptune is in conjunction with the **Sun** at 6 PM CST,
The **Moon** passes 4° south of **Mercury** at 7 PM CST.

Mar. 13th - **New Moon** occurs at 4:21 AM CST (**Lunation 1215**),
Uranus discovered by **William Herschel** in 1781.

Mar. 14th - **Daylight-Savings Time** starts at 2 AM CST to become 3 AM CDT.

Mar. 16th - The **Moon** passes 3° south of **Uranus** at 9 PM CDT.

Mar. 18th - The **Moon** is at apogee (251,812 miles or 405,252 km from **Earth**) at 12:03 AM CDT,
Dusk: The waxing crescent **Moon**, **Aldebaran**, **Mars**, and the **Pleiades** are arranged in a

parallelogram shape.

- Mar. 19th** - The **Moon** passes 1.9° south of **Mars** at 1 PM CDT,
Dusk: The **Moon**, **Aldebaran**, and **Mars** form a triangle.
- Mar. 20th** - The **Vernal Equinox** occurs at 4:37 AM CDT, for the official beginning of **Spring** in the
Northern Hemisphere, and **Fall** in the **Southern Hemisphere**.
- Mar. 21st** - **First Quarter Moon** occurs at 9:40 AM CDT,
The **Moon** is 0.7° north of **M35 (NGC 2168)** at 12 Noon CDT.
- Mar. 22nd** - Dusk: The **Moon** is in **Gemini**, 5° from **Pollux**,
- **Mars** passes 7° north of **Aldebaran** at 7 PM CDT.
- Mar. 23rd/24th** - All Night: The **Moon** moves closer to the **Beehive Cluster (M44)** in **Cancer**, moving
closer together as they sink toward the western horizon in the pre-dawn hours, and sets by
about
5 AM local daylight time.
- Mar. 25th** - Evening: As the gibbous **Moon** continues to wax, it moves into **Leo**, where it can be
found above the southeast horizon, some 4° from **Regulus**.
- Mar. 26th** - **Venus** is in superior conjunction at 2 AM CDT.
- Mar. 28th** - **Full Moon** occurs at 11:48 PM CDT,
Minor planet **Makemake** is at opposition.
- Mar.30th** - The **Moon** is at perigee (223,886 miles or 360,309 km from **Earth**) at 1:16 AM CDT.
- Apr. 4th** - Last Quarter Moon occurs at 5:04 AM CDT.

Planets:

Mercury - **Mercury** starts the month 2.5° west of **Jupiter**, and by the 4th, the pair will stand 0.6° apart. On the 5th, early in the morning, the pair of planets will be only 0.4° separated, with **Mercury** at magnitude 0.2, and spanning 7" at 55% illuminated. On the 6th, the planet has its greatest western elongation (27.3°) from the **Sun** – the biggest separation of the two for all of 2021. On the 10th, **Jupiter** will be 5° north-northeast of the **Moon**, with **Mercury** being 4.5° due east of **Jupiter**. On the 14th, **Mercury** will be about 3° high, at magnitude 0.0, at around 6:40 AM local time, before the twilight drowns it out.

Venus – **Venus** is too close to the **Sun** to be seen. The planet reaches superior conjunction on the 26th. The planet will re-emerge as the **Evening Star** in mid-April.

Mars – **Mars** spends the month in **Taurus**. On the 1st, the planet is about 3° due south of **M45** (the **Pleiades**), and will slowly drift eastward. On the 4th, the planet is 2.5° from the center of **M45**, shining at magnitude 1.0. The planet will stay within a 5° binocular field of the **Pleiades** until the 11th. **Mars** has not been this close to **M45** since 2006, and will not be this close again until 2038. On the 18th, the moon is 5° from **M45**, with **Mars** standing 8° northeast of the **Moon**. On the 19th, the planet stands less than 4° west of the **Moon**, forming a triangle with **Aldebaran** to the south. The planet passes 7° due north of **Aldebaran** on the 22nd, and by the 31st, it stands near **NGC 1746**, glowing at magnitude 1.3. The planet spans only 6" as March opens, and will shrink to 5" by the end of the month.

Jupiter – **Jupiter** is in conjunction with **Mercury** on the 5th, with only 19' separation, low in the east-southeast at 1 AM CST, shining at -2.0 magnitude. On the 9th, in **Capricornus**, at dawn, the **Moon** is about 7.5° to the right of **Saturn**, with **Jupiter** below and to the left of **Saturn**, and **Mercury** below and to the left of **Jupiter**, 30 minutes before sunrise. On the 10th, the **Moon** has shifted to be to the lower right of **Jupiter**. Every six years the orbital plane of **Jupiter's** four **Galilean** moons are edge-on with the **Sun** and **Earth**, and we enter mutual event season, when **Jupiter's Galilean** moons occult and eclipse one another. The current season ends on November 16th. The following is a list of mutual satellite events, all listed in CDT: March 17th, 10:04 AM to 10:08 AM – **Io** occults **Europa** with a 0.6 magnitude change; on the 29th, from 7:06 AM to 7:14 AM – **Io** occults **Ganymede** with a 0.4 magnitude change; and on the 30th, from 4:30 AM to 4:35 AM – **Europa** will eclipse **Io**, with a 0.5 magnitude change. There will be 5 mutual events in April.

Saturn – **Saturn** rises above the southeast horizon at about 5:10 AM local time on March 1st, just as the sky begins to show the first signs of twilight. **Mercury**, further to the east, joins **Saturn** in the sky 15 minutes later, followed by **Jupiter**, just after 5:30 AM local time. **Saturn** shines at magnitude 0.6. On the 5th, the planet will be 8.5° to the upper right of **Mercury** and **Jupiter**, shining at magnitude +0.7. On the 9th, **Saturn** rises 1.5 hours before the **Sun**, and at dawn, the **Moon** is about 7.5° to the right of the planet, with **Jupiter** and **Mercury** to the lower left of **Saturn**. On the 14th, the planet rises by 5:20 AM (after **Daylight Savings Time** takes effect at 2 AM to become 3AM). By the end of the month, **Saturn** is low in the southeast, in **Capricornus**, rising about 4:20 AM local time on the 31st, below 15° altitude as twilight begins.

Uranus – **Uranus**, shining at magnitude 5.9, will stand nearly 40° high in the western sky an hour after sunset on March 1st. It will be 10° south and slightly east of **Hamal (Alpha Arietis)**, or 3.3° below the star **29 Arietis**. By mid-month, the distance will shrink to 2.7°. On the 31st, the separation is only 2°. The planet will span only 3' through a telescope.

Neptune – **Neptune** reaches superior conjunction with the **Sun** on March 10th, and is not visible this month.

Pluto – **Pluto** will be low in eastern **Sagittarius**, at about 19 53 00 -22 14 00 on the 15th, at magnitude 15.2, and showing a span of 0.1”

Moon – The **Lunar “X”** (also called the “**Werner X**”) should be visible from around 7PM CDT to 8 PM CDT on the 20th. Favorable Librations: **Baily Crater** on the 1st; **Drygalski Crater** on the 2nd;

Pingre Crater on the 28th, and **Hausen Crater** on the 29th.

Greatest North Declination on the 22nd (+25.2°)

Greatest South Declination on the 8th (-25.1°)

Libration in Longitude: East limb most exposed on the 10th (+5.0°)

West limb most exposed on the 24th (-7.3°)

Libration in Latitude: North limb most exposed on the 13th (+6.6°)

South limb most exposed on the 27th (-6.6°)

Asteroids – Asteroid **4 Vesta** – **Vesta** reaches opposition on March 4th at magnitude 5.8, and shows an angular size of 4.7'. **Vesta's** positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On March 7th – 11 16.36 +16 25.7, at magnitude 6.0; on the 17th – 11 07.2 +17 34.6, at magnitude 6.2; and on the 27th – 10 58.67 +18 21.5, at magnitude 6.3. **Vesta's** positions, *by my estimates*, are as follows: On March 1st – just under 2° due east of **Cherton (Theta Leonis)**; on the 5th – just over 1° north-northeast of **Cherton**; on the 10th – about 1.5° north-northwest of **Cherton**; on the 15th – about 2.5° northwest of **Cherton**, or about 3° southwest of the star **60 Leonis**; on the 20th – about 2.5° south-southeast of **60 Leonis**; on the 25th – about 2° due south and a little west of **60 Leonis**; and on the 30th – about 2.5° southwest of **60 Leonis**.

Asteroid **9 Metis** – **Metis's** positions, according to the *RASC Observers Handbook, 2021 USA Edition*, are as follows: On March 17th – 13 22.18 +00 30.0, at magnitude 9.8; and on the 27th – 13 13.69 +00 30.0, at magnitude 9.6.

Asteroid **15 Eunomia** – **Eunomia's** positions, according to the *RASC Observers' Handbook, 2021 USA Edition*, are as follows: On March 7th – 07 42.12 +15 58.3, at magnitude 9.6; and on the 17th – 07 42.52 +15 41.6, at magnitude 9.8.

Asteroid **29 Amphrite** – **Amphrite's** positions, according to the *RASC Observer's Handbook, 2021 USA Edition*, are as follows: On March 7th – 10 14.88 +14 25.3, at magnitude 9.4; on the 17th – 10 06.66 +14 40.2, at magnitude 9.6, and on the 27th – 10 00.69 +14 41.6, at magnitude 9.8.

Comets – Comet **7P/Pons- Winnecke** – **7P's** positions, according to **ALPO**, are as follows: On March 2nd – 16 25.0 +09 45, in **Hercules** at magnitude 15.6; on the 12th – 16 52.4 +09 42, in **Ophiuchus** at magnitude 14.8; and on the 22nd - 17 21.0 +09 31, in **Ophiuchus** at magnitude 13.7.

Comet **141P/Machholz** – **141P's** positions, according to **ALPO**, are as follows:

On March 2nd – 05 18.2 +02 49, in **Orion** at magnitude 16.0; on the 12th – 05 54.0 +04 07, in **Orion** at

magnitude 17.0; and on the 22nd – 06 23.7 +05 03, in **Orion** at magnitude 18.0.

Comet **C/2020 M3 (ATLAS)** – **M3**'s positions, according to **ALPO**, are as follows: On March 2nd – 06 15.6 +47 29, in **Auriga** at magnitude 13.5; on the 12th – 06 32.4 +46 42, in **Auriga** at magnitude 13.9; and on the 22nd – 06 49.6 +45 48, in **Auriga** at magnitude 14.3.

Comet **C/2020 R4 (ATLAS)** – **R4**'s positions, *by my estimates*, are as follows; On March 1st – about 3.5° west-northwest of **M72 (NGC 6981 in Aquarius)**, or 5° due east and a little north of **Algedi (Alpha Capricorni)**, or just under 3° southwest of **Epsilon Aquarii**; on the 5th - 3° east-northeast of **Epsilon Aquarii**; on the 10th - 4° northeast of **Algedi**, or 4° due west of **Epsilon Aquarii**; on the 15th – 4.5° north-northeast of **Algedi**, or 5.5° west-northwest of **Epsilon Aquarii**; on the 20th – just over 6° south-southeast of **Theta Aquilae**; on the 25th – 4.5° due south and a little west of **Theta Aquilae**; and on the 30th – just over 3° due south and a little east of **Eta Aquilae**.

Meteor Showers – There are no major meteor showers this month. The background sporadic rate provides an average of seven meteors per hour.

When to View the Planets:

Evening Sky

Mars (west)

Uranus (west)

Midnight

Mars (west)

Morning Sky

Mercury (east)

Jupiter (east)

Saturn (southeast)

DARK SKY VIEWING - PRIMARY ON MARCH 13TH, SECONDARY ON MARCH 20TH



Auriga – The Charioteer

This prominent constellation has several identifications in mythology. The most popular interpretation is that he is Erichthonius, the legendary king of Athens. He was the son of Hephaestus, the god of fire, better known by his Roman name of Vulcan, but he was raised by the goddess Athene, after whom Athens is named in her honor. Erichthonius instituted a festival called “The Panathenaea”.

Athene taught Erichthonius many skills, including how to tame horses. He became the first person to harness four horses to a chariot, in imitation of the four horse chariot of the Sun, a bold move which gained him the admiration of Zeus and assured him a place in the stars. There, Erichthonius is depicted at the reins, perhaps participating in the Panathenaic games in which he frequently drove his chariot to victory.

Another identification is that Auriga is really Myrtilus, the charioteer of King Oenomaus of Ehis and son of Hermes. The king had a beautiful daughter, Hippodamia, whom he was determined not to let go. He challenged each of her suitors to a death-or-glory chariot race. They were to speed away with Hippodamia on their chariots, but if Oenomaus caught up with them before they reached Corinth, he would kill them. Since he had the swiftest chariot in Greece, skillfully driven by Myrtilus, no man had yet survived the test.

A dozen suitors had been beheaded by the time Pelops, the handsome son of Tantalus, came to claim Hippodamia's hand. Hippodamia, falling in love with him on sight, begged Myrtilus to betray the king so that Pelops might win the race. Myrtilus, who himself was secretly in love with Hippodamia, tampered with the pins holding the wheels on Oenomaus's chariot. During the pursuit of Pelops, the wheels of the king's chariot fell off

and Oenomaus was thrown to his death.

Hippodamia was now left in the company of both Pelops and Myrtilus. Pelops solved the awkward situation by unceremoniously throwing Myrtilus into the sea, from which he cursed the house of Pelops as he drowned.

Hermes put the image of his son Myrtilus into the sky as the constellation Auriga. Germanicus Caesar supports this identification because, he says, ‘you will observe that he has no chariot, and his reins broken, is sorrowful, grieving that Hippodamia has been taken away by the treachery of Pelops’.

A third identification of Auriga is Hippolytus, son of Theseus, whose stepmother Phaedra fell in love with him. When Hippolytus rejected her, she hanged herself in despair. Theseus banished Hippolytus from Athens. As he drove away his chariot was wrecked, killing him. Asclepius the Healer brought blameless Hippolytus back to life again, a deed for which Zeus struck Asclepius down with a thunderbolt at the demand of Hades, who was annoyed at losing a valuable soul.

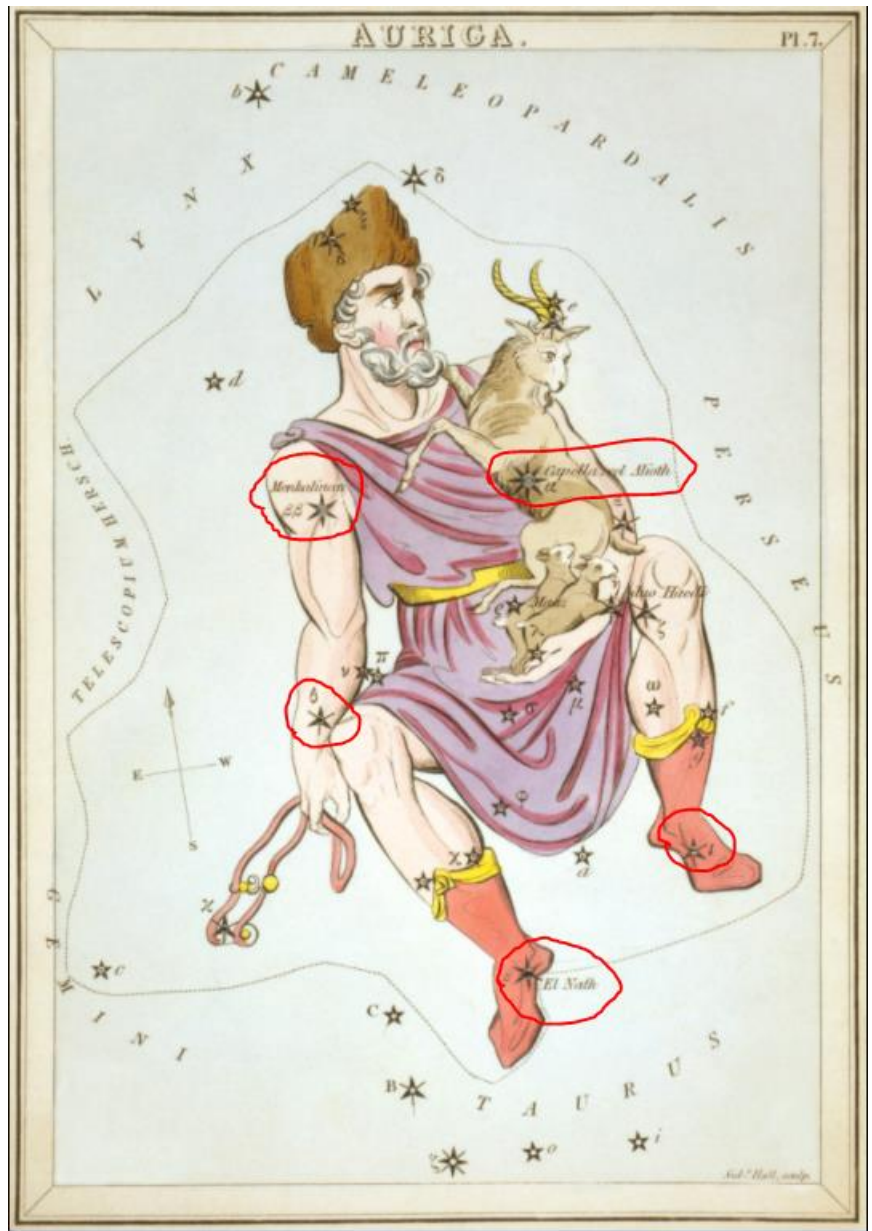
Auriga contains the 6th brightest star in the night sky, Capella, a Roman name meaning “she-goat” (its Greek name was Aix). Ptolemy describes this star as being on the Charioteer’s left shoulder.

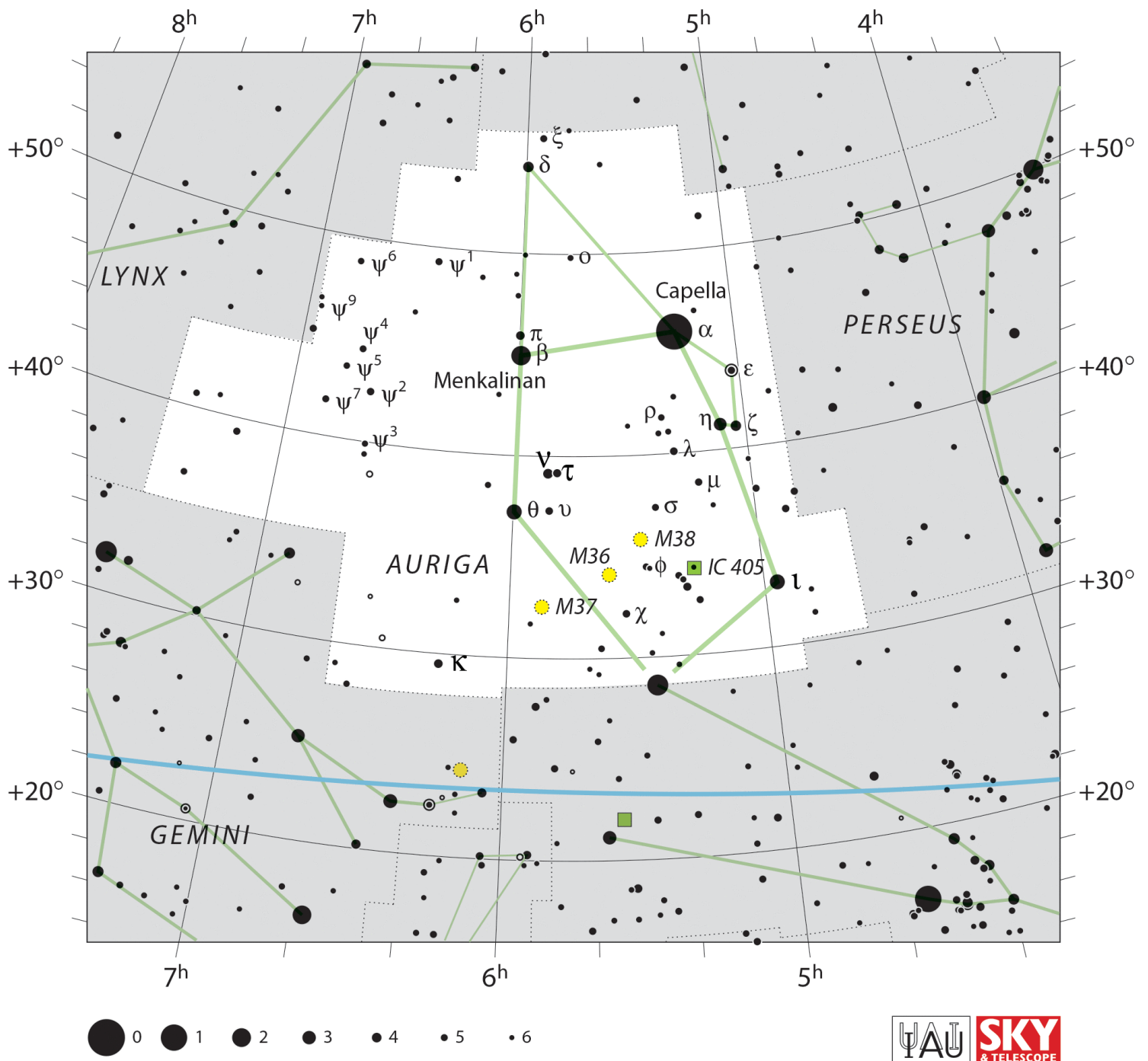
According to Aratus, it represents the goat Amaltheia, who suckled the infant Zeus on the island of Crete, and was placed in the sky as a mark of gratitude, along with the two kids she bore at the same time. The kids, frequently known by their Latin name of Haedi (Eriphi in Greek), are represented by the neighboring stars Eta and Zeta Aurigae.

An alternative story is that Amaltheia was the nymph who owned the goat. Erastosthenes says that the goat was so ugly that it terrified the Titans who ruled Earth at that time. When Zeus grew up and challenged the Titans for supremacy, he made a cloak from the goat’s hide, the back of which looked like the head of a Gorgan. This horrible looking goatskin formed the so-called aegis of Zeus (the word aegis actually means goatskin). The aegis protected Zeus and scared his enemies, a particular advantage in his fight against the Titans.

Some early writers spoke of the Goat and the Kids as a separate constellation, but since the time of Ptolemy they have been awkwardly combined with the Charioteer, the goat resting on the charioteer’s shoulder, with the kids supported on his wrist. There is no legend to explain why the charioteer is so encumbered with livestock.

Greek astronomers regarded one star as being shared by Auriga and Taurus, representing the right foot of the Charioteer and the tip of the Bull’s left horn, as old star maps show it. Modern astronomers now assign this star exclusively to Taurus.





The End