

Night Visions

February 2022

Newsletter of the **Baton Rouge** Astronomical Society

Artist conception of the James Webb Space Telescope, fully opened. Credit: NASA
The telescope reached its orbit and mirrors were fully deployed on January 24th 2022. See Page 7.

Monthly Meeting February 14th at 7:00 PM, in person

*You may also join this meeting via meet.jit.si/BRASMeet
(Monthly meetings are held on 2nd Mondays of the month, at Highland Road Park Observatory)*

PRESENTATION: Trevor McGuire, via Jitsi from Finland, on Observing north of the Arctic Circle.

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www.braastro.org

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Baton Rouge Astronomical Society Facebook Page
BRAS YouTube Channel – Monthly Speakers via Jitsi**

President's Message

The **James Webb telescope** has reached its destination at the Lagrange 2 point and has been inserted into its final orbital point. It will undergo 5 to 6 months of testing and checkout before its first official observations. We might, before the end of this year, see the first galaxies created! Wishing all involved the best of luck and success!

Check out **Ben's Outreach Report** for outreach opportunities this month.

BRAS is investigating the costs of obtaining **magnetic vehicle door signs** of the BRAS Logo, to be used for official BRAS business – outreach, visits to the dark site, etc.). We hope to have them before next month.

Ben is revising the list for **BRAS Volunteers name badges** – hope to have them soon also.

Training on the new NSN kits will start in March sometime. Stay tuned! Scott C says he is willing to train BRAS members on how to **use electronic controlled telescopes** using the loaner/outreach BRAS telescopes or bring your own. This training will be on the evenings after the BRAS General Membership meetings (Monday nights). If you are interested, let Scott know at publicity@brastro.org.

Chris K is giving us the opportunity to have a table(s) at the **IAD (on May 7th)** for the sale/swap of used BRAS equipment only (to help clean out our closet). BRAS must provide the table(s) and personnel to staff the table(s) – no one that is also volunteering for BREC that day. If you are interested in taking a shift between 3 PM and 11 PM, let me know at president@brastro.org.

BRAS is looking into the design of an **official BRAS letterhead**. Michele has agreed to submit one.

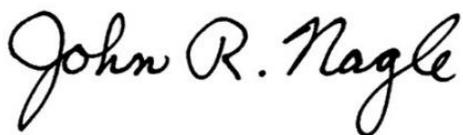
We **NEED** to fill the **Vice-President position**. The VP's duties are to arrange for the speaker at our Monthly meetings (we all pitch in and help on this duty) and conduct meetings when the President is not present.

We need a new **Light Pollution Committee Chair**. With my new duties as President, and continuing on as Observing Chair, I need to let the LPC chair go (held since January 2018). But don't you be thinking that the position is any less important. In some respects, the **MOST IMPORTANT THING WE CAN DO** is increase awareness, stir up the waters, and demand a decrease in light pollution so we can continue to observe, study, photograph and teach our children to marvel at the stars. If no one steps up willingly, we will start twisting arms! Let me know at president@brastro.org.

Craig B has made a proposal to have a **BRAS ONLY Observatory** (a small building where BRAS could install telescopes from the closet) at HRPO. BRAS has asked Craig to give us a preliminary proposal for our input/consideration before we approach BREC about it.

Trevor McGuire, our former Outreach Coordinator (before Ben T), **will be the speaker for our February meeting**. He is living in Finland at this time and has observed north of the Arctic Circle. Here is the teaser he sent for his online talk: *"We all know that winter nights are longer than summer nights, and many amateur astronomers know their winter constellations better than their summer ones. What if you have no summer constellations at all, though?"*

Clear Skies



John Nagle, 2022 President

Upcoming BRAS Meetings:

Monthly Member Meeting – 7 pm Monday, January 10th at the Observatory, in person and via Jitsi

Light Pollution: 6 pm Wednesday, January 26. (In person only, Open to the public), followed by . . .

Monthly Business Meeting: 7 pm Wednesday, January 26, via Jitsi (Members Only)

MOON (Members Only Observing Night) TBA

ALCon 2023 ("Astronomical Gumbo") Committee Meeting TBA



Monthly Meeting Minutes – January 10th, 2022, 7 p.m.

- Welcome by the new president, John Nagle.
- John introduced the speaker for the evening, Merrill Hess. The talk was titled “Our Dynamic Sun” and came about as the result of a request and interest in solar storms and their impact on our lives.
- John announced the following:
 - The James Webb Space Telescope has completed 78% of its trip to Earth’s L2 Lagrange point. The individual mirrors still need to be adjusted before it’s operational.
 - The AAS has now made all of their journals open access as of January 1st.
 - The Daylight Savings Time bill in the Louisiana Legislature passed; this means that if DST passes in Congress, Louisiana would automatically go to DST year-round.
 - Trevor McGuire who lives in Finland now has offered to speak remotely for the February 14th meeting on viewing the sky from the Arctic Circle.
- Steven spoke about Carroll Iorg’s visit to Baton Rouge in December. Mr. Iorg is the president of the Astronomical League. He visited the Hilltop Arboretum as well as the Planetarium downtown while he was in town checking out possible venues for the 2023 ALCON. Steven wants those involved with this event to watch your email for news, and work with your subcommittee on changes and updates.
- Chris Kersey announced that the change of adding a game to the end of Science Academy was working; attendance is up there. The first Plus Night of the year is scheduled for this coming weekend. Fred’s website should be updated within the week; Celestial Events should reflect 2022. The Naval Observatory’s website is under construction, 3 years and counting.
- Ben gave the outreach report. The schedule has been set up with Perkins Rowe through April of this year. The event on Tuesday is scheduled from 6 to 9 pm. The next Makers Market event is on January 22nd at 1857 on Government Street.
- John announced that BRAS would have a table at IAD this year to sell or swap old equipment (nothing new will be allowed). We will probably have to provide our own table(s) as the ones for the observatory are already committed. In addition to handing out door prizes at the December meeting, Carroll Iorg also gave the club a certificate commemorating our 40th anniversary. The party for the 25th anniversary of HRPO is scheduled for November of this year.

2022 Officers:

President: John Nagle
president@brastro.org

VP:
vice-president@brastro.org

Secretary: Roz Readinger
secretary@brastro.org

Treasurer: Trey Anding
treasurer@brastro.org

BRAS Liaison for BREC:

Chris Kersey

BRAS Liaison for LSU:

Greg Guzik

Committees/Coordinators:

al_awards@brastro.org

Merrill Hess

lightpollution@brastro.org

??????

newsletter@brastro.org

Michele Fry

observing@brastro.org

John Nagle

outreach@brastro.org

Ben Toman

public_relations@brastro.org

Scott Cadwallader

webmaster@brastro.org

Frederick Barnett



Business Meeting Minutes – January 26th, 2022, 7 p.m.

(meeting is the last Wednesday of the month, in person, at HRPO)

Old Business

1. ALCon 2023 update. Steven wants to make a promotional video he can take to ALCon 2022.
2. Telescope for HRPO Raffle has been ordered along with other items – they have been received.
3. Urban Dark Sky Place (UDSP) certification by IDA – awaiting BREC word.
4. Outreach – Sidewalk Astronomy at Perkins Rowe next on February 8th, Maker’s Market on February 12th from 5 to 9 PM, Home School group at North Sherwood Forest Park on February 24th. See outreach Report. Name tags for BRAS volunteers – Ben is updating the list before the nametags are ordered. Magnetic signs (for vehicle doors) with BRAS Logo and name to be ordered for use at outreaches, at dark site to identify BRAS personnel, and at some LP work.
5. HRPO Report. Meeting of all HRPO Partners to be held soon.
6. Training: NSN Kit training to start in March, training on electronic controlled telescopes will be on Monday nights after the General Membership meetings. Working on New Member Kits. If you have any suggestions on the contents, let us know at president@brastro.org.
7. Moon Night – to be determined.
8. Library Telescope – inquired of EBRPL main branch and WBRPL into the use/check-out frequency.
9. BRAS sell table at IAD – will use this to clean out the BRAS closet – only used equipment to be sold/swapped, sale book needs pricing for items. We need to provide the table(s). We need volunteers that have not already volunteered for HRPO to staff the table(s).
10. Bras Star Party 2022 – Don Weinell is working on it.
11. BRAS Stationary – will get a letterhead designed so it can be used for official communications – letters to developments, letters to City/Parish and its departments, etc.
12. Investigating a possibility of a BRAS only observatory at HRPO. Craig B to put together a preliminary proposal.

New Business

1. Invite to an ICCBR (a group of non-profit service organizations) meeting on Tuesday evening, February 8th. Invite to join this group. BRAS President to attend.
2. BRAS President asked to speak about BRAS at a Kiwanis meeting (at 7:30 AM) on February 17th.
3. Discussed a proposal from Michele F on how to grow membership.
4. Website needs to be updated about the Daylight Savings Time legislation. Fred B notified.
5. Will start checking between meetings with people assigned tasks to see if they need any help.
6. Need ideas for speakers at BRAS meetings.
7. Need to fill V.P. position and need a replacement LPC Chairperson (John N currently).

Minutes submitted by John Nagle

John R. Nagle



Outreach Report

Hi Everyone,

2022 is off to a good start! We've already had 2 outreach events (Sidewalk Astronomy at Perkins Rowe and Mid City Makers Market.) Thank you to our volunteers for making them happen. (Chris R., Chris K., John N., Scott C., Roz R., Coy W. and Ben T.)

We're starting to get requests for events. Some of them are repeats and some of them are new events for us. We're also going to try to get our Outreach Orientation (for lack of a better title) back up and running in March. That will be a continuation of what we had started pre-pandemic. We'll meet at the HRPO and learn about the contents, and how to utilize them, of some of the Toolkits provided to us by the Night Sky Network. We have a lot to go through!

In the meantime, please take a look at the upcoming events and let me know if you'll be available and willing to help out. February will have 3 events and then we'll have 2 to staff for March. (So far!) These outreach events are a great way to become more involved in astronomy. You learn more about something in which you already have a great interest, and it's a wonderful service to the community. I hope you'll consider joining us!

Upcoming Events

Tuesday, February 8th

6pm-9pm

Sidewalk Astronomy at Perkins Rowe

Saturday, February 12th

5pm-9pm

Mid City Makers Market at Circa 1857 on Government St
(OK to show up later since it doesn't get dark until after 6pm)

Thursday, February 24th

9am-12pm

Homeschool Day at BREC's North Sherwood Forest Park
(A couple of people to man a station. Possible demos and/or solar viewing and providing info on the club and the HRPO.)

Tuesday, March 8th

6pm-9pm

Sidewalk Astronomy at Perkins Rowe

Saturday, March 12th

9am-4pm

Rockin' At The Swamp at BREC's Bluebonnet Swamp and Nature Center

(Several volunteers needed to work shifts throughout the day for demos and info. Possible solar viewing if you have a capable scope.)

Clear Skies, Ben Toman



When the clouds roll in, Outreachers improvise! Here is Scott C. using my little 3" reflector to show off our Moon banner. It worked pretty well with this eager little observer.



LPC (Light Pollution Committee) Report

This committee meets at 6:00, same day as the 7:00 BRAS Business Meeting
Meetings are on the last Wednesday of the month.

Everyone is welcome to join in.

Meeting called to order by John Nagle

3 members in attendance: John Nagle, Steven Tilley, Chris Kersey

December 29th minutes were published in the January newsletter

Old Business:

1. Draft of an update for the signers of the LPC Petition was discussed.
2. Posting of SQM Readings at HRPO and any other location was discussed. Currently, readings are posted at HRPO. Will investigate posting them on the BRAS Forums.
3. The 7-year plan update was discussed.
4. The 7-year plan summary is on the BRAS Dark Sky Advocacy web page.
5. Urban Dark Sky Place (UDSP) designation by the International Dark-Sky Association – awaiting to hear from BREC.
6. The survey of all outside luminaires at all BREC facilities/parks is about to be started.
7. Last word on the University Lakes Project – Request for Flood Risk Reduction Proposals.
8. Organizations to contact about LP: LSU – Landscape Architecture – the Associate Dean of Research and Development is forwarding request to three unit heads – awaiting their response; the local Architecture Institute of America (AIA) chapter – Awaiting word from the executive director; Federation of Greater Baton Rouge Civic Associations (FGBRCA) Awaiting to hear from them.
9. Discussed a form letter to be sent to any, and all development projects in the Greater Baton Rouge area.

New Business:

1. New development items to be discussed each month.
2. Must have form letter for New Development completed by next meeting.
3. Start contacting members who were assigned tasks in between meetings – if not completed offer help in the completion of the task.

Meeting adjourned.

John Nagle, LPC Chair pro-tem

Globe At Night

The target for the Globe at Night program is

Orion from January 24th through February 2nd, and from February 22nd through March 3rd.

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.

Where Is Webb NOW?

As of January 24th 2022, the telescope is in permanent orbit at L2:



NASA illustration, augmented by Michele.Fry for clarity.

More on What is Webb?

[About Webb/NASA](#)

Webb is The Premier Observatory Of The Next Decade

The James Webb Space Telescope (sometimes called JWST or Webb) will be a large infrared telescope with an [approximately 6.5 meter](#) primary mirror. The telescope was launched on an Ariane 5 rocket from French Guiana, on December 29, 2021.

Webb will replace the now defunct Hubble Telescope, and be the premier observatory of the next decade, serving thousands of astronomers worldwide. It will study every phase in the history of our Universe, ranging from the first luminous glows after the Big Bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own Solar System.

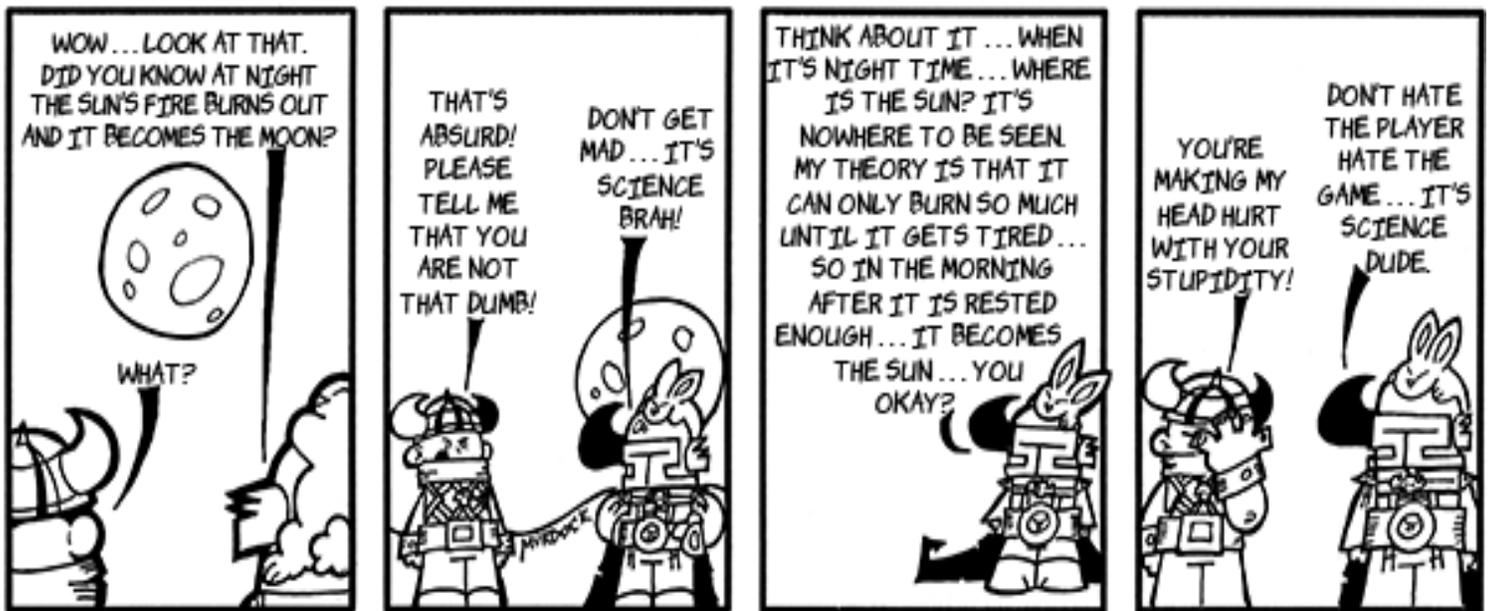
Click on the link above to learn all about NASA's Webb project.

What is “the three-body problem?”

[NASA - 'L2' Will be the James Webb Space Telescope's Home in Space](#)

The term L2 may sound futuristic and mysterious, but the name actually honors a Mathematician born in 1736. The Lagrange points were named after the Italian-born mathematician and astronomer Joseph-Louis Lagrange, who made important contributions to classical and celestial mechanics. Lagrange studied the "three-body problem" (so-called because three bodies are orbiting each other) for the Earth, sun, and moon in 1764, and by 1772 he had found the solution; there are five stable points at which you could put an object and have it stay fixed in place relative to the other two.

In the case of L2, this happens about 930,000 miles away from the Earth in the exact opposite direction from the sun. The Earth, as we know, orbits the sun once every year. Normally, an object almost a million miles farther out from the sun should move more slowly, taking more than a year to complete its orbit around the sun. However, at L2, exactly lined up with both the sun and Earth, **the added gravity of the two large bodies pulling in the same direction gives a spacecraft an extra boost of energy, locking it into perfect unison with the Earth's yearly orbit.** The Webb telescope will be placed slightly off the true balance point, in a gentle orbit around L2.



BRAS subreddit and a Discord server.

Our subreddit has been set up for us to reach out to the public. Please join us on there. <https://www.reddit.com/r/BRAStro/>

Our Discord server is for Members only, and requires the download of a free app. It's a fun place for us to hang out. To join the discord, email safey2007@gmail.com with the subject **BRAS Discord**.

To add a Flair next to your username, PM Amy Northrop.

For Discord help, access **techsupport-faq**, or message Amy or Justin: <https://discord.gg/6N8r8DDj>
It also has voice channels so that you can speak to people through Discord.

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.

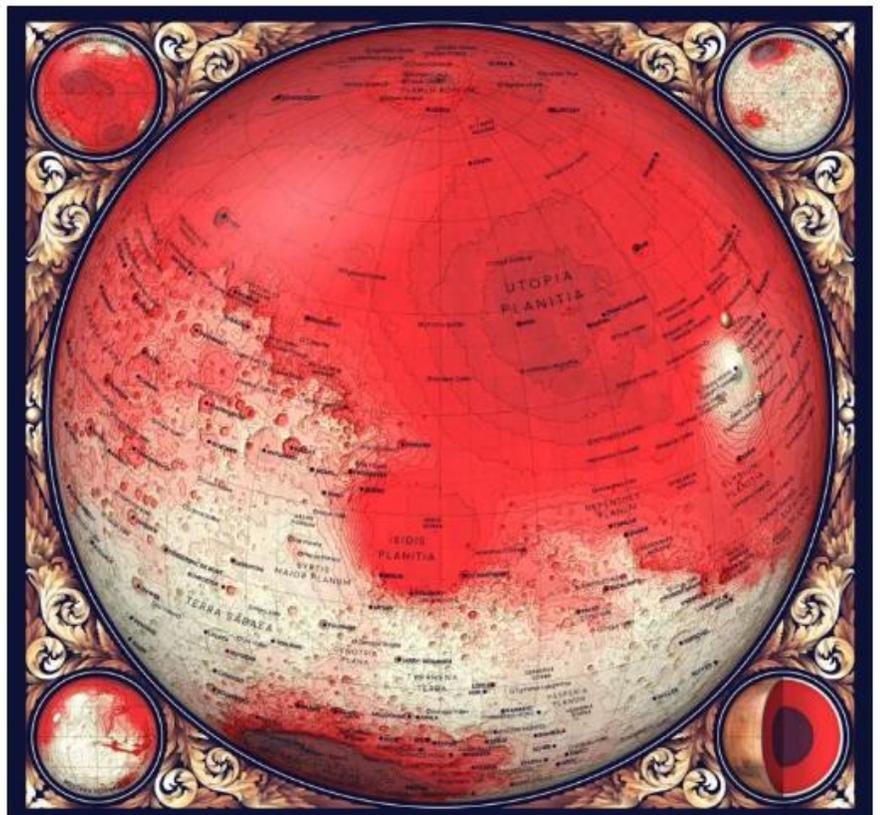
DIY Projects from MAKE MAGAZINE

Projects Archive:

<https://makezine.com/projects/>

This illustration is from a project by Eleanor Lutz called "Atlas of Space"

Here are a few more:



2023 Astronomical League Convention in Baton Rouge!

BRAS has the honor of being the first to host an AL-CON in Louisiana since AL's inception in 1939.

Our theme will be "Astronomical Gumbo"

This theme represents the blend of diverse subfields within the vast field of astronomy. People from all over the globe will be in attendance for the biggest yearly gathering of amateur astronomers in the nation. This convention will offer a large range of benefits not only to BRAS, but to HRPO, other nearby astronomy facilities, and the tourism industry of Baton Rouge. For example, the publicity will bring in many new club members and allow us to reach a much larger audience to share our love of astronomy with. There's not a better time than now to get involved, and lots of help will be necessary to make this event one to remember. Volunteers from all areas of any skill level are welcome to join any of the subcommittees: Scheduling, Finance, Publicity/Communications/Photography, Venue & Housing, Transportation, and Reports.

Next Full committee meeting: TBA

If you would like to attend this meeting, and/or help by working on a subcommittee please send an email to Steven Tilley at steveareno225@gmail.com.

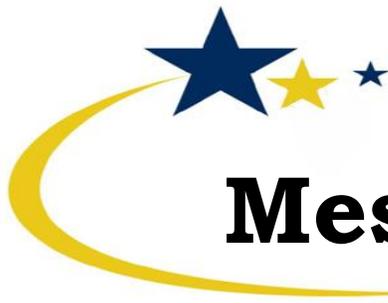
**REGISTRATION FOR
THE 2022 CONVENTION
IN ALBUQUERQUE WILL
BEGIN IN LATE
FEBRUARY.**



ALCON 2022
July 28 – 30
EMBASSY SUITES HOTEL
1000 Woodward Pl. NE
Albuquerque, New Mexico 87102
<https://alcon2022.astroleague.org/>
(Website available by January 14, 2022)



Hosted by:
The Albuquerque Astronomical Society
www.TAAS.org



Messages from HRPO

Highland Road Park Observatory



FRIDAY NIGHT LECTURE SERIES

All start at 7:30pm. All are for ages fourteen and older.

4 February: “Commercial Space Flight” Just as Columbus’ government-funded, history-changing trip opened the way for private ventures, so did NASA for low-Earth orbit journeys! BREC Program Aides Jacob Des Roches and James DeOliveira give a run-down of the companies currently experimenting with short flights, upper-atmosphere hotels and the like!

11 February: “Space Law” As government and commercial manned spaceflight expands, there will be discussion of legal precedents and standards. Loyola Law student Clifford Fields will outline the current state of this new branch of jurisprudence.

18 February: “Atmospheric Phenomena” Sun dogs, dewbows, lunar halos and aurorae. BRAS member and asteroid discoverer Merrill Hess opens the doors to a bizarre and beautiful menagerie of rare sights. [*Postponed from 21 January.*]

25 February: “The Gateway” In March the CAPSTONE will launch, to validate navigation for Gateway’s orbit. Gateway will be the Moon-orbiting outpost for the Artemis Mission!



EVENING SKY VIEWING

No admission fee. For all ages.

Friday (4, 11, 18 and 25 February) from 8:30pm to 10pm

Saturdays (5, 19 and 26 February) from 7:30pm to 10pm

HRPO houses a 50-cm reflector, a 40-cm reflector and several smaller telescopes to bring the majesty of the night sky to the public. Trained operators, sharing duties via a rotating roster, work throughout the year in shifts. Each operator has a pre-planned list of objects to highlight. However, requests will be taken if there is time and if all present have viewed the previous target.



SCIENCE ACADEMY

Saturdays from 10am to 12pm

For ages eight to twelve. \$5/\$6 per child.

5 February = “Dwarf Planets” This new category is fraught with frustration and awe. Cadets will explore the lesser-known objects in our corner of the Galaxy.

12 February = “Soaring on the Space Shuttle I” Cadets have heard the tales of the launch system that brought satellites and experiments into orbit. This is the first in a long series of sessions bringing that glorious time alive, with never-before-seen activities.

26 February = “Computers Through History” Computers have been around a little longer than most Cadets might believe. This session delves into the parameters that make a machine a computer, and the different tasks a computer can perform.



ADULT COURSES

Saturdays from 3:30pm to 7:30pm

Must be eighteen or over to register. \$15/\$18 per registrant.

5 February: Learn Your Telescope This class is a hands-on introduction to the operations of your personal telescope. We'll even take it outside for some practice with the waxing gibbous Moon, weather permitting. Also included will be an overview of all major sky events for the next twelve months. Up to four household members over the age of eight are encouraged to attend, though the registrant for this course must be over eighteen. Please bring all parts and accessories belonging to the telescope, including the instruction manual. *This one-day course focuses specifically on telescopic views of the Baton Rouge sky.*



PLUS NIGHT: “Love Is In The Air”

Saturday 12 February from 7pm to 10pm

For all ages. No admission fee. Binocular recommended.

During Plus Nights and extra features are available to the public...

*The well-known marshmallow roast takes place at the campfire ring (weather-dependng).

*Six to eight of HRPO's collection of over fifty physical science demonstrations will be on hand to perplex and amaze. Which demos will it be?

*An unaided eye sky tour takes place, showing the public major features of the sky for that month.

*Filters are inserted into the viewing mechanisms, to show patrons “hidden” details of the Moon, Mars and Jupiter (when they are available).

*Reveal your age, and be shown any “birth stars” in the sky at that time.



STEM EXPANSION: "Computer Engineering"

Saturday 19 February from 3:30pm to 7:30pm.

For ages twelve to sixteen. \$15/\$18 per kid.

This program offers advanced topics, topic extensions and all-new games and activities to an older crowd. Certificates will be earned, and a section of archived experiments, some not seen in over fifteen years (and some never performed on site) take place.



SOLAR VIEWING

Saturday 26 February from 12pm to 2pm.

For all ages. No admission fee. 200GS Tour at 1pm.

(Solar Viewers, \$2 each. Add-on Activity: \$2.50.)

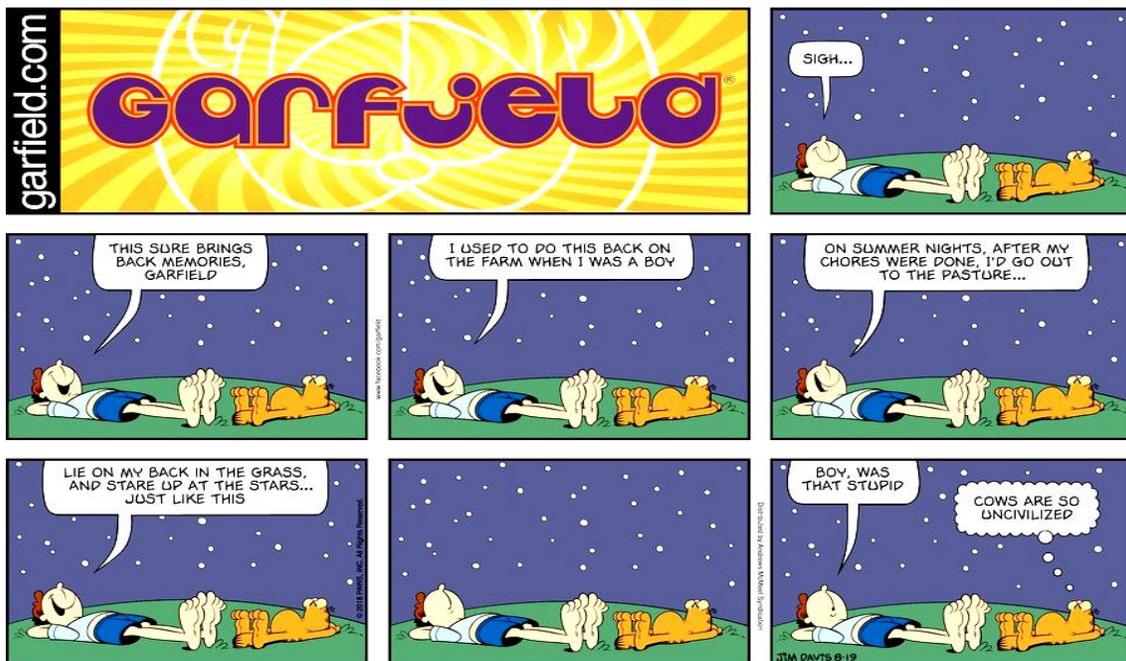
The hobby of astronomy immediately brings to mind thoughts of darkened backyards and dimly-lit nighttime activities at HRPO. But patrons also have the option of visiting during daylight hours to see our parent star.

Weather permitting, once monthly HRPO personnel offers three views of the Sun...

12pm to 12:30pm - indirect projection onto white viewing surface //[Learning Technologies Sunspotter]

12:15pm to 1:15pm - safely-filtered optical light sent through standard telescope [Orion 10" Skyquest Dobsonian Reflector]

12:30pm to 2:00pm - hydrogen-alpha light [Coronado Solar Max II 90mm]





OBSERVING NOTES FEBRUARY

Capricornus The Sea Goat

Position: RA 20 06 to 21 59, Dec-08 40° to -27 69°

Position: RA 22, Dec-30°

Note: For six years I have been writing these Observing Notes, featuring the 62 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. The last of the updates is this month -- February 2022.

Named Stars

Algedi Prima (Alpha¹ Cap), “Prima Giedi,” from the Arabic “al jady,” “the kid,” or “Algedi,” “Goat,” mag. 4.30, 20 17 38.86 -12 30 29.6, is a spectroscopic binary star, and part of an optical binary system with **Alpha² Capricorni**. The primary is a yellow-hued supergiant star with its companion star (B) at magnitude 8.6 at a separation of 0.8.” Also known as **HD 192876, HIP 100027, SAO 163422, Gould 8, and 5 Capricorni**.

Algedi Secundus (Alpha² Cap), “Secundi Giedi,” from the Arabic “al-jady,” “the kid,” mag. 3.58, 20 18 03.22 -12 32 41.5, is a yellow-hued (C) multiple star, paired optically with **Alpha¹ Capricorni**. It has a companion star (D) at magnitude 11.0 at a separation of 6.6” at a PA of 196°. The companion star is also a binary star with its secondary (E) star also at magnitude 11 at a separation of 1.2” at a PA of 245°. Also known as

HD 192947, HIP 100064, SAO 163427, Gould 9, and 6 Capricorni.

Dabih Major (Beta¹ Cap), “The Slaughterer,” from the Arabic “al-dhâbih,” “the butcher,” mag. 3.05, 20 21 00.65 -14 46 53.0, is an orange-hued giant star with three companions. There are two blue-white main sequence dwarf stars of magnitude 7.20. The separation of the primary to the 2nd star is 0.05” with an orbital period of 3.77 years. The third star orbits the second star every 8.7 days. The star **HR 7775** is a 6th magnitude companion at a separation of 3.4’ at a PA of 261°. Also known as **HD 193495, HIP 100495, SAO 163481, Gould 14, and 9 Capricorni**.

Dahib Minor (Beta² Cap), from the Arabic “al-dhâbih,” “the butcher,” mag. 3.05, 20 21 00.65 -14 46 53.0, is a close double star that is a blue-white hued giant or sub-giant star, with a dwarf star companion at a separation of 30 au. **Beta² Capricorni** has an atmosphere unusually rich with mercury and manganese. The separation between **Beta¹ Capricorni** and **Beta² Capricorni** is 3.5.’ The C star is a foreground star 3.7’ to the southeast (magnitude 8.7, **HD 193543**). The secondary star, a spectroscopic binary, has a period of 8.7 days at a separation of 0.1 au. The WDS says that the DE pair of stars has a 4” separation at a PA of 321°. Also known as **HD 193452, HIP 100325, SAO 163471, and Gould 13**.

Nashira (Gamma Cap), from the Arabic “Al Sadal Nashirah,” “She Who Brings Good News,” “The Fortunate One,” “The Bringer of Good Tidings,” “Lucky Star of Nashira,” mag. 3.69, 21 40 05.34 -16 39 44.1, is a blue-white giant star and is a chemically peculiar star with strong magnetic fields. Also known as **HD 206088, HIP 106985, SAO 164560, HR 8278, Gould 110, and 40 Capricorni**.

Deneb Algedi (Delta Cap), from the Arabic “Al Dhanab al-Jady,” “the tail of the goat,” or “the kid’s tail,” also called Sa’ad udh-Dhābih,” “The lucky star of the Slaughter,” also called “Scheddi,” mag. 2.85, 21 47 02.29 -16 07 35.6, is a multi-star system. **Delta Capricorni A** is a giant white star and a spectroscopic binary whose two components are at magnitude 3.2 and 5.2, separated by 0.0018.” The star is also an eclipsing binary with its unseen companion, **Delta Capricorni B**, which orbits every 1.022768 days. There are two other stars that are thought to be part of this system. **Delta Capricorni C**, a 16th magnitude star, is separated from the primary by 1”, while **Delta Capricorni D**, a 13th magnitude star, is separated from the primary by 2”. Also known as **HD 207098**, **HIP 107556**, **SAO 164644**, **Gould 123**, and **49 Capricorni**.

Castra (Epsilon Cap), also called **Kastra**, mag. 4.51, 21 37 04.82 -19 27 57.6, is a triple star system. Also known as **HD 205637**, **HIP 106723**, **SAO 164520**, **Gould 108**, and **39 Capricorni**.

Marakk (Zeta Cap), “loins,” also called **Yen (or Yan) - the Chinese name of an old feudal state**, Mag. 3.77, 21 26 40.03 -22 24 41.0, is a double star composed of a yellow supergiant star and a white dwarf star. The primary is a barium star that is particularly notable for having an overabundance of *praseodymium* (atomic number 59 element). Also known as **HD 204075**, **HIP 105881**, **SAO 190341**, **Gould 93**, and **34 Capricorni**.

Armus (Eta Cap), also called **Zhou or Chow – an old Chinese feudal state**, mag. 4.82, 21 04 24.32 -19 51 17.8. Also known as **HD 200499**, **HIP 104019**, **SAO 189986**, **Gould 68**, **Sh 323**, and **22 Capricorni**.

Dorsum (Theta Cap), “the back of the goat,” also called “Tsin” or **Qin – an old Chinese feudal state**, mag. 4.08, 21 05 56.78 -17 13 57.8, is a white main sequence star. Also known as **HD 200761**, **HIP 104139**, **SAO 164132**, **Gould 70**, and **23 Capricorni**.

Dai (Iota Cap), also called **Tae – an old Chinese feudal state**, mag. 4.27, 21 22 14.78 -16 50 04.4. Also known as **HD 203387**, **HIP 105515**, **SAO 164346**, **Gould 86**, and **32 Capricorni**.

Kuh (Mu Cap), from the Chinese for “weeping,” mag. 5.07, 21 53 17.58 -13 33 06.5, is a suspected variable star. Also known as **HD 207958**, **HIP108036**, **SAO 164713**, **Gould 130**, and **51 Capricorni**.

Alshat (Nu Cap), mag. 4.77, 20 20 39.81 -12 45 32.6. Also known as **HD 193432**, **HIP 100310**, **SAO 163468**, **Gould 12**, and **8 Capricorni**.

Okul (Pi Cap), mag. 5.08, 20 27 19.20 -18 12 42.1, is a double star with the primary blue-white and the secondary at magnitude 8.3 is a white-hued star. Also known as **HD 194636**, **HIP 100881**, **SAO 163592**, **Gould 17**, **β60**, and **10 Capricorni**.

Bos (Rho Cap), mag. 4.77, 20 28 51.62 -17 48 49.2. Also known as **HD 194943**, **HIP 101027**, **SAO 163614**, **Gould 22**, and **11 Capricorni**.

Al Shat (Upsilon A Cap), from the Arabic for “the Sheep,” also called “Loo Sieu” from the Chinese, mag. 5.15, 20 40 02.96 -18 08 19.0, is a binary star. Also known as **HD 196777**, **HIP 101984**, **SAO 163779**, **Gould 41**, and **15 Capricorni**.

Pazhan (Psi Cap), also called the Chinese “Yue,” “Battle Axe,” mag. 4.13, 20 46 05.77 -25 16 13.9, is a rotating variable star. Also known as **HD 197692**, **HIP 102485**, **SAO 189664**, **Gould 47**, and **16 Capricorni**.

Baten Algiedi (Omega Cap), mag. 4.12, 20 51 49.3 -26 55 08.9. Also known as **HD 198542**, **HIP 102978**, **SAO 189781**, **Gould 56**, and **18 Capricorni**.

Tsoo (24 Cap), an old Chinese feudal state, mag. 4.49, 21 07 07.69 -25 00 20.7, is a variable red giant star. Also known as **HD 200914**, **HIP 104234**, **SAO 190025**, **Gould 73**, and **A Capricorni**.

Jin (36 Cap), an old Chinese feudal state, also called **Tsin**, mag. 4.50, 21 28 43.32 -21 48 25.8. Also known as **HD 204381**, **HIP 106039**, **SAO 190374**, **Gould 98**, and **b Capricorni**.

Deep Sky:

M 30 (NGC 7099), “The Jellyfish Cluster”, mag. 6.9, 21 40 22.1 -23 10 47.5, 12” in size, brightest star is magnitude 12.1, is a globular cluster with a medium concentration of stars; bright, large, slightly elongated. **M30** is thought to be extra-galactic in origin – captured by the **Milky Way**. The cluster’s

central density may exceed a million stars per cubic parsec. Such an extremely dense nucleus is indicative of a core collapse. The cluster harbors two populations of blue straggler stars – there are two sequences. One group is red, and the other is bluer, and they form two separate prongs in the

H-R Diagram. The red-blue arm stars are thought to be generated by mass transfer binary stars, and the blue sequence from collisions. There is a centrally concentrated population of low luminosity X-ray sources – the brightest source is thought to be a 10 Km diameter neutron star in a binary system. **M30** is located 3° east-southeast and 0.75° south of **Zeta Capricorni**, or just 25' east-southeast of the star **41 Capricorni**. **HD 206036** (magnitude 8.6) is 6' to the west – it is a dwarf star in the foreground. **M30** is also known as **GCL 122**, **ESO531-SC021**, **Mel 237**, **C2137-234**, and **E2131-234**.

There are no other Deep Sky objects of note above magnitude 10.

Asterisms:

Wei, an old Chinese feudal state, is composed of **Phi** and **Chi Capricornus**.

Tien Luy Ching, “The Heavenly Walled Castle,” is composed of **Lambda Capricorni**, **Xi Aquarii**, and other close by stars.

Deep Sky Objects in Capricornus are as follows: 27 NGC; 21 IC, 46 ESO; 93 MGC; 1 Mrk; 1 HCG; 1 Pal; 1 Ben; 1 Str; 1 PHL; 5 A; 2 AGC; 6 AS; 10 Radio galaxies; 3 Quasars; 7 PGC; 3 h; 3 VV; 2 Voids; 2 Trios; 1 Dwarf galaxy; 1 LPC; and 7 Super clusters of Galaxies for a total of 243.

Other Stars:

HD 192310, mag. 5.73, 20 15 16.58 -27 01 57.1, has two planets in orbit. Also known as **HIP 99825**, **HR 7722**, **SAO 189065**, **Gliese 785**, **CD-27° 14659**, **LHS 488**, **LTT 8009**, and **Gould 5**.

HD 206893, mag. 6.67, 21 45 22.0 -12 47 00, has one planet in orbit. Also known as **HIP 107412**, **SAO 164627**, and **Gould 119**.

HD 204313, mag. 7.99, 21 28 12.21 -21 43 34.5, has three planets in orbit. Also known as **HIP 106006**.

HD 202206, mag. 8.08, 21 14 57.77 -20 47 21.15, has one planet and a brown dwarf star in orbit. Also known as **HIP 104903**.

HD 202772A, mag. 8.32, 21 18 48.0 -26 36 59, has one planet in orbit.

HD 204941, mag. 8.45, 21 32 24 -20 57 27, has one planet in orbit. Also known as **HIP 106353**.

HD 197027, mag. 9.15, 20 41 54.63 -27 12 57.4, is a solar twin. Also known as **HIP 102152**.

STARS of Interest Beyond Magnitude 10:

WASP-111, mag. 10.3, 21 55 04.0 -22 36 45, has one transiting planet in orbit.

HD 193334 (WASP-68), mag. 10.68, 20 20 23.0 -19 18 53, has one transiting planet in orbit.

HATS-3, mag. 11.44, 20 49 50.0 -24 25 44, has one planet in orbit.

LP 816-60, 11.458, 20 52 33.016 -16 58 29.02, is a red dwarf star. Also known as **HIP 103039**.

WASP-89, mag. 13.1, 20 55 36.0 -18 58 16, has one transiting planet.

PSR B2045-16, 20 48 35.45 -16 16 43.0, is a pulsar star.

Stars in Capricornus are as follows: 30 Greek; 51 Numbered; 55 Lettered; 2 Σ; 10 h; 1 AGC; 1 Bar; 1 Hl; 1 Hd; 1 HN; 1 Hn; 2 Ho; 2 Hu; 1 HV; 6 See; 15 β; 2 h; 1 S; 2 Sh; 1 A; 1 CorO; and 4 HD for a total of 196.

Sky Happenings: February 2022

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

Feb. 1st - **New Moon** occurs at 11:46 AM CST (Lunation 1226).

Feb. 2nd - The **Moon** passes 4° south of **Jupiter** at 3 PM CST,
Dusk: In the west-southwest the thin crescent **Moon**, just one day past new, will then be 4° to the lower left of **Jupiter**.

Feb. 3rd - The **Moon** passes 4° south of **Neptune** at 3 PM CST,
Mercury is stationary at 4 PM CST.

Feb. 4th - **Saturn** is in conjunction with the **Sun** at 1 PM CST.

- Feb. 5th** - Asteroid **Massalia** is at opposition at 2 AM CST.
- Feb. 7th** - The **Moon** passes 1.2° south of **Uranus** at 2 PM CST.
- Feb. 8th** - **First Quarter Moon** occurs at 7:50 AM CST,
Dusk: High in the south-southwest the first quarter **Moon** gleams about 6° below the **Pleiades**.
- Feb. 9th** - The **Moon** passes 0.03° north of the dwarf planet **Ceres** at 5 AM CST,
Evening: The **Moon** is between **Aldebaran** and the **Pleiades** in **Taurus**.
- Feb. 10th** - The **Moon** is at apogee (251,591 miles or 404,897 km from **Earth**) at 8:37 PM CST.
- Feb. 11th** - The **Moon** is 1.9° north of **M35** in **Gemini** at about 10 PM CST.
- Feb. 12th** - **Venus** is at greatest brilliancy (magnitude -4.9) at 12 Noon CST,
Venus passes 7° north of **Mars** at 7 PM CST.
- Feb. 13th** - Evening: The waxing gibbous **Moon** visits **Gemini** and lines up with **Castor** and **Pollux**.
- Feb. 16th** - **Full Moon** occurs at 10:56 AM CST,
Mercury is at greatest western elongation (26°) at 3 PM CST,
Dusk: The full **Moon** and **Regulus** rise in tandem in the east in **Leo** with about 5° separation.
- Feb. 18th** - Find a dark viewing spot away from the city lights, face west after sunset, and starting tonight you might spot the soft glow of the zodiacal light. Look for a faint, hazy pyramid of light stretching up through **Taurus** into **Gemini** and beyond. This can be seen for the next two weeks or so.
- Feb. 20th** - The waning gibbous **Moon** is in **Virgo**, trailing **Spica** by about 5.5° as they rise above the east-southeast horizon.
- Feb. 23rd** - **Last Quarter Moon** occurs at 4:32 PM CST.
- Feb. 24th** - Morning: The just-past-last-quarter **Moon** will be some 3° to the left of the **Scorpion's** heart, **Antares**.
- Feb. 26th** - The **Moon** is at perigee (228,533 miles or 367,789 km from **Earth**) at 4:25 PM CST.
- Feb. 27th** - The **Moon** passes 9° south of **Venus** at 12 AM (midnight) CST,
The **Moon** passes 4° south of **Mars** at 3 AM CST,
Dawn: The waning crescent **Moon**, **Mars**, and **Venus** will grace the southeast horizon before day breaks.
- Feb. 28th** - The **Moon** passes 4° south of **Mercury** at 2 PM CST,
The **Moon** passes 4° south of **Saturn** at 6 PM CST.
- Mar. 2nd** - Dawn: A quartet of planets are on the southeastern horizon. **Venus** and **Mars** are separated by about 5° guarding the duo of **Mercury** and **Saturn** – only 1° apart. A half-hour before sunrise **Mercury** and **Saturn** are only 3° high so you will need a clear, unobstructed horizon to see them.
- Mar. 5th** - **Jupiter** is in conjunction with the **Sun** at 8 AM CST.

Planets:

Mercury – **Mercury** can be spotted an hour before sunrise when it will stand 19° east of **Mars** on February 1st, shining at magnitude 1.1. The planet will brighten to magnitude 0.5 by February 5th, when **Mercury**, **Venus**, and **Mars** will be in the morning sky forming a right triangle. **Venus**, at magnitude -4.9, will anchor the group, followed by **Mercury** at magnitude +0.3 and **Mars** at magnitude +1.4. **Mars** will be about 7.5° to the lower right of **Venus**. On the 15th, **Mercury** will reach magnitude 0.0 and will be 14.5° east of **Mars**. On the 16th, **Mercury** will reach greatest western elongation (26°) from the **Sun**. The waning crescent **Moon** will stand 4.5° southeast of **Mars** as day breaks, with **Mercury** (at magnitude -0.1) being 18° east of the **Moon** – **Mercury** will be very low in the southeast in the brightening sky. **Saturn** will be a further 4° east of **Mercury** and will shine at magnitude 0.7. The two planets will stand 2.5° and 4.0° high in the east 30 minutes before sunrise. **Mercury** will be at aphelion on the 28th, standing 6.5° to the upper left of a 27-day-old, very thin waning crescent **Moon**, with **Saturn** 2.8° east of **Mercury**.

Venus – **Venus** will reach greatest brilliancy (at magnitude -4.9) during the first half of February. The planet always reaches its brightest when it is 26% illuminated, which occurs on February 12th. The planet is located among the rich star field of **Sagittarius**. The planet will rise more than two hours before sunup with

the best time to view in the late twilight or even in daylight. On February 1st, the planet will span 49" but it will have a narrow 16% illuminated crescent. During the month, the planet will fatten and shrink in apparent size. By the 13th, it will span 40" and by the 17th its magnitude will drop to -4.8 and another 0.1 magnitude by the end of the month. The disk will span 32" and be 38% illuminated by the end of the month.

Mars – **Mars** starts February 9° southwest of **Venus** with the pair moving across **Sagittarius** together in lockstep. Through a telescope, **Mars** spans only 4" and will begin its slow progress to an end-of-year opposition. By the 12th, the planet will lie 6.6° south of **Venus** with the two planets straddling the **Teaspoon** asterism in eastern **Sagittarius**. They will remain roughly this distance apart as they continue to trek with each other across the starry realm of **Sagittarius**.

Jupiter – **Jupiter** is briefly visible after sunset. On February 1st, the bright planet is hanging 10° high in the western sky an hour after sunset. At magnitude -2.0, it is bright enough to remain easily visible through the first week of February, becoming more difficult to spot as the second week progresses. The 36-hour-old waxing crescent **Moon** will pass 4° south of the planet on the 2nd.

Saturn – **Saturn** is in conjunction with the **Sun** on February 4th. By the end of the month the planet will re-appear near **Mercury** in the morning twilight.

Uranus – **Uranus** is up all evening during February in Aries. The planet will set just after local midnight early in the month and about two hours earlier by the end of the month. At magnitude 5.8, it is just bright enough to spot with the unaided eye. The planet lies about 11° south-southeast of Hamal (Alpha Arietis), and 5.3° north-northwest of Mu Ceti. On the 1st, the planet pairs up with the 6th magnitude star 29 Arietis – separated by only 26' with the planet due south of the star. The planet will continue its easterly trek moving to a point 43' east of 29 Arietis by the 28th. A telescope will show a 3" wide disk.

Neptune – **Neptune** will set three hours after sunset in early February. To spot the planet try as soon as the sky is dark. On the 3rd, the planet will stand 4° due north of the slender crescent **Moon**. The planet will glow at magnitude 7.9 among the stars of eastern **Aquarius**. A telescope will reveal a 6th magnitude star 4° northeast of **Phi Aquarii**. The planet lies only 1.5' due north of this star on the 3rd. The planet will trek to the northeast during the rest of the month and will be overtaken by twilight before month's end. The planet will be in conjunction with the **Sun** on March 13th.

Pluto – **Pluto** will be located at 19 58.0 -22 30 (less than 2° southwest of **M75**) on February 15th, at magnitude 14.8 and an angular size of 0.1".

Moon – **New Moon** will occur on February 1st. On the 7th the **Moon** will pass 1.2° south of **Uranus**. On the 9th, the **Moon** passes 0.03° north of the dwarf planet **Ceres** at 5 AM CST. That evening the **Moon** is between **Aldebaran** (in the **Hyades**) and the **Pleiades**. The **Moon** is at apogee on the 10th. The **Moon** will be 1.9° north of **M35** on the 11th. On the 26th, the **Moon** is at perigee.

There will be two **Lunar Occultations** this month. On February 9th, the dark limb of the 65% illuminated waxing gibbous **Moon** will occult both **Kappa¹** and **Kappa² Tauri**. The pair of stars are separated by 5.7' and shine at magnitudes 4.2 and 5.3, respectively. The event begins around 10:30 PM CST in the middle of **North America** – the timing will vary considerably depending on your location. Far southern **United States** will be excluded from the double occultation, only seeing the occultation of **Kappa¹ Tauri**. The second occultation is on the 22nd as the 66% illuminated waning gibbous **Moon** will occult the double star **Alpha Librae** – known as **Zubenelgenubi**. The double star has a separation of 3.9' and magnitudes of 5.2 (**Alpha¹**) and 2.7 (**Alpha²**). The occultation will be visible across the western three-quarters of **North America** and **Central America**. The occultation will start around 5:45 AM CST with **Alpha¹** and then **Alpha²**. The stars will re-appear around 6:30 AM CST – the exact times will depend on where your location is. For maps and up-to-date times, consult the **International Occult Timing Association's (IOTA)** website at www.lunar-occultations.com/iota/iotandx.htm.

Favorable Librations: **Goddard Crater** on February 5th; **Hubble Crater** on the 7th; **Mare Orientale** on the 18th; and **Carpenter Crater** on the 26th.

Greatest North declination on the 13th (+26.4°)

South declination on the 18th (-26.5°)

Libration in longitude: Eastern limb most exposed on the 5th (+6.6°)

Western limb most exposed on the 18th (-5.0°)

Libration in latitude: North limb most exposed on the 2nd (+6.5°)
 South limb most exposed on the 17th (-6.5°)

Asteroids / Minor Planets Asteroid **1 Ceres** – Ceres positions, according to the *RASC Observer's Handbook, 2022 USA Edition*, are as follows: On February 10th – 03 50.44 +20 17.6, magnitude 8.4 in **Taurus**; and on the 20th – 03 57.78 +21 06.5, magnitude 8.5 in **Taurus**.

Ceres positions, *by my estimates*; are as follows: On February 1st – about 0.5° due east of **14 Taurii**; on the 5th – about 1° east-northeast of **14 Taurii**; on the 10th – about 1.8° northeast of **14 Taurii**; on the 15th – about 2.2° northeast of **14 Taurii**, or about 3.5° northwest of **43 Taurii**; on the 20th – about 3° northwest of **43 Taurii**, or about 1.6° southwest of **37 Taurii**; and on the 25th – about 0.5° southwest of **37 Taurii**.

Asteroid **7 Iris** – Iris's positions, according to the *RASC Observer's Handbook, 2022 USA Edition*, are as follows: On February 10th – 07 13.32 +15 4.7, magnitude 8.5 in **Gemini**; and on the 20th – 07 10.49 +16 02.3, magnitude 8.8 in **Gemini**.

Asteroid **10 Hygiea** – Hygeia's position on February 10th, according to the *RASC Observer's Handbook, 2022 USA Edition*, will be 14 30 -19 12.

Asteroid **20 Massalia** – Massalia's positions, according to the *RASC Observer's Handbook, 2022 USA Edition*, are as follows: On February 10th – 09 08.46 +15 09.1, magnitude 8.6 in **Cancer**; and on the 20th – 08 59.52 +15 51.3, magnitude 9.0 in **Cancer**. Massalia's positions, *by my estimates*, are as follows: On February 2nd – about 0.8° south-southeast of **Pi Cancrri**; on the 4th – about 0.3° southwest of **Pi Cancrri**; on the 6th – about 0.1° due south of **81 Cancrri**; on the 8th – about 0.5° due west of **81 Cancrri**; on the 10th – just under 1° west and a touch north of **81 Cancrri**; on the 14th – about 1.75° east and a touch north of **Omicron Cancrri**; on the 16th – about 1.3° east and a little north of **Omicron Cancrri**; on the 18th - 1° east-northeast of **Omicron Cancrri**; on the 20th – about 0.7° north-northeast of **Omicron Cancrri**; on the 22nd – 0.7° north and a touch east of **Omicron Cancrri**; on the 24th – 0.8° north and a touch west of **Omicron Cancrri**; on the 26th – just under 1° due south of **X (c) Cancrri**; and on the 28th - 1° south and a little west of **X (c) Cancrri**.

Comets – Comet **19P/Borrelly** – Borrelly's positions, by my estimates, are as follows: On February 1st – about 0.6° south and a touch west of **Mu Piscium**; on the 5th – about 2.5° north and a touch west of **Nu Piscium**; on the 10th – 2.7° north and a little east of **Omicron Piscium**; on the 15th – about 6.8° north-northwest of **Xi Ceti**, or about 6.5° south-southeast of **Beta Arietis**, on the 20th – about 2.7° due south of **Theta Arietis**; and on the 25th – about 2° southwest of **Nu Arietis**.

Meteor Showers – There are no Major (Class I) meteor showers active in February.

There is one Minor (Class II) meteor shower active in February – the **Alpha Centaurids**. Active from February 3rd through February 20th, peaks on February 8 with a maximum zenith hourly (mzhr) rate of 6.

There are no Variable (Class III) meteor showers active in February.

There are 6 Weak (Class IV) meteor showers (mzhr <2) active in February: The **Eta Corvids**, active from January 7th through February 5th, peaked on January 21st; the **Alpha Coronae Borealis**, active from January 26th through February 5th, peaked on January 27th; the **Alpha Antliids**, active from January 22nd through February 6th, peaks on February 2nd; the **Theta Centaurid Complex**, active from February 2nd through February 6th, peaks on February 4th; the **Pi Hydriids**, active from February 3rd through February 9th, peaks on February 6th; and the **Gamma Cancrriids**, active from February 11th through February 15th, peaks on February 14th.

When to View the Planets:

Evening Sky

Jupiter (west)
 Uranus (southwest)
 Neptune (west)

Midnight

Uranus (west)

Morning Sky

Mercury (east)
 Venus (southeast)
 Mars (southeast)
 Saturn (east)

Mythology:

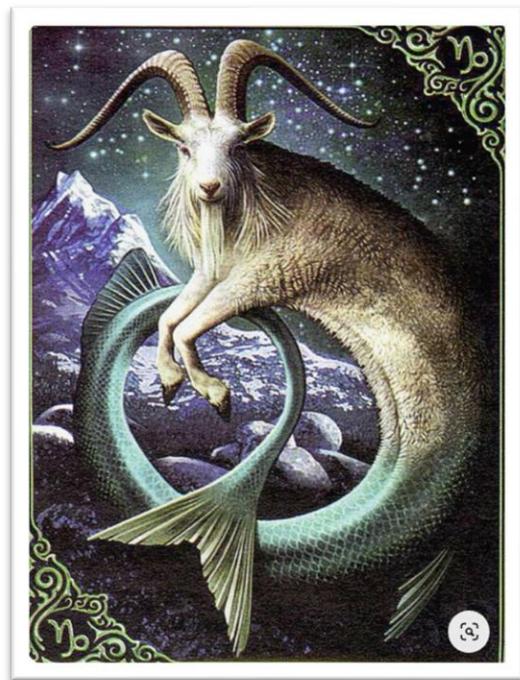
Capricornus – the Sea Goat

Capricornus is an unlikely looking creature, with the head and forelegs of a goat and the tail of a fish. The constellation evidently originated with the Sumerians and Babylonians, who had fondness for amphibious creatures; the ancient Sumerians called it SUHUR-MASH-Ha, the goat-fish. But to the Greeks, who named it Aegoceros (goat-horned), the constellation was identified with Pan, god of the countryside who had the horns and legs of a goat.

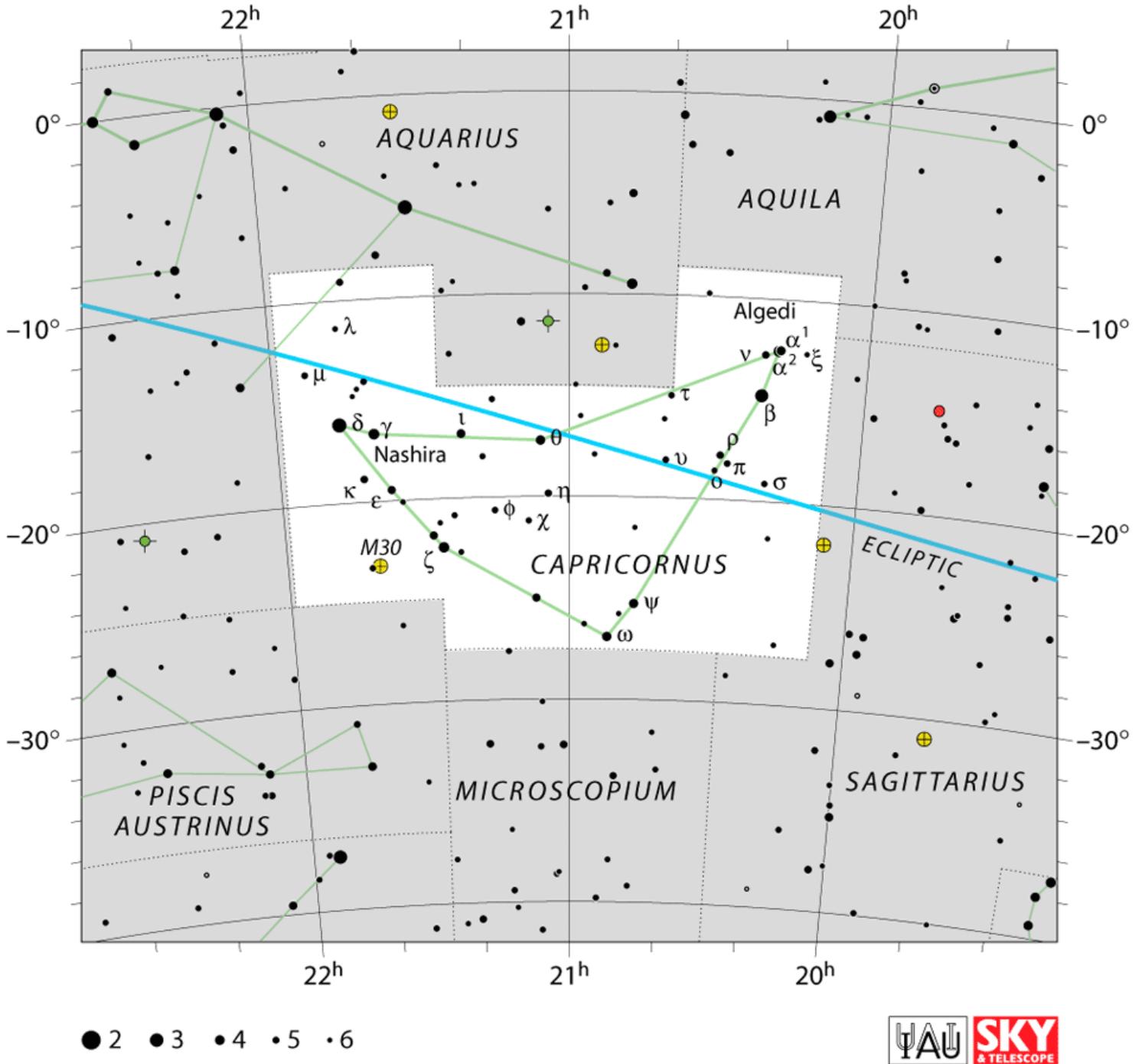
Pan, a playful creature of uncertain parentage, spent much of his time chasing females or sleeping it off with a siesta. He could frighten people with his loud shout, which is the origin of the word “panic.” One of his offspring was Crotus, identified with the constellation Sagittarius. Pan’s attempted seduction of the nymph Syrinx failed when she turned herself into a handful of reeds. As he clutched the reeds the wind blew through them, creating an enchanting sound. Pan selected reeds of different lengths and stuck them together with wax to form the famous pipes of Pan, also called the syrinx.

Pan came to the rescue of the gods on two separate occasions. During the battle of the gods and the Titans, Pan blew on a conch shell to help put the enemy to flight. According to Eratosthenes his connection with the conch shell accounts for his fishy nature in the sky, although Hyginus says somewhat absurdly that it is because he hurled shellfish at the enemy. On a later occasion Pan shouted a warning to the gods that the monster Typhon was approaching, sent by Mother Earth (Gaea) against the gods. At Pan’s suggestion the gods disguised themselves as animals to elude the monster. Pan himself took refuge in a river, turning the lower part of his body into a fish.

Zeus grappled with Typhon, but the monster pulled out the sinews from the hands and feet of Zeus, leaving the god crippled. Hermes and Pan replaced the sinews, allowing Zeus to resume his pursuit of Typhon. Zeus cut down the monster with thunderbolts and finally buried him under Mount Etna in Sicily, which still belches fire from the monster’s breath. In gratitude for these services, Zeus placed the image of Pan in the sky as the constellation Capricornus.



The star Alpha Capricorni is variously called Algedi or Giedi, from the Arabic al-jady meaning “the kid,” the Arabic name for the constellation. Delta Capricorni is called Deneb Algedi, from the Arabic for “the kid’s tail.” The tropic of Capricorn is the latitude on Earth at which the Sun appears overhead at noon on the winter solstice, around December 22nd. In Greek times the Sun was in Capricornus on this date, but the effect of precession means that the Sun is now in Sagittarius at the winter solstice.



The End