Monthly Meeting December 13th at 7:00 PM, in person!

(Monthly meetings are held on 2nd Mondays of the month, at Highland Road Park Observatory)

PRESENTATION: 40th Anniversary of BRAS, pot luck and Christmas Party.
Special guests will include our founding and early club members.

What's In This Issue?

***OBSERVING NOTES* - Sculptor - Apparatus Sculptoris**

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

BRAS YouTube Channel

President's Message

Well here we are again, it's always such a pleasure. At the end of the year, I'll finish my term as club president and I want to start off by thanking you for the opportunity to steer the club for a bit: though it ended up being a bit more complicated than I thought it might be, it was a fun time, and I hope you had a good time too.

So, with that said, we've got a lot going on in December so be sure to check out the newsletter for details. Right off the bat, you'll see that we've finally got the engine running on the old outreach machine: Tuesday nights at Perkins Rowe are back (at least for now) and we've got a host of other opportunities to educate and entertain the community coming up, so take a look and let us know if you can help out.

Our meeting for this month will serve several purposes: first, to see how many more people show up if we promise them food (and, yes, we promise food). This is our **annual pot-luck meeting, so please bring a side dish** with you; we'll provide the main course (should be barbecue of some kind, direct all bribes to Trey Anding if you want something specific). The second, will be to **elect our new slate of officers for the 2022 season**—so far, I only know of one candidate having announced himself, so if you happen to have some free time on your hands, consider throwing your hat in the ring. And finally, we'll be celebrating **BRAS's fortieth anniversary:** John has assured me he has secured us a cake for the occasion, as for what else he has planned, he won't say, other than that we'll have guest speakers. (Craig was good enough to tell us that the club was actually founded in November, but I reminded him that I'm too lazy to throw two club parties back-to-back, so, we'll be celebrating it in December.) This will be one of two events that we've put together for this occasion, the next one will be the Friday after, which will be open to the public, but which we also encourage you to attend—we'll be setting up demos and scopes for the public at HRPO that night, so come help out if you can. As a further reminder, HRPO's annual Geminid Meteor shower event will be happening directly after our December meeting, so I encourage everyone to hang around and watch for meteors with the public.

The moon is out of the way for the month, so this is your monthly reminder to go grab your **Globe at Night observations** to help us out with the light pollution. You've got about two weeks in this window, so get out there and get those numbers.

One last thing, be sure to scan the newsletter to see how you can help out with our **ALCON 2023 planning commission.** We're going to need a lot of help going forward with this, so even if you can't do much, offer to do what you can—they'll let you know what they need.

And that's all I've got.

Scott Cadwallader, President 2021

Merry Christmas

MONTHLY MEETING MINUTES – November 9, 2021

in person at HRPO, live-streamed on YouTube, and remotely via Jitsi

The speaker was Melanie Templet and the topic of her talk was Chaco Canyon. Chaco Canyon is an International dark Sky Park located in New Mexico, and the National Park Service has declared that the sky over Chaco Park to be a natural resource.

- Scott C – Our December general meeting will be our annual pot-luck dinner with officer elections, and the BRAS 40th Anniversary Membership Party. The meeting will be on Monday, December 13th.
- John N. is running for President. BRAS still needs a Vice President and a Secretary.
- Perkins Rowe wants us back with Sidewalk Astronomy. We will have our return on November 16th, with a return to the normal schedule of the Tuesday closest to the First Quarter Moon on December 7th (6-8 PM).
- White Light Night will be on November 19th, and BRAS will be doing public viewing at Circa 1857.
- BREC Farr Park will host BRAS on December 10th from 6 to 8 PM for public viewing.
- Don Weinell is looking for a suitable site for BRAS annual Star Parties.
- There will be an ALCon 2023 Committee meeting on Thursday, November 11th at HRPO from 6 to 9 PM.
- The BRAS 40th Anniversary Public Party will be on Friday, December 17th at HRPO.
- Chris K says there will be a partial eclipse of the Moon (about 97%) on the night of November 18th/19th – HRPO will be open for the public. There will be a + Night on November 27th. The only lecture at HRPO in November is "How To Buy Astronomy Equipment." In January, HRPO will have its annual training courses "Learn to Use Your Binoculars" and "Learn to Use Your Telescope." HRPO needs instructors.
- Scott C – The money BRAS has saved by using Jitzi (a free service) can be used to refurbish a telescope to donate to another library. Motion seconded and passed.
- Craig Brenden – 40 years ago was the first meeting of BRAS.
- Scott C – Thank You Craig for helping found this club. The club is the membership, and the club will follow the membership.
- Scott C. got an AL award.

Meeting was adjourned.

Minutes submitted by Thomas Halligan, Secretary, typed up by John Nagle

Thomas J. Halligan

2021 Officers:

President: Scott Cadwallader
president@brastro.org
VP:
vicepresident@brastro.org
Secretary: Thomas Halligan
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
Merrill Hess
Lightpollution@brastro.org
John Nagle
Newsletter@brastro.org
Michele Fry
Observing@brastro.org
John Nagle
Outreach@brastro.org
Ben Toman
Publicity@brastro.org
Open
Webmaster@brastro.org
Frederick Barnett

Business Meeting Minutes –November 23, 2021

remotely via Jitsi thru November

(meeting is the last Wednesday of the month)

The following items were discussed:

- **BRAS 40th Anniversary** – Two parties (private and public):
  - **Member meeting/pot luck dinner on Monday December 13th** – BRAS will provide BBQ and drinks, John N will arrange for the Anniversary Cake. **The annual elections of Officers** will take place at this meeting. Melanie Templet and Randy McNabb (one of the BRAS founders) will be present, and possibly Walt Cooney (co-discoverer of over 45 asteroids at HRPO).. There will be Geminid meteor viewing after the party.
  - **Public Party will be on Friday December 17th at HRPO**. Melanie, Randy, and possibly Walt will attend and give a short (10 minute) talk. Merrill will be operating the 16" Meade telescope for public viewing. BRAS will offer a 40% discount (in honor of our 40th anniversary) on any new membership if signed up at the party ($12 for primary, $5 for each family member). BRAS will use this party as a membership drive, and will have exhibits/demonstrations/NSN kits, etc.
- **Outreach –**
  - Sidewalk Astronomy at Perkins Rowe will resume its usual schedule on Tuesday December 7th 6 to 8 PM.
  - BREC Farr Equestrian Park for public viewing from 6 to 9 PM on Friday December 10th.
  - The December Mid-City Market is on December 17th.
  - Port Hudson Solar Viewing from 9 to 11 AM on December 17th.
  - BRAS 40th Anniversary Public Party on Friday December 17th.
  - Independence Park viewing on December 18th.
- **Observatory –**
  - Parking lot railing has been repaired.
  - Geminid Meteor Shower coming up in December.
  - EP photography is having problems with the iPhone 13+.
- **ALCon 2023** – The AL President will be in Baton Rouge on December 15, 16, and 17 to review the possible venues for the convention. He might attend the Public 40th Anniversary Party.
- The raffle telescope donation to HRPO (Astronomy Day Raffle) will, with tax, be more than $500. Will get approval at membership meeting/pot luck dinner on December 13th.
- Discussed buying another Library telescope for about $250.
- Discussed a possible small BRAS Observatory at HRPO.
- Sent a message to the WBRPL asking how often the donated telescope is checked out.
- Will send an e-mail to Mr. Hughes (BREC) about HRPO becoming an UDSP.

Minutes submitted by Thomas Halligan, Secretary, typed up by John Nagle

BRAS Outreach Report

Hi Everyone,

Well, it was a slow start to the year, but we are finishing strong! Last month saw the return of Sidewalk Astronomy at Perkins Rowe and we've continued to be present at the Mid City Makers Market where we are very popular. Throw in a couple of Boy Scout outreaches and a few upcoming appearances at some BREC events and you see we've been busy lately.

Even though it was a much slower year than we are used to, we still logged 14 events with the Night Sky Network. By the end of the year, we will have logged 19. Actually, not too shabby considering the circumstances of the past year. Thank you to (and I hope I get all the names!): Chris and Annette R., Chris K., Roz R., Scott C., Coy W., John N., Craig B., Natalia B., James E., and Ben T.
It was a lot of effort in the face of challenging circumstances, but we have continued to be a force for astronomy education in our community. Well done, everyone!!

Ben scaring away the people at Mid City Makers Market

We still have one last Sidewalk Astronomy event at Perkins Rowe and one more Mid City Makers Market. (See below.) If you would like to come out and help at either event, just let me know. You don't have to have a telescope to help out!

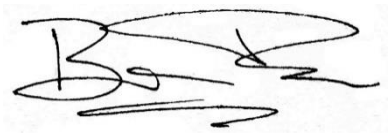
Upcoming Events

Tuesday, December 7th
6pm-9pm
Perkins Rowe Sidewalk Astronomy

Friday, December 10th
6pm-9pm
Farr Park Equestrian Center
Toy Drive/Movie Night

Friday, December 17th
6pm-9pm
Mid City Makers Market Circa 1857 off Government St.

Clear Skies, Ben Toman



L to R: Coy, Ben, John, Scott and Roz pose after a long night of Outreach at Perkins Rowe

2023 Astronomical League Convention in Baton Rouge!

As you may know, Baton Rouge Astronomical Society has been selected to host the 2023 Astronomical League Convention (ALCon 2023); This conference will include lectures, panel discussions, workshops, an exhibition, and astronomy field trips. It will be Wednesday July 26 through Saturday July 29. This event could bring from 250 to 500 people to Baton Rouge. This is an opportunity to bring speakers we always wish for to Baton Rouge.

Subcommittees: We are breaking up the work in small bites so no one will have too much work and one may work with a subcommittee without having to be at the full ALCon 2023 committee meetings.

- Venue & Housing
- Finance
- Publicity/Communications/Photography (this subcommittee will do a lot
- of work needs volunteers)
- Reports
- Scheduling/Speakers

If you would like to help by working on a subcommittee please send an email to Steven Tilley at stevearenо225@gmail.com. *Check calendar below for details on meetings.*

The public is invited to help us celebrate on December 17th, at HRPO, 6 - 10 p.m. (see Page 14)

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:

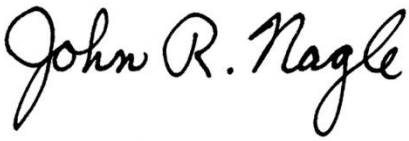
The Albuquerque Astronomical Society
www.TAAS.org

BRAS Light Pollution Committee Report

This committee meets at 6:00, same day as the 7:00 BRAS Business Meeting, the last Wednesday of the month. (This meeting is "in person only". All members are welcome to join.)

- Discussed update for signers of the Light Pollution Petition; posting SQM readings for HRPO and Dark Site on the BRAS LP website; put a brief description of the 7-year plan on the LP page of the BRAS website.
- Update on 7-year plan – Schools on hold, all EBR and Ascension schools have calls completed, will pick up folders and give them to STEM people – offering consultation at each school. Cities are 90 days behind schedule (due to Covid).
- Still awaiting to hear back from BREC (Mr. Hughes) about getting HRPO designated as an "Urban dark Sky Place" by IDA. Will follow up in December with an e-mail and phone call.
- Will use the EBRPL Library Information data Base for contact information on Home Schooling groups to enlist them in the Globe-At-Night program.
- BREC Go Green Committee – discussion of the BREC "Environmental Sustainability Policy." Chris K e-mailed Darryl Hughes about this today. Chris K is doing a formal survey of every luminaire at each BREC facility.
- Need to contact LSU School of Architecture – Landscape Architecture; the local branch of the AIA; various civic groups (Federation of Greater Baton Rouge Civic Associations) Nancy Curry?
- Need an update on the status of the challenge to the project at Bluebonnet and Highland Road.
- Want BRAS volunteers to note any construction projects in the Greater Baton Rouge area and inform the BRAS LP Committee about them.
- University Lake Project – the basic design has been finalized.
- There will be no Natural Sky Conference next year (2022) due to HRPO having its 25th Anniversary then.
- Need to design a form letter and procedure to follow for any new development by the City/Parish.

John Nagle, LPC Chair



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Globe At Night

The target for the Globe at Night program is Perseus from November 25th through December 4th.
If you would like to participate in this citizen science program, you can find instructions at

https://www.globeatnight.org

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

Upcoming BRAS Meetings:

Monthly Member Meeting –

7 pm Monday, December 13th at the Observatory, in person only.

Light Pollution Committee:

6 pm Wednesday, December 29th. (In person only, Open to the public), followed by . . .

Monthly Business Meeting:

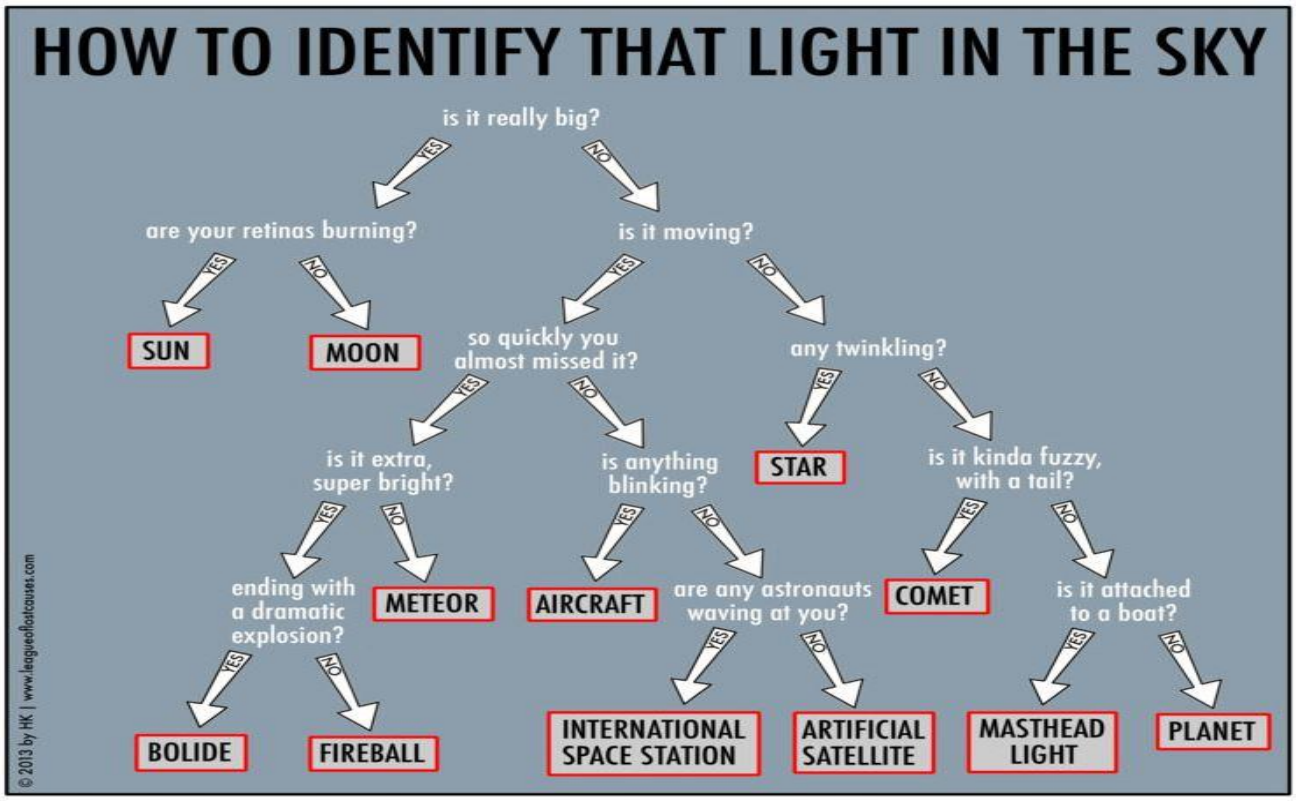
7 pm Wednesday, December 29th, via Jitsi (Members Only)

MOON (Members Only Observing Night)

TBA

ALCon 2023 ("Astronomical Gumbo") Committee Meeting

TBA



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NOTE: Given time constraints December will be my last issue of Flying "Rocks" and "Dirty Snowballs". If you would like to take it over, please e-mail me, Steven M. Tilley, at steveareno225@gmail.com.

Flying "Rocks" and "Dirty Snowballs":

Asteroid and Comet News

December 2021

Volume 3, Issue 11.

JPL Close Approach Data from 2021-Oct-18 to 2021-Nov-12 Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal (LD)	H (mag)	Diameter
(2021 TG14)	2021-Oct-18	0.65	28.2	6.0 m - 13 m
(2021 UT)	2021-Oct-24	0.39	29.3	3.6 m - 8.1 m
(2021 UO1)	2021-Oct-25	0.4	28	6.6 m - 15 m
(2021 UA1)	2021-Oct-25	0.02	31.8	1.1 m - 2.5 m
(2021 UA7)	2021-Oct-27	0.33	28.8	4.7 m - 11 m
(2021 UH1)	2021-Oct-27	0.19	31.7	1.2 m - 2.8 m
(2021 UV5)	2021-Oct-29	0.3	28.8	4.6 m - 10 m
(2021 UT5)	2021-Oct-29	0.8	28.3	5.8 m - 13 m
(2021 UF12)	2021-Oct-29	0.63	29.3	3.7 m - 8.2 m
(2021 UW1)	2021-Oct-30	0.99	26.1	16 m - 35 m
(2021 UJ6)	2021-Oct-31	0.9	28.3	6.0 m - 13 m
(2021 VH)	2021-Nov-01	0.08	29.6	3.2 m - 7.1 m
(2021 UO7)	2021-Nov-04	0.96	29.6	3.3 m - 7.3 m
(2021 VS11)	2021-Nov-07	0.79	28.7	4.9 m - 11 m
(2021 VK3)	2021-Nov-07	0.22	30.5	2.2 m - 4.8 m
(2021 VL3)	2021-Nov-08	0.43	28.4	5.5 m - 12 m
(2021 VN3)	2021-Nov-08	0.36	30.6	2.0 m - 4.6 m
(2021 VM3)	2021-Nov-08	0.79	29.8	2.9 m - 6.5 m
(2021 VD8)	2021-Nov-09	0.32	30.3	2.4 m - 5.3 m
(2021 VP11)	2021-Nov-09	0.15	31.8	1.2 m - 2.6 m
(2021 VU4)	2021-Nov-10	0.28	28.4	5.6 m - 13 m
(2021 VY7)	2021-Nov-11	0.83	29.3	3.6 m - 8.1 m
(2021 VC7)	2021-Nov-12	0.48	28.3	5.9 m - 13 m

As of 2021-09-23 there is:
1,313 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL) (https://cneos.jpl.nasa.gov/sentry/)
2,877 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/giorgjon.htm) (i.e. "A risk-page listing is not a *prediction* of impact")

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)

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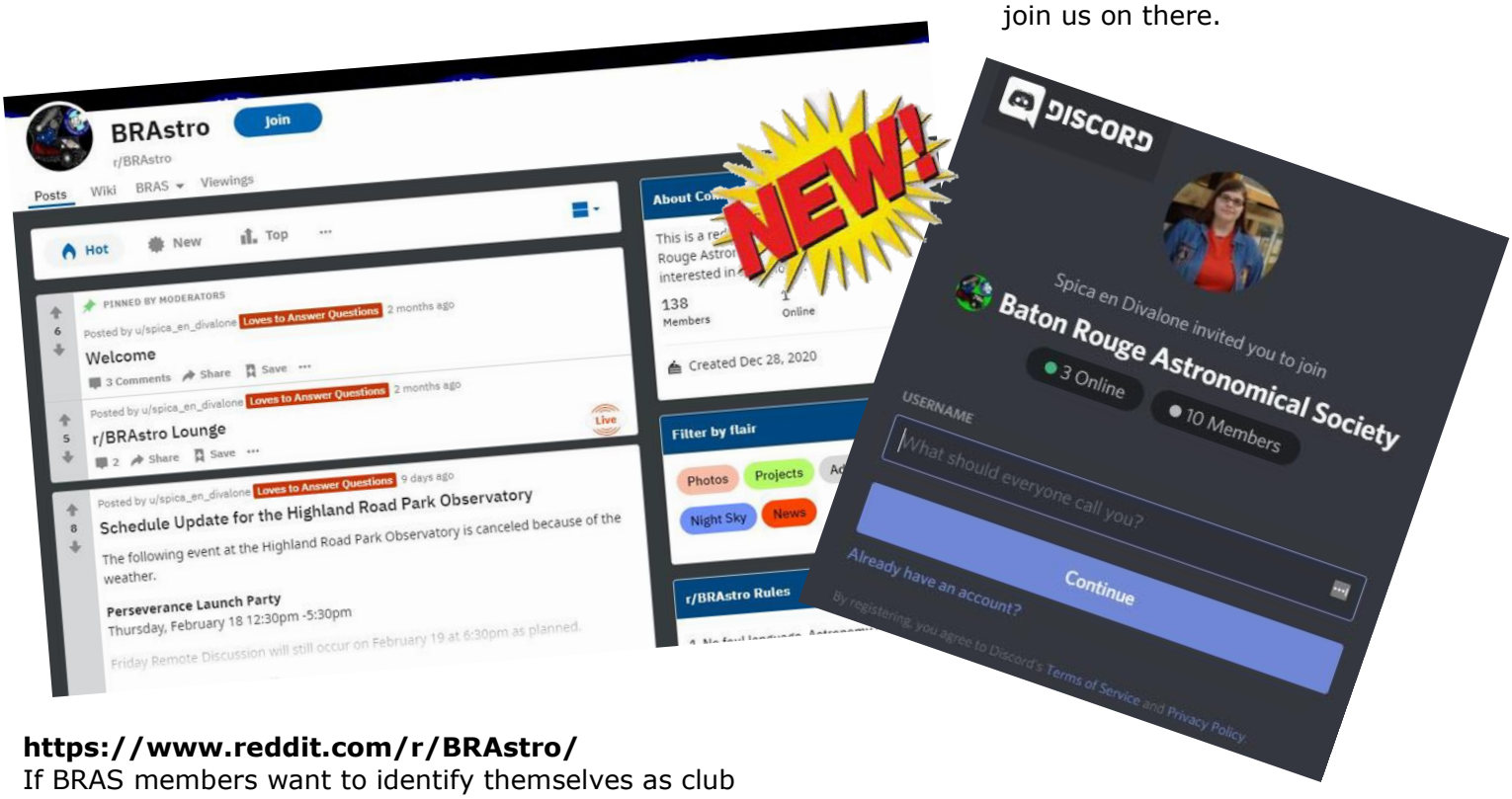
BRAS subreddit and a Discord server.

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



https://www.reddit.com/r/BRAstro/
If BRAS members want to identify themselves as club members, PM me to add a Flair next to your username.

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

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

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

Sincerely,
Amy & Justin Northrop

Messages from HRPO

Highland Road Park Observatory

FREE TO WONDER, FREE TO ASK, FREE TO HEAR, FREE TO DECIDE

Wednesday 1 December to Wednesday 29 December

This display has drawn enough attention to warrant a month-long extension! As it moves to the south side of the main floor, this display will receive an addition explaining real-life situations concerning those challenges to free thought and free speech in STEM-field studies.

FRIDAY NIGHT LECTURE SERIES

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

3 December: "Let There Be Good Lighting" There is a wealth of clusters, nebulae, comets and galaxies above Baton Rouge every night of the year. Our families, kids and students can see most of them—if only we would eliminate a majority of the light pollution in town. Let us show you how!

10 December: "Ten Years of Heavenly Events" A quarter-century of public service is only the beginning! This checklist of bright comets, close asteroids, meteor showers, eclipses and transits will have you and yours returning again and again to the facility that broke the mold in professional-grade admission-free viewing.

EVENING SKY VIEWING

No admission fee. For all ages.

Friday (3 and 10 December) from 8:30pm to 10pm

Saturdays (4 and 11 December) 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.

4 December = "Historic Experiments III" **Priestley… Ohm … Faraday**. The sweet chemical and electrical truths of the Universe hold sway! Cadets will understand the power.
18 December = "Hidden Physics of Baton Rouge" From chemical plants to water flow to amusement parks to broadcasting, our hometown is an experience in the basic rules of the natural world! Cadets will unlock the STEM faces of the Red Stick.

SOLAR VIEWING

Saturday 11 December from 12pm to 2pm.
For all ages. No admission fee. 20OGS 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]

STEM EXPANSION

Saturday 11 December 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.

GEMINID METEOR SHOWER

Monday 13 December from 9pm to 1am / No admission fee. For all ages.

The Geminid meteors, in addition to being part of one of the most reliable showers of the year, are quite intriguing and were first noticed in the 1860s. For this *one* night the public is welcome to join us for sky viewing. Due to the light pollution problem here in East Baton Rouge Parish, it is feasible to attempt viewing of this major shower only during its peak time. The waxing gibbous Moon will be up. Patrons *must* follow the rules and regulations below if they expect to stay on park property.

BATON ROUGE ASTRONOMICAL SOCIETY
FORTIETH ANNIVERSARY PARTY

Friday 17 December from 6pm to 10pm
No admission fee. For ages eight and older.

The club that has introduced thousands to the pleasures of skygazing—while helping them save thousands of dollars in expenses—is four decades old. Come celebrate!
*Viewing of the waxing crescent Moon, Jupiter, Saturn, Uranus, Neptune, Ceres, Pallas, Sirius, Betelgeuse, the Pleiades, the Hyades, the Orion Nebula, the Andromeda Galaxy, the Perseus Double Cluster, Albireo, Upsilon Cassiopeiae, Delphinus the Dolphin and the "Kids" of Auriga will take place (weather permitting).
*Physical science demonstrations, Quest Game for kids to earn prize, food and more!
*Special Wormhole and Rocket Range rewards.
*The Meade DS-16 "Big Blue" will have its final light!
*Predicted Russian rocket body pass!
*BRAS will offer a discount on any in-person new memberships.

WINTER SPACE EXPLORATION CAMP

Monday 27 December and Tuesday 28 December (8am to 5pm daily)
**for Explorers ages 9 to 13*
**$55 per in-parish Explorer / *$66 per out-of-parish Explorer*

Explorers will build and fly a single-stage chemical rocket, while learning about the upcoming missions to the Moon and Mars, and the latest news about the brightening comet! All materials are supplied; Explorers will need a sack lunch and drink that does not require refrigeration. Explorers will also need to bring a hat and sunscreen. Parents may register in person at the HRPO or online at Webtrac (the activity number is 531180).

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OBSERVING NOTES NOVEMBER

Sculptor - Apparatus Sculptoris

Position: RA 23 06 to 01 45, Dec-24.8° to -39.4

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

Cocibolca (HD 4208), from the Nahuati language for "Lake Nicaragua", mag. 7.79, 00 44 26.65 -26 30 56.4, is a yellow main sequence dwarf star that has one planet in orbit at about 1.66 au and has an orbital period of 2.28 years. Also known as **HIP 3479**, **BD-27° 233**, **GJ 9024**, **SAO 166526**, and **LTT 410**.

Deep Sky:

Blanco 1, mag. 4.5, 00 04 24 -29 56 24, 70' in size, 30 stars, is an open cluster; detached, no concentration of stars; moderate range in brightness. Also known as **Zeta Sculptoris Cluster**, **EQ 0001-302**, and **C 0001-302**

NGC 253, "Silver Dollar Galaxy", mag. 7.0, 00 47 36 -25 18, 27.5'x6.8' in size, is an extremely bright, extremely large, and very elongated galaxy; has complex dust lanes; extremely small, bright nucleus. Discovered in 1783 by Caroline Herschel. It is a strong radio source, and it can be seen with binoculars. Located 7.5° south of **Beta Ceti**, or 4.8° north-northwest of **Alpha Sculptoris**, and 1.8° northwest of **NGC 288**. Also known as "**Sculptor Galaxy**," "**Silver Coin Galaxy**," **ESO 474-029**, **H5-01**, **UGCA 13**, **MCG-4-03-009**, **PKS 0045-25**, **Bennett 4**, **Caldwell 65**, and **IRAS 00450-2533**.

NGC 288, mag. 7.2, 00 52 48 -26 35, 13.8' in size, is a globular cluster with a low concentration of stars (a star poor halo); large, bright, slightly elongated. It is located 1.8° southeast of **NGC 253**, and 3.1° north-northwest of **Alpha Sculptoris**. The **South Galactic Pole** is 37' to the south-southwest. Also known as **ESO 474 SC37**, **H6-20**, **Mel 3**, **Bennett 5**, **EQ 0050-268**, and **C 0050-268**.

NGC 55, the "Southern Whale Galaxy", mag. 7.9, 00 14 54 -39 11, 31.2'x5.9' in size, is a very bright, very large, and very elongated galaxy. It is a barred spiral galaxy seen almost edge on and is the brightest member of the **Sculptor Galaxy Group**. Located 3.7° north-northwest of **Ankaa** (Alpha **Phoenices**). The eastern part is sometimes called **IC 1537**. Also known as "**The Southern Cigar Galaxy**," "**The String of Pearls Galaxy**," **Dunlop 507**, **ESO 293-050**, **MCG-7-01-013**, **PKS 0012-394**, **Caldwell 72**, **PGC 1014**, **Bennett 1**, and **IRAS 00125-3928**.

NGC 300, "The Southern Pinwheel", mag. 8.1, 00 54 54 -37 41, 19.3'x13.3' in size, is a very bright, very large, and elongated S-shaped galaxy; contains dark lanes; bright, extremely small nucleus; a member of the **Sculptor Galaxy Group**. It has an X-ray source at its core, designated **NGC 300 X-1**, with the source believed to be a Wolf-Rayet-Black Hole binary system. It is located 7.2° northeast of **Ankaa** (**Alpha Phoenices)**, also it is gravitationally bound to **NGC 55**. Also known as **ESO 295-020**, **PGC 3238**, **MCG-6-03-005**, **Bennett 6**, **Caldwell 70**, and **IRAS 00525-3757**.

NGC 7793, mag. 9.1, 23 57 48 -32 36, 9.6'x6.4' in size, is a galaxy that is comet like; very small, very bright nucleus; it has an 8'x4' halo. There is a chain of galaxies in the background. Also known as **ESO 349-012**, **MCG-6-01-009**, **PGC 7513**, **Bennett 130**, and **IRAS 23552-3252**.
Sculptor Dwarf Galaxy, "Sculptor System," mag. 9.51, 01 01 10.66 -33 35 34.5, 1.1'x0.9' in size, is a dwarf spheroidal galaxy, a satellite of the **Milky Way** galaxy. It contains only 4% of the carbon and other heavy elements that the **Milky Way** has, making it look similar to primitive galaxies seen at the edge of the universe. Also known as **Scl DEG**, **ESO 351-030**, **MCG-6-03-015**, and **PGC 3589**.

Objects of interest that are beyond magnitude 10:

NGC 613, mag. 10.1, 01 34 18 -29 25, 5.2'x4.3' in size, is a very bright, very large, and elongated galaxy; small, extremely bright nucleus with a dark lane. Also known as **ESO 413-011**, **H1-281**, **VV824**, **MCG-5-04-044**, **PKS 0131-296**, and **IRAS 01319-2940**.
NGC 134, "The Giant Squid Galaxy", mag. 10.4, 00 30 24 -33 15, 8.4'x1.8' in size, is a very bright, large, and elongated galaxy; nearly edge on; very small, bright nucleus with dark lanes. Paired with **NGC 131** (9.4' to the west, 0.5° southeast of **Eta Sculptoris**). Also known as **ESO 350-023**, **MCG-6-02-012**, and **IRAS 00278-3331**.
Cartwheel Galaxy, mag. 15.2, 00 37 42 -33 43, 72"x54" in size (a ring galaxy). Also known as **ESO 350-040**, **MCG-6-02-022A**, **PGC 2248**, **VV 784**, and **IRAS 00352-3359**.
Sculptor Dwarf Irregular Galaxy, "Scl DIG," mag. 15.66, 00 09 20 -34 27 21, 72'x57' in size. Also known as **ESO 349-031**, and **PGC 00621**.
2MASX J00482185-2507365, mag. 16.5, 00 48 21.859 -25 07 36.53, is an occulting pair of overlapping spiral galaxies. Also known as **PGC 198197**.
Haro II, mag. 17.2, 00 36 52.7 -33 33 17.2, is a starburst galaxy that is 60,000 light years in size. Also known as **ESO 350 IG038**, **PGC 2204**, and **AM0034-334**.
Comet Galaxy, mag. 18.7, 23 51 44.03 -26 03 59.6. Also known as **IC 3418**, **LEDA 3234374**, and **VCC 1217**.
AGC 2744, "Pandora's Cluster", mag. 19.18, 00 14 19.51 -30 23, is a giant galaxy cluster in which the gas is so hot that it shines in X-rays. Dark matter makes up around 75% of the cluster's mass. It shows a radio halo and contains at least 4 galaxies.
H2356-309, 23 59 00.7 -30 37 40.57, is a Blazer.
Klemola 44, 23 44 59 -28 24 10, is a galaxy group that has at least 30 galaxies in it.
Sculptor Group of Galaxies, it includes **NGC 253**, **300**, **7739**, **NGC 247** in **Cetus**, possibly **NGC 45**, plus other galaxies.
Sculptor Void, 23 48 -24 29, is a void in the north side of the spiral disk of **NGC 247**(in **Cetus**), that is a companion to **NGC 253**(in **Sculptor**). Located in the **Sculptor Filament** of the **Sculptor Galaxy Group** next to the **Southern Wall** (or **Great Southern Wall**).
Sculptor Wall, it is a superstructure of galaxies. Also known as **Sculptor Superclusters**, **Southern Wall**, **Great Southern Wall**, and **Southern Great Wall**.
South Galactic Pole, the **South Galactic Pole** is located south and a little west of **NGC 288** (37' to the south-southwest).

Objects in Sculptor: 65 NGC; 26 IC; 206 MCG; 1 CGCG (C); 175 ESO; 12 AGC; 15 AGCS; 6 Radio Galaxies; 5 Quasars; 4 Str; 6 Bennett; 14 PGC; 5 Herschel; 3 Caldwell; 8 VV; 7 Ring Galaxies; 1 UKS; 1 Mel; 1 Klemola; 2 Al; 1 Dunlop; 1 Best; 1 ASz; 1 Blanco; 1 Blazer; 1 Haro; and 1 2MASX for a total of 580.

Other Stars

Alpha Scl, mag. 4.30, 00 58 36.35 -29 21 26.9, is a blue-white giant star and a helium weak star that rotates very slowly. It can generate a huge stellar magnetic field and can even flip its magnetic pole. Also known as **HD 5737**, **HIP 4577**, **HR 280**, **Gould 92**, and **SAO 166716**.
Beta Scl, mag. 4.38, 23 32 58.19 -37 49 06.1, is a blue-white sub-giant star, a mercury-manganese star with a strong magnetic field. Also known as **HD 221507**, **HIP 11623**, **HR 8937**, **Gould 16**, and **SAO 214615**.

Epsilon Scl, mag. 5.29, 01 45 38.65 -25 03 08.8, is a multi-star system. The primary is a yellow-white sub-giant star, and the first companion is a magnitude 8.6 yellow dwarf star. Both stars orbit their common center of mass every 1200 years. There are two more companions in the system – one, at 15th magnitude, has a separation from the main pair of stars by 15", and the second, an 11th magnitude star, has a separation of 142" from the main pair. Around the year 2090, the **Epsilon Sculptoris** system will have moved into the **Fornax** constellation. Also known as **HD 10830**, **HIP 8209**, **HR 514**, **Gould 131**, **h 3461**, and **SAO 167275**.
Kappa Scl, is two systems separated by 0.53° in the sky. **Kappa¹ Sculptoris**, mag. 5.42, 00 09 21.02 -27 59 16.5, is itself a triple star system composed of a binary pair of yellow giant stars at magnitudes 6.2 and 6.3, and a 18th magnitude companion separated by 70" from the main pair. **Kappa² Sculptoris**, mag. 5.41, 00 11 34.42 -27 47 59.2, is a binary star consisting of an orange giant star and a 21st magnitude companion separated by 46". Also known as: **Kappa¹ Scl** – **HD 493**, **HIP 761**, **HR 24**, **Gould 51**, **ADS 111**, and **SAO 166083**; **Kappa ² Scl** – **HD 720**, **HIP 930**, **HR 34**, **Gould 52**, and **SAO 166103**.
Lambda Scl, is another star system with two separate systems. **Lambda¹ Sculptoris**, mag. 6.05, 00 42 42.89 -38 27 48.5, is a binary system with the primary star a blue-white main sequence dwarf star at magnitude 6.7, and the companion star a magnitude 7.0 white star. **Lambda² Sculptoris**, mag. 5.90, 00 44 11.92 -38 25 19.1, is an orange giant star. Also known as: Kappa¹ Scl – **HD 4065**, **HIP 3356**, **HR 185**, **Gould 83**, **Hd 182**, and **SAO 192690**; **Lambda² Scl** – **HD 4211**, **HIP 3456**, **HR 195**, **Gould 84**, and **SAO 192703**.
R Sculptoris, mag. 5.72, 01 26 58.10 -32 33 35.2, is a red giant star in the final stage of its existence. It is notable for the unusual spiral structure in the material surrounding it. There is a suspected unseen binary companion toward which is throwing off its gas. Also known as **HD 8879**, **HIP 6759**, **Gould 113**, and **SAO 193122**.
HD 4113, mag. 7.91, 00 49 12.60 -37 58 57.5, is a yellow dwarf star with one planet in orbit with an orbital period of 526.62 days. Also known as **HIP 3391**.
HD 9578, mag. 8.20, 01 33 17.14 -38 14 42.1, is a yellow main sequence dwarf star with one planet in orbit with an orbital period of 494 days. Also known as **HIP 7240**.
WASP-8, mag. 9.89, 23 59 36.07 -35 01 52.9, is a yellow main sequence dwarf star with one transiting planet, orbital period of 8.16 days.

Stars of interest beyond magnitude 10:

WASP-173A, mag. 11.3, 23 36 40.0 -34 36 41, has one transiting planet in orbit.
TOI-178a, mag. 11.95, 00 29 12.3 -30 27 13.46, is a main sequence star with six planets in a chain of Laplace resonances. The b planet has an orbital period of 1.914 days; c planet orbital period 3.238 days; d planet orbital period 6.557 days; e planet orbital period 9.961 days; f planet orbital period 15.231 days; and the g planet orbital period 20.709 days. The resonances for the orbital periods are 2:4:6:9:12. The resonances for orbits are 18:9:6:4:3 – the b planet is in a 3.5 resonance with planet c. Also known as **TYC 6991-00475-1**.
CD-38 245, mag. 12.0, 00 46 36.19 -37 39 33.6, is a very metal poor star. Also known as **HIP 3635**.
WASP-45, mag. 12.0, 00 20 57.0 -35 59 53.8, has one transiting planet in orbit.
WD 0137-349, mag. 15.33, 01 39 42.85 -34 42 39.3, is a white dwarf star with a brown dwarf star companion.

Stars in Sculptor: 46 Lettered; 23 HR; 19 Greek; 17 h; 5 β; 2 Lal; 8 I; 2 Arg; 1 HdO; 1 Stone; 4 B; 1 Str; 3 Howe; 3 See; 1 Numbered; 1 Dunlop; and 1 Gleise, for a total of 138.

Sky Happenings: December 2021

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

Dec. 1st - **Neptune** is stationary at 4 PM CST,
Dusk: **Jupiter**, **Saturn**, and **Venus** form a line above the south-southwest horizon. You can enjoy this view all month.
Dec. 2nd - The **Moon** passes 0.7° north of **Mars** at 6 PM CST.
Dec. 4th - **New Moon** occurs at 1:43 AM CST,
The **Moon** is at perigee (221,702 miles or 356,794 km from **Earth**) at 4:04 AM CST, a total solar eclipse will be visible for part of the **South Pole**.

Dec. 6th - **The Moon** passes 1.9° south of **Venus** at 7 PM CST**.**
Dec. 7th - The **Moon** passes 4° south of **Saturn** at 8 PM CST.
Dec. 9th - The **Moon** passes 4° south of **Jupiter** at 12 AM CST (midnight).
Dec. 10th - The **Moon** passes 0.5° north of asteroid **2 Pallas** at 7 AM CST,
Asteroid **Nysa** is at opposition at 8 AM CST,
Double shadow transit of **Jupiter** starts at 4:13 PM CST,
The **Moon** passes 4° south of **Neptune** at 7 PM CST,
First Quarter Moon occurs at 7:36 PM CST.
Dec. 14th - **Geminid Meteor Shower** peaks at 1 AM CST, with the waxing gibbous **Moon** setting about 3 AM local time.
Dec. 15th - The **Moon** passes 1.5° south of **Uranus** at 12 AM CST (midnight).
Dec. 16th - Evening: High in the southeast the nearly full **Moon** (in **Taurus**) is bracketed by the **Pleiades** and the **Hyades**.
Dec. 17th - The **Moon** is at apogee (252,475 miles or 406,320 km from **Earth**) at 8:15 PM CST.
Dec. 18th - **Venus** is stationary at 5 AM CST,
Full Moon occurs at 10:35 PM CST.
Dec. 19th - The **Moon** is 1.8° north of M35 at 8 AM CST.
Dec. 21st - Dawn: In the west the waning gibbous **Moon** is just under 3° from **Pollux**, in **Gemini**.
Dec. 22nd - Dawn: The **Moon**, now in **Cancer**, is 3° to the upper right of the **Beehive Cluster** (**M44**), high in the west-southwest,
Ursid Meteor Shower peaks at 10 AM CST.
Dec. 26th - **Mars** passes 5° north of **Antares** at 12 PM (Noon),
Last Quarter Moon occurs at 8:24 PM CST.
Dec. 28th - Dawn: The waning crescent **Moon** shepherds **Spica**, in **Virgo**, as they climb 4.5° apart in the south-southeast in the brightening twilight,
Mercury passes 4° south of **Venus** at 7 PM CST.
Dec. 29th - Dusk: In the southwest after sunset, tiny **Mercury** and the blazing **Venus** are low above the horizon.
Dec. 31st - Dawn: The slender lunar crescent, **Mars**, and **Antares** are arranged in an equilateral triangle in the southeast,
The **Moon** passes 0.9° south of **Mars** at 2 PM CST.

Planets:

Mercury – Mercury is reappearing out of the **Sun's** glare (after its conjunction with the **Sun** on November 29th) in the evening late in December. On December 26th, it is less than 6° below **Venus**. On the 28th, they are 4° apart, with **Mercury** shining at -0.8 magnitude. By New Year's Eve, **Mercury** will stand 1° higher than **Venus** 45 minutes after sunset.

Venus – Venus is the first planet to appear after sunset, hanging low in the southwest. The planet will reach greatest brilliancy on December 4th – shining at magnitude -4.9 in eastern **Sagittarius**. On the 6th, the planet is joined by the waxing crescent **Moon** – less than 3° apart. In mid-month, the planet approaches the **Capricornus** border, and comet **C/2021 A1** (**Leonard**) might be visible nearby if it reaches magnitude 5 or better. On the 17th, **Leonard** will stand 5° below the planet. On the 18th, the planet at a 30° elongation, will stop its easterly movement just short of the **Capricornus** border and will sink back into twilight. On the 1st, the planet will show a 28% lit crescent spanning 39". The disk will grow to 61" by the 31st, but will shrink to 2% lit. The planet is approaching inferior conjunction on January 9th, 2022. On the 1st, the planet will set about 3 hours after the **Sun**, and by the 31st the planet sets a little more than 1 hour after the **Sun**.

Mars – Mars reappears in the morning sky in **Libra**, and will cross into **Scorpius** at mid-month, and will then move into **Ophiuchus** on December 25th when it will shine at magnitude 1.6 less than 5° north of **Antares** (magnitude 1.1). The planet will rise nearly 2 hours before the **Sun**, low in the southeast as twilight begins. On the 31st, a waning crescent **Moon** will be within 4° of the planet and **Antares**.

Jupiter – Jupiter will start December in the eastern part of **Capricornus**, about 16.5° east of **Saturn**, where it will shine at magnitude -2.3. The planet will dim 0.1 magnitude and then cross into **Aquarius** on the 14th.

The waxing **Moon** will stand below the planet on the 8th, and the planet will stand 10° west of the **Moon** on the 9th. The planet's 37" diameter disk will look best as twilight descends and for the 1st hour or so after dark. By the end of the month, the planet will dip below 20° above the horizon around 7 PM local time and will set by 9 PM. There will be one double shadow transit of **Jupiter** on December 10th. **Callisto** starts transit at 1:03 AM CST and will exit transit at 4:38 AM CST. **Callisto's** shadow starts transit at 12:11 PM CST, with **Europa** starting transit at 1:43 PM CST. **Europa's** shadow will start transit at 4:13 PM CST, with **Callisto's** shadow exiting transit at 4:16 PM CST. NOTE: The double shadows will be visible for only 3 minutes! **Europa** will exit transit at 4:33 PM CST, and its shadow will exit transit at 7 PM CST.

Saturn – Saturn, on December 1st, will be 18° from **Venus**, shining in the southwest sky at magnitude 0.6. The closest approach of the two planets is on the 16th, when they will be separated by 14°. **Saturn** will remain in **Capricornus** all month. The best telescopic views are during the first half of the month, when the planet remains above about 20° altitude for up to one hour after twilight ends. In late December, the planet is too low for good viewing. The planet's disk spans 16", with the long axis of its rings spanning 35" at a tilt of 19° to our line of sight. **Titan** will shine at magnitude 8. The planet will set shortly after 7 PM local time on the 31st.

Uranus – Uranus will stand high in the sky against the backdrop of **Aries** every evening and will set in the early morning hours. The planet lies about 11° southeast of **Hamal** (**Alpha Arietis**). The planet will shine at magnitude 5.7. On the 14th, the planet is about 3° northeast of the gibbous **Moon**. The planet spans 4" with a distinctive greenish-blue hue.

Neptune – Neptune is a binocular object shining at magnitude 7.8 for most of December in **Aquarius**. On the 1st, high in the southern sky the planet will remain visible all evening until it drops very low after 11 PM local time. The planet is 3° northeast of the 4th magnitude star **Phi Aquarii** on the 1st and is at its stationary point – it will barely move all month. The planet will stand 4.5° north of the **First Quarter Moon** on the 10th. The planet's disk spans only 2", and high magnification on a night of steady seeing will reveal its bluish-green disk.

Sun – The **Winter Solstice** will occur on December 21st at 10 AM CST.

Moon – The **Moon**, on December 6th, is about 2.5° to the lower left of **Venus**. On the 18th, the **Moon** is full at 10:35 PM CST, just 27 hours after apogee (the second most distant apogee of the year). On the 23rd, the waxing gibbous **Moon** rises about 4.5° to the above left of **Regulus**. **Eta Leonis** will be occulted, for central **United States**, but it's re-emergence from the **Moon's** dark limb will occur around 9:48 PM CST. On the 31st, there will be a pretty conjunction at dawn – the **Moon**, **Mars**, and **Antares** will form a symmetrical triangle in the southeast during the morning twilight, with the thin lunar crescent about 3.5° from **Mars** and about 3° from **Antares**.

Favorable Librations: **Bouvard R Crater** on December 1st; **Zeno Crater** on December 7th; **Lashakidze Crater** on December 10th; and **Graff Crater** on December 26th.

Greatest North Declination on the 20th (+26.3°)

Greatest South Declination on the 6th (-26.3°)

Libration in Longitude: East Limb most exposed on the 11th (+7.9°)
West Limb most exposed on the 27th (-7.1°)

Libration in Latitude: North Limb most exposed on the 10th (+6.8°)
South Limb most exposed on the 24th (-6.7°)

Asteroids / Minor Planets

Asteroid **1 Ceres** – **Ceres** positions, according to the ***RASC Observers Handbook***, ***2021 USA Edition***, are as follows: On December 2nd – 04 09.89 +16 43.8, at magnitude 7.1 in **Taurus**; on the 12th – 04 00.27 +17 01.8, at magnitude7.3 in **Taurus**; on the 22nd -p 03 52.14 +17 19.9, at magnitude 7.5 in **Taurus**; and on January 1st – 03 46.28 +17 43.6, at magnitude 7.7 in **Taurus**. **Ceres** positions, ***by my estimates***, are as follows: On December 1st – about 2.7° west-northwest of **Gamma Tauri**; on the 5th – about 3.7° west-northwest of **Gamma Taurii**; on the 10th – about 4.7° west and a little north of **Gamma Tauri**; on the 15th – about 5.7° west and a little north of **Gamma Tauri**; on the 20th – about 6.7° west and a little north of **Gamma Tauri**; on the 25th – about 7.6° west and a little north of **Gamma Taurii**; and on the 30th – about 8.3° west-northwest of **Gamma Taurii**.

Asteroid **2 Pallas** – **Pallas's** positions, according to the ***RASC Observers Handbook***, ***2021 USA Edition***, are

as follows: On December 2nd – 22 55.12 -12 16.8, at magnitude 9.8 in **Aquarius**; on the 12th – 23 02.11 -12 24.6 at magnitude 9.9 in **Aquarius**; and on the 22nd – 23 10.58 -12 18.7, at magnitude 9.9 in **Aquarius**.

Asteroid **44 Nysa** – **Nysa's** positions, according to the ***RASC Observers Handbook***, **2021 USA Edition**, are as follows: On December 2nd – 05 20.54 +17 26.2, at magnitude 9.3 in **Taurus**; on the 12th – 05 10.23 +17 25.2, at magnitude 9.1 in **Taurus**; on the 22nd – 04 59.96 +17 30.4, at magnitude 9.3 in **Taurus**; and on January 1st, 2022 – 04 51.35 +17 42.8, at magnitude 9.5 in **Taurus**.

Minor Planet **Pluto** – On December 15th – 19 48 30 -22 42, about 4' west of **HD 187333** in **Sagittarius**.

Comets **–** Comet **4P/Faye** – **Faye**, a morning comet that will have its closest approach to **Earth** (0.94 au) on December 5th, according ***to ALPO***, will be at the following positions: On December 10th – 06 49 36 +07 16, at magnitude 11.5 in **Monoceros**; on the 20th – 06 46 12 +07 05, at magnitude 11.9 in **Monoceros**; and on the 30th – 06 34 00 +07 19, at magnitude 12.3 in **Monoceros**.

Comet **6P/d'Arrest** – **d'Arrest**, an evening comet, according to ***ALPO***, will be at following positions: On December 10th – 22 57 24 -25 24, at magnitude 10.7 in **Piscis Austrinus**; on the 20th – 22 25 24 -22 46, at magnitude 11.3 in **Piscis Austrinus**; and on the 30th – 22 51 24 -20 01, at magnitude 11.9 in **Piscis Austrinus**.

Comet **8P/Tuttle** – **Tuttle**, a morning comet whose return in 2048 will have a very close approach to **Earth** (0.17 au), according to ***ALPO***, will be at the following positions: On November 10th – 14 50 12 -50 56, at magnitude 12.7 in **Lupus**; on the 20th – 15 22 18 -52 12, at magnitude 13.4 in **Lupus**; and on the 30th – 15 52 00 -53 07, at magnitude 13.9 in **Norma**.

Comet **19P/Borrelly** – **Borelly's** next return will be in 2028 with its closest approach to **Earth** at 0.41 au and will have a perihelion of 1.31 au, its current appearance will have its closest approach to **Earth** on December 11th at 1.47 au. **Borelly's** positions, according to ***ALPO***, will be as follows: On December 10th – 23 39 18 -32 49, at magnitude 9.9 in **Sculptor**; on the 20th – 22 55 48 -26 27, at magnitude 9.5 in **Sculptor**; and on the 30th – 00 14 12 -19 38, at magnitude 9.3 in **Sculptor**.

Comet **67P/Churyumov-Gerasimenko** – **67P**, a morning comet, according to ***ALPO***, will be at the following positions: On December 10th – 08 58 48 +27 12, at magnitude 8.9 in **Cancer**; on the 20th – 09 03 48 +27 43, at magnitude 9.0 in **Cancer**; and on the 30th – 09 01 48 +28 19, at magnitude 9.2 in **Cancer**.

Comet **104P/Kowal** – **Kowal,** an evening comet, will reach perihelion on January 11, 2022 at a distance of 1.07 au, and will have its closest approach to **Earth** on January 28, 2022 at a distance of 0.64 au. **Kowal's** positions, according to ***ALPO*** are as follows: On December 10th – 22 55 06 -09 06, at magnitude 11.3 in **Aquarius**; on the 20th – 23 24 42 -07 36, at magnitude 10.9 in **Aquarius**; and on the 30th – 23 59 00 -05 38, at magnitude 10.6 in **Aquarius.**

Comet **C/2019 L3 (ATLAS)** – **L3**, a morning comet that will reach perihelion on January 9th 2022 at a distance of 3.57 au, according to ***ALPO***, will be at the following positions: On December 10th – 07 33 42 +36 23, at magnitude 10.2 in **Lynx**; on the 20th – 07 24 48 +34 57, at magnitude 10.1 in **Gemini**; and on the 30th – 07 14 42 +33 18, at magnitude 10.0 in **Gemini**.

Comet **C/2021 A1 (Leonard)** – **Leonard**, a morning comet that will reach perihelion on January 3rd , 2022 at a distance of 0.62 au, and its closest approach to **Earth** is on December 12th at a distance of 0.233 au, according to ***ALPO***, will be at the following positions: On December 10th – 15 49 18 +12 10, at magnitude 6.6 in **Serpens Caput**; on the 20th – 20 14 00 -29 06, at magnitude 7.0 in **Sagittarius**; and on the 30th – 21 28 36 -35 02, at magnitude 8.1 in **Piscis Austrinus**. **Leonard's** positions, ***by my estimates***, are as follows : On December 1st – On the border of **Canes Venatici** and **Coma Berenices**, about 6.2° northwest of **M3**; on the 2nd – about 2.8° northwest of **M3**; on the 3rd – at **M3**; on the 4th – about 1.5° southeast of **M3**, just over the border into **Boötes** , or about 1° west of **9 Boötis**; on the 5th – about 1.7° northwest of **d Boötis**, or about 5° north of **Arcturus**; on the 6th – about 5.2° north and a little east of **Arcturus**; on the 7th - 6° northeast of **Arcturus**; on the 8th – about 4° northeast of **Omicron Boötis**; on the 9th – about 1° northwest of **Tau Serpentis**; on the 10th – about 2° east and a little south of **Chi Serpentis**, or about 5° north and a little east of **Epsilon Serpentis Caput**; on the 12th – about 4° north-northeast of **M10**; on the 17th – at dusk 5° below **Venus**. After December 12th, it will be low in the southwest sky after sundown. On December 12th and 13th, the comet will move over 10° from **Ophiuchus**

into **Sagittarius**. At the month's end, the comet will be in **Pisces Austrinus**. **Leonard** had its aphelion about 35,000 years ago at about 3,500 au distance, and once it leaves the inner system on this appearance, it will not return for another 35,000 years.

Meteor Showers – There are two **Major** (**Class I**) **Meteor Showers** active in December. The **Leonids**, active from November 3rd through December 2nd, peaks on November 18th with a maximum zenith hourly rate (mzhr) of 10; and the **Geminids**, active from November 13th through December 22nd, peaks on December 14th with a mzhr of 120.

There are 8 **Minor** (**Class II) Meteor Showers** active in December. The **Southern Taurids**, active from September 22nd through December 2nd, peaked on November 5th; the **Northern Taurids**, active from October 13th through December 2nd, peaked on November 12th; the **November Orionids**, active from November 13th through December 12th, peaked on November 30th; the **Sigma Hydrids**, active from November 22nd through December 26, peaks on December 7th with a mzhr of 3; the **Puppids/Velids**, active from December 1st through December 15, peaks on December 7th with a mzhr of 10; the **Monocerotids**, active from November 17th through December 26th, peaks on December 11th with a mzhr of 2; and the **December Leonis Minorids**, active from November 22nd through February 10th, peaks on December 20th with a mzhr of 5; and the **Coma Berenicids**, active from December 12th through December 23rd, peaks on December 15th with a mzhr of 5.

There is two **Variable** (**Class III**) **Meteor Showers** active in December. The **December Phoenicids,** active from December 4th through December 6th, peaks on December 5th; and the **Volantids**, active from December 27th through January 4th.

There are 14 **Weak** (**Class IV**) **Meteor Showers** active in November, all having a mzhr of <2.
The **Andromedids**, active from October 24th through December 2nd, peaked on November 6th; the **Omicron Eridanids**, active from October 23rd through December 2nd , peaked on November 13th; the **November Sigma Ursae Majorids**, active from November 17th through December 2nd, peaked on November 24th; the **Theta Pyxidids**, active from November 27th through December 7th, peaks on December 1st; the **Southern Chi Orionids**, active from November 12th through December 21st, peaks on December 2nd; the **December Kappa Draconids**, active from November 29th through December 9th, peaks on December 3rd; the **Psi Ursae Majorids**, active from November 27th through December 12th, peaks on December 4th; the **December Phi Cassiopeiids**, active from November 28th through December 10th, peaks on December 4th; the **December Rho Virginids**, active from November 27th through December 26th, peaks on December 5th; the **December Alpha Draconids**, active from November 30th through December 15th, peaks on December 8th; **December Chi Virginids**, active from December 2nd through December 26th, peaks on December 12th; the **Eta Hydrids**, active from November 22nd through December 31st, peaks on December 13th; and the **December Sigma Virginids**, active from November 22nd through January 25th, peaks on December 21st; and the **c Velids**, active from December 26th through December 31st, peaks on December 28th.

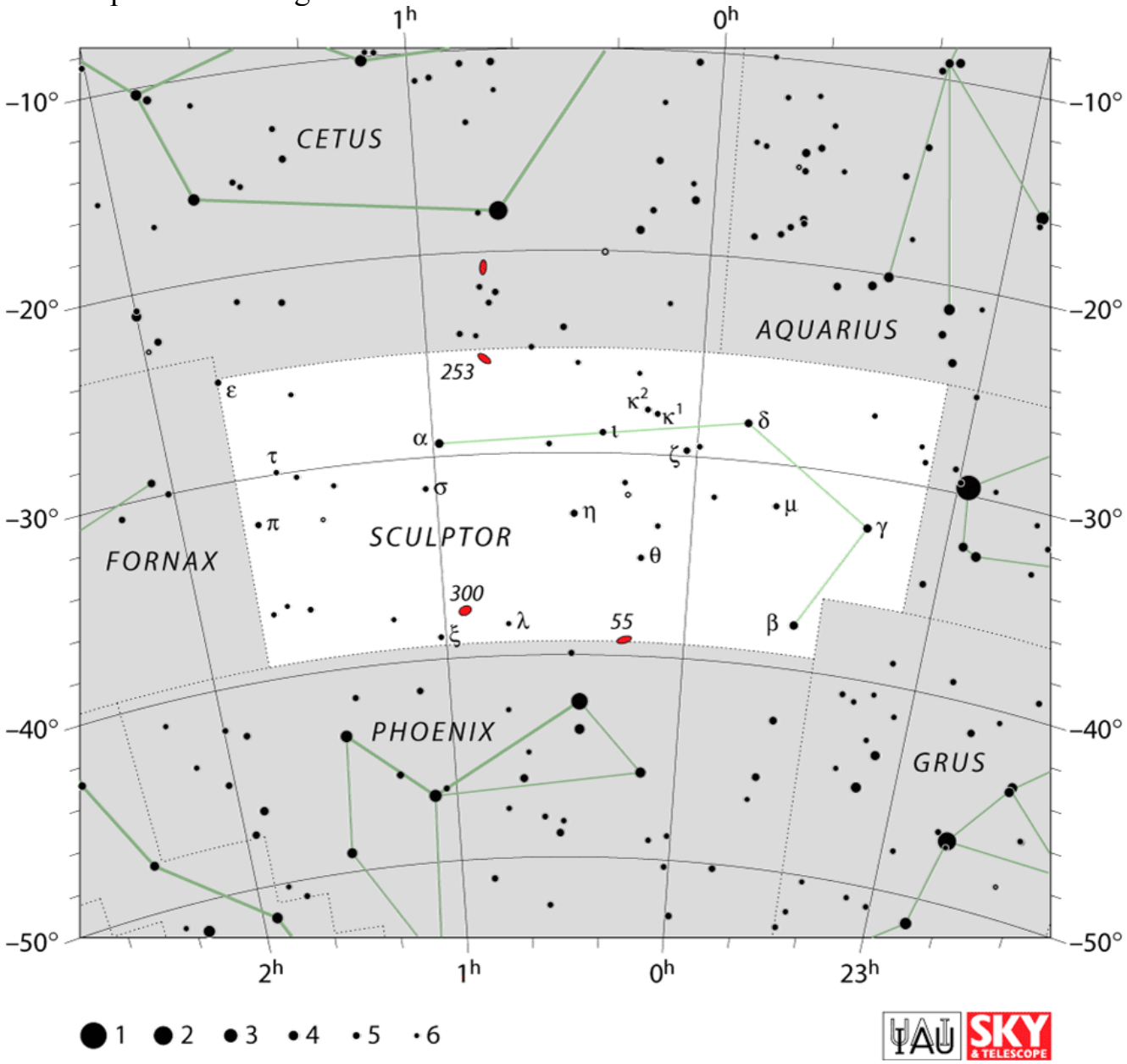
When to View the Planets:

Evening Sky		**Midnight**		**Morning Sky**	
Mercury	**(southwest)**	**Uranus**	**(west)**	**Mars**	**(southeast)**
Venus	**(southwest)**				
Jupiter	**(south)**				
Saturn	**(southwest)**				
Uranus	**(east)**				
Neptune	**(south)**				

Mythology:

Sculptor – The Sculptor

A faint constellation south of Cetus and Aquarius was invented by the French astronomer Nicolas Louis de Lacille during his mapping of the southern skies in 1751-52. Its original name was Apparatus Sculptoris and has since been shortened to Sculptor. Sculptor represents a sculptor's studio, complete with a fine marble head on a platform and a mallet and chisel. The stars of Sculptor are 4th magnitude and fainter.



The End