



Night Visions



December 2017 Issue

Newsletter of the Baton Rouge Astronomical Society

Christmas Party Pot-Luck Monday, December 11th at 7PM at HRPO

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

Club provides the meat and drinks. Everyone who wishes to share, please bring a dish. Go ahead and wear your electric tie, Santa hat, elf shoes, whatever. Just come. Family members welcome.

What's In This Issue?

President's Message

Secretary's Summary

Outreach Report

Light Pollution Committee Report

Recent Forum Entries

20/20 Vision Campaign

Messages from the HRPO

Friday Night Lecture Series

Globe at Night

HRPO 20th Anniversary

Adult Astronomy Courses



Observing Notes – Fornax – The Furnace & Mythology

**Like this newsletter? See past issues back to 2009 at
<http://brastro.org/newsletters.html>**

President's Message

Well, here it is, the end of my 2-year term as President of BRAS. I feel that I have done a good job, and have helped improve and expand BRAS.

HRPO celebrates its 20th Anniversary on Friday, December 29th. Hope to see all of you there to support the Observatory and all it does for BRAS and the public.

Modifications to the telescope from AL are going slow due to hard to find material required. BRAS will keep you informed as to its progress.

BRAS is back in full swing for our Sidewalk Astronomy outreach. On November 28th we held the third outreach for the season. Watch for announcements of future outreaches in the Night Visions, and come out to support BRAS.

Our first interstellar visitor, now leaving our system, has been named 1I/'Oumuamua. For more information, see this month's Observing Notes/Comets, which I will continue to contribute.

Chris Kersey and I, at the Burbank Soccer Field Complex on Monday, November 20th for the twilight triple conjunction (it was a wash due to cloud coverage), saw what may be classified as a "**Light Pillar**", along with 40 to 50 LSU astronomy students, and a HRPO Galactic Cadet and his mother. HRPO got some calls about it the next day by other people who had seen it too. Light Pillars are not normally seen this far south, so its appearance is rare for us.

The December BRAS meeting is our annual Pot-Luck dinner and I hope you all come. The meeting is also when we elect new officers, with the added bonus of voting to approve new/revised By-Laws. Offices up for election (due to term limits) are President, Vice-President, and Secretary, with the Chairperson of the Light Pollution Committee (LPC) also open for appointment by the new President. All BRAS members have been mailed a copy of the proposed revised By-Laws, so you know the duties involved for each office. We want "new blood", with new and fresh ideas, to move BRAS forward. In the past, it has been the same small group of people who have swapped jobs back and forth because no one would volunteer. I want to see some different people step up to the challenge of steering BRAS's future. Think hard about what you want BRAS to become, and volunteer to bring it about.

In closing, I want to thank the membership for giving me the opportunity to serve and lead BRAS for the last two years. It has been an experience I will not forget, and am grateful to have had. I especially thank my wife Michele for supporting me through all my time spent away from home at meetings and outreach events and the countless hours I spend absorbed in researching my Observing Notes; also a huge thanks to her for stepping up as editor of our newsletter, Night Visions. She has done an excellent job and I hope she will continue to do this for our club. Thank you one and all.

Clear Skies, and Happy Holidays to everyone.

John R. Nagle

John R. Nagle
Outgoing President of BRAS, and Observing Chairperson



Secretary's Summary of October Meeting

John Nagle (President) opens the meeting- 26 people in attendance

- ✦ Scott Cadwallader earned the Lunar Observing award
- ✦ John talked about the bylaws and upcoming club elections
- ✦ We received an outreach kit from LIGO for evaluation
- ✦ Report that the Maker Faire was yet again a successful endeavor
- ✦ The HRPO still needs more donations in order to reach its goal to purchase spectrograph equipment
- ✦ Chris Kersey talked about the upcoming Natural Sky Conference and upcoming outreach events at the HRPO
- ✦ Merrill Hess and Craig Brenden talked about the Deep South Star Gaze
- ✦ The money to purchase IAD raffle prizes for the HRPO was voted on and approved
- ✦ Guest speaker, club member Connor Matherne, gave his presentation on geology and how it relates to astronomy
- ✦ Raffle held
- ✦ Meeting adjourned

Ben Toman, BRAS Secretary (For all the good I'm worth!)



Hi Everyone,

Another year down, and it was a busy one! We're back on the scene with Sidewalk Astronomy and it's been a big hit. We also hit up several BREC events around town including showings at the HRPO, Farr Equestrian Center, Bluebonnet Swamp and Nature Center and the Baton Rouge Zoo. Throw in a school outing or two, a few Scouting events, the Maker Faire at the Main Library and even an appearance at a Military camp and you can see we've been making the rounds.

How do we do all this? With the help of volunteers like you. Yes, you! If you've ever wanted to give back to the community, what better way to do it than by helping to educate people about a topic you already love?! We're going to have many great opportunities coming up, too.

"But Ben, I don't even own a telescope," you may say. Let me tell you, a bunch of our outreach events won't even require a telescope. Also, we're working on having some scopes available for use at outreach events. With a short training session, you'll be ready to show people the universe if you want.

We've made huge strides this year keeping up with the Night Sky Network. Because of that, we've received yet another Outreach Toolkit from them and we have qualified for another. The latest kit we received is called Our Galaxy, Our Universe and deals with scale distances in our universe. Add that to our Explore the Solar System, Our Magnetic Sun and Space Rocks (thanks Shane and Krista Dison for molding the scale model asteroids for the kit!) kits and we've got a nice little arsenal of outreach at our fingertips.

You don't have to be any kind of expert to help out with this stuff. The fact you are a member of this club means you already have what we need the most...interest in astronomy! Your interest in astronomy will rub off on other people at these outreach events. And like I've said before, you'd be amazed at how much you can learn yourself just by showing up to help out. (Every time I do an outreach event with Chris Raby, I think I learn at least 4 new things about the universe. The man is an encyclopedia!!)

Thank you to all of our outstanding volunteers. Without you, we wouldn't have the growing presence in our community (or our non-profit status!)

Now is the time to enlist in our ranks of volunteers. We have a few events in the somewhat near future and a couple on the horizon that I'll mention in the next month or so. As always, if you would like to help out, please let me know ASAP. Sometimes I'm waiting to hear from members before I can even confirm with the requesting party that we will do their event. If there's anything I hate more than having to cancel an event due to weather, it's having to say we can't help out at all because no one has responded to our request for volunteers. It would be nice to get some more new faces in our ranks to help take some of the pressure off the same people that help out at every event. Yours could be that face!

Upcoming Outreach:

Thursday, December 21st

4:30pm-6:30pm

City-Brooks Community Park

(If you can help, we'll get the details for you!)

Tuesday, December 26th

6:30pm-8:30pm

Sidewalk Astronomy

Perkins Rowe Shopping Center

(Yes, it's right after Christmas. I say let's celebrate together with the 1st Quarter Moon!)

Thursday, January 18th

6pm-8:30pm

Shaw Center (Roof Top Terrace)

(Telescope viewing to piggyback again on an art lecture. It was fun last time!)

Friday, February 2nd

6pm-8:30pm

Louisiana Key Academy on Government Street (charter school for dyslexic children)

Family Astronomy Night

(They are asking for telescope observing, but if we want to set up some of our demos, that would be great, too. It will be based on how many volunteers we can get.)

Clear Skies,



Ben Toman
Outreach Coordinator





BRAS Light Pollution Committee Report

This committee now meets at 5:45, same day as the 6:30 BRAS Business Meeting (which takes place on the Wednesday before the Monthly Meeting)

Everyone is welcome to join in.

Thomas calls meeting to order.

One new member, with 5 members in attendance.

Previous meeting's minutes were read.

Old Business

- Globe at Night has had only 36 measurements reported for the year 2017, all taken within a 50 mile radius of the observatory – our goal was to report 100 measurements for the year.
- Awaiting photos for the Good Lighting Award candidate Sam's Club at Denham Springs. New candidates proposed: Rouse's Market on Airline Highway; and Peak Performance on Claycut at Old Jefferson Highway.
- Still no response from the city of St. Gabriel, we will be moving on to other cities/towns – Zachary, Central, and Prarieville among those proposed.
- Natural Sky Conference on Friday, November 17th has enough volunteers.
- Discussed requirements for the Good Lighting Award. Requirements to be refined and added to the Dark Sky website (link on BRASTRO.ORG).
- Requirements, in general, are: 1. Color Temperature of lights; 2. Proper aim of lights; and 3. Properly shielded lights. These requirements were voted on and accepted, with the refinement and specifics to be completed in a written policy.



New Business

- Dark Sky web pages to be updated with current information.
- Minutes read and approved.
- Meeting adjourned.

Submitted by John R. Nagle, Acting LPC Secretary for this meeting

2017 Officers:

President: John Nagle
 Vice-President: Craig Brenden
 Secretary: Ben Toman
 Treasurer: Trey Anding

BRAS Liaison for BREC:

Chris Kersey

BRAS Liaison for LSU:

Greg Guzik

Committees/Coordinators:

Outreach:

Ben Toman

Observing:

John Nagle

Light Pollution:

Thomas Halligan

Webmaster:

Frederick Barnett

Newsletter:

Michele Fry

*LPC makes this "wish upon a star" -
 that in future our kids will be able to see
 the night sky in all its glory.*





Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum. There are also nine active polls. The Forum has reached 5000 posts.

[James Bridenstine](#) Nominated to be NASA Administrator

[New Measurement Toolkit](#) Developed by Former LIGO Employee

[Light Pillar](#) Confuses and Astonishes Local Citizens

Local School Acquires [Near-Antique Telescope](#)

[Request for Dark Skies](#) in Local Area

[Moon-Neptune Conjunction](#) on 30 October

[JPSS-1](#) Launched

[Iridium Flare Viewing](#) to Come to End Soon

[Moon-Mercury-Saturn Conjunction](#) Completely Clouded Out

[Standard Time](#) Returns

[G1 Conditions](#) Predicted for 29 November





20/20 Vision Campaign *9 to 18 December Pegasus*

RX Leporis

Magnitude Range: 5.4 to 7.4 Period: 75 days Class: K
Dates: 11 December to 9 March

T Monocerotis

Magnitude Range: 5.6 to 6.6 Period: 27 days Class: G
Dates: 14 December to 12 April

S Leporis

Magnitude Range: 6.0 to 7.6 Period: 89 days Class: K
Dates: 12 January to 4 March

ST Ursae Majoris

Magnitude Range: 6.0 to 7.6 Period: 81 days Class: M
Dates: 12 February to 15 July

g Herculis

Magnitude Range: 4.4 to 6.0 Period: 80 days Class: M
Dates: 29 April to 28 September

R Lyrae

Magnitude Range: 3.9 to 5.0 Period: 46 days Class: M
Dates: 5 June to 6 November

Sheliak

Magnitude Range: 3.3 to 4.4 Period: 12.9 days Class: B
Dates: 8 June to 31 October

X Cygni

Magnitude Range: 5.9 to 6.9 Period: 16.4 days Class: F
Dates: 5 July to 29 November

Algol

Magnitude Range: 2.1 to 3.4 Period: 2.87 days Class: B
Dates: 9 October to 9 March

Observations should only be made when the Moon is below the horizon. Each observation should include the location's GLOBE at Night measurement or SQM measurement. Use all of these parameters to report your results to observatory@brec.org.



"We can stay home Christmas Eve! This year everyone is getting music, movies, and games they can download from my website!"



Messages from HRPO

Highland Road Park Observatory



FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

1 December: “Skygazing Binoculars” Unlike a telescope, a good binocular for nighttime sky viewing can be gotten at a variety of retailers in town. Whether gift-hunting or searching for oneself, acquiring the right binocular will yield a plethora of celestial beauty. The Earth’s Moon alone has at least two dozen features easily accessible with a good binocular. Come learn from longtime amateur Merrill Hess the ins-and-outs of acquiring a handheld device that will work every time!

8 December: “The Star of Bethlehem” What exactly occurred in the Middle East 2000 years ago? Can modern scientific calculations shed light on the puzzle? LSU physics professor Brad Schaefer will use current theory to take the audience step-by-step toward the solution to the mystery. If you’ve never experienced this lecture before, don’t miss out. This is Professor Schaefer’s fifteenth consecutive year bringing this incredible presentation to HRPO patrons. During his career he has published in *Sky & Telescope* magazine, discovered a long-lost ancient atlas, appeared on a National Geographic program and earned an invitation to the Nobel Physics Prize ceremony.

15 December: “The Universe with X-Ray Vision” For over a dozen years the Chandra X-Ray Observatory has orbited Earth, giving us a unique view of areas of the Universe where high magnetic fields or extreme gravity dominate. LSU physics professor Rob Hynes tells us what all of the data means, and how it can shed light on the evolution of the Universe!

22 December: “The Final Flares” The humanmade phenomenon known as the Iridium flare will be no more as the satellites responsible are deorbited! There are only a few more months of flare excitement—come learn how to not miss the action!

SCIENCE ACADEMY

Saturdays from 10am to 12pm

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

2 December: “Meteor Showers”

9 December: “Asteroids and Comets”

16 December: “Expedition 10”

23 December: “Dwarf Planets”

30 December: “Genetics”



ONE-TIME CALLS FOR VOLUNTEERS

***Saturday 16 December, 12pm to 2pm.** *One or two volunteers.* **Solar Viewing.** Telescope operation, physical science demonstrations, front desk duty. Low to moderate difficulty.

***Friday 29 December, 6pm to 10pm. HRPO 20th Anniversary.** *Three or four volunteers.* Networking with long-time public supporters of HRPO. Standing up and reciting anecdotes regarding HRPO. Low difficulty.

***Saturday 20 January, 5:30pm to 7:30pm.** *One or two volunteers.* **Learn Your Binocular.** Showing patrons how to care for and use their personal binoculars. Moderate difficulty.

***Saturday 27 January, 5:30pm to 7:30pm.** *Three or four volunteers.* **Learn Your Telescope.** Showing patrons how to set up and use their personal telescopes. Moderate difficulty.

ONGOING CALL FOR VOLUNTEERS

HRPO periodically needs BRAS volunteers for crafting (gluing, cutting, painting, etc.); training is offered for these easy to moderate tasks. We also have plenty of “grunt work”. We are asking any members with the time to do so to assist. Thank you.



GLOBE at Night

9 to 18 December [Pegasus]

Instructions to participate in this project are at...
<http://www.brastro.org/phpBB3/viewtopic.php?f=29&t=2612>



HRPO 20TH Anniversary

Friday 29 December from 6pm to 10pm

No admission fee. For all ages.

The idea to bring a public telescope to East Baton Rouge Parish came from a phone call between LSU astrophysicist Greg Guzik and Melanie Hair. Melanie was a member of BRAS, which was founded by Craig Brenden and Wally Pursell in 1981. The Department of Physics and Astronomy at LSU secured the funding for a 50cm (20in) professional-grade reflector from the Optical Guidance Systems company. Greg ultimately became, and remains, HRPO’s official LSU liaison. BREC (under then-Superintendent Eugene Young) agreed to provided grounds, a building, staff and an operating budget.

BRAS members (mainly Walt Cooney) have used the 20OGS reflector to discover

over three dozen asteroids, the first of which was named after HRPO's home city of Baton Rouge. More of the asteroids have been named for Greg, Craig, Wally, and BRAS members Frank Conrad and Merrill Hess. For twenty years 13800 Highland Road has been the site of asteroid discoveries, comet apparitions, elongations, conjunctions, oppositions, transits, eclipses and fireballs. Come celebrate with us and we fondly remember the past and look to the future with renewed resolve to continue to bring to space enthusiasts, taxpayers, students and the curious an unhindered views of the beauty of the heavens.



Adult Astronomy Courses

Saturday in January from 3:30pm to 7:30pm

For ages eighteen and older.

\$15 per in-parish registrant; \$18 per out-of-parish registrant.

13 January: Learn Your Sky

20 January: Learn Your Binocular

27 January: Learn Your Telescope

© Randy Glasbergen
www.glasbergen.com



**"I was texting while driving my sleigh.
Your toys are in a ditch outside
of South Bend, Indiana."**



Observing Notes:

by John Nagle

Fornax – The Furnace

Position: RA 03 34, Dec. -31°52'

Named Stars:

Dalim (Alpha For), “Fornacis” (*the archways of the outer city gates of Rome*), mag. 3.85, 03 12 04.28 -28 59 20.8, is a binary star. The primary is a yellow-tinged sub-giant main sequence star at magnitude 3.9, and the secondary is a yellow star at magnitude 6.5. The orbital period is 314 years, with a separation of 5.1”.

There are no other named stars in Fornax.

Deep Sky:

NGC 1315, Bennett 14, Fornax A, Arp 154, mag. 8.2, 03 22.7 -37 12, 12.1’x8.6” in size, is a radio galaxy and the 4th brightest radio source in the sky. **Fornax A** appears in the optical spectrum as a large elliptical galaxy with dust lanes near its core, visually quite large, slightly elongated, with a diffuse center; extended envelope with faint loops. **NGC 1316** appears to be interacting with **NGC 1317**. **NGC 1316** is 2° southwest of **Chi For**. **NGC 1317** is just north of **NGC 1316**, and 47’ north-northeast is magnitude 11.4 **NGC 1326**. **Fornax A** is also an X-ray source. It is a member of the **Fornax Galaxy Cluster** (anchoring the western end).

NGC 1399, Bennett 19, mag. 8.8, 03 38.5 -35 27, 60’ in size, is a very bright and pretty large galaxy, with a bright nucleus. A member of the **Fornax Galaxy Cluster**. **NGC 1387** (**Bennett 18**, at magnitude 11.7) and **NGC 1379** (magnitude 12.0) lie due west of **NGC 1399**. Just to the south of **NGC 1399** is **NGC 1389**, while just north lies the much elongated **NGC 1381** (magnitude 12.6). **NGC 1399** is located 2° east of **Chi³ Fornacis**.

NGC 1097, Bennett 10, Caldwell 67, mag. 9.2, 02 46.3 -30 16, 9.3’x6.6’ in size, is a very bright, large, and very elongated galaxy; two main arms; has a small, extremely bright, peculiar nucleus with an inner spiral structure. The galaxy is also classified as a Seyfert galaxy, one that has a nucleus that produces spectral line emission from highly ionized gas and is believed to have a super-massive black hole at its center. **NGC 1097** has two satellite galaxies, **NGC 1097A** and **1097B**. **NGC 1097A** is a peculiar dwarf elliptical galaxy that orbits 42,000 light years from the center of **NGC 1097**. **NGC 1097B** is a dwarf irregular galaxy, and is located 5.7° west-southwest of **Alpha Fornacis**.

NGC 1365, Bennett 16, the “Fornax Propeller Galaxy”, mag. 9.3, 03 33.6 -36 08, 9.8’x5.5’ in size, is a very bright, very large, and quite elongated galaxy; extremely bright nucleus. It has two clearly discernible arms. This galaxy is also known as the “**Great Barred Spiral Galaxy**”, and is one of the most studied barred spiral galaxies. **NGC 1365** anchors the center of the **Fornax Galaxy Cluster**, and is located 1° east-southeast of **Chi³ Fornacis**.

NGC 1398, Bennett 19A, mag. 9.5, 03 38.9 -26 20, 6.6’x5.2’ in size, is a quite bright, quite large, and round galaxy; large, bright nucleus; internal ring with bar. To the west-southwest (1.3°), at 03 33.3 -25 51, is the planetary nebula **NGC 1360** (**Bennett 15**), called the “**Robin’s Egg Nebula**”, a Wolf-Rayet star violently ejecting matter into a surrounding shell.

NGC 1380, Bennett 17, mag. 9.9, 03 36.4 -34 59, 4.8'x3.0' in size, is a very bright, large, and elongated galaxy; very bright nucleus. Member of the **Fornax Galaxy Cluster**.

Fornax Dwarf Galaxy, ESO 356-4, mag. 9.0, 02 40.0 -34 27, 60'x48' in size, this galaxy belongs to the **Local Group** and is a satellite of the **Milky Way Galaxy**. The **Fornax Dwarf Galaxy** contains 6 globular clusters, the largest (**NGC 1049**, mag. 12.9, 02 39.7 -34 17 0.4)) of which was discovered before the galaxy itself.

Fornax Galaxy Cluster is relatively small, yet it is the second richest galaxy cluster within 100 million light years. It has about 58 member galaxies. The main galaxies are: **NGC 1399; NGC 1365; and NGC 1316**. Northern observers require a careful star hop through a barren area of the sky. Owners of polar aligned telescopes can move 62° south from the **Pleiades** (not joking, it works!). Southern observers can move northeast from **Achernar (Alpha Eridanis)** to **Acamar (Theta Eridanis)**, then go 5.7° east-northeast.

UDFj-39546284 is a candidate proto-galaxy, although recent analysis has suggested it is likely to be a lower red shift source.

UDFy-38135539 (HUDF.YD3), is identified as the second most distant object in the universe, at 13.1 billion light years away from our **Sun**. It is the first galaxy to be observed during the re-ionization epoch (between 150 million and one billion years after the **Big Bang**).

Beyond magnitude 10 there are: 59 NGC's; 27 IC's; 39 ESO's; 11 MCG's; 2 PGC's; 1 Arp; and 1 UGCA.

Other Stars:

Beta For, mag. 4.45, 02 49 05.36 -32 24 22.6, is a yellow giant double star with its optical companion at magnitude 14.

Omega For, mag. 4.96, 02 33 50.71 -28 13 56.4, secondary at mag. 7.7 and a separation of 10.8".

Kappa For, mag. 5.19, 02 22 32.42 -23 48 58.7, is a spectroscopic binary star.

Gamma² For, mag. 5.39, 02 49 54.15 -27 56 31.3, is part of a triple star system with the double stars **Gamma¹A For** and **Gamma¹B For** (mag.6.0 and 12.0), with a separation from **Gamma² For** of 41".

Zeta For, mag. 5.69, 02 59 36.07 -25 16 27.6, is a binary star.

Lambda² For, HD 16147, mag. 5.78, 02 36 58.62 -34 31 38.4, is a star about 1.2 times as massive as the **Sun**, and has a planet in orbit that is about as massive as **Neptune**, in a 17.24 day orbit.

Eta²For, mag. 5.92, 02 50 14.75 -35 50 37.3, is a double star with Eta¹For, at mag. 6.51, 02 47 33.78 -35 33 01.9.

HD 22262, mag. 6.20, 03 33 56.81 -31 04 49.1, is a double star.

HD 11262, mag. 6.37, 01 49 48.86 -38 24 12.5, is a double star.

HD 12135, mag. 6.37, 01 58 26.68 -33 04 00.3, is a double star.

HD 22322, mag. 6.39, 03 34 33.58 -31 52 29.3, is a double star and is a suspected variable star.

HD 16589, mag. 6.48, 02 38 24.75 -37 59 25.4, is a spectroscopic binary star.

Chi³For, mag. 6.49, 03 28 11.50 -28 51 14.7, is a double star.

HD 20782, mag. 7.38, 03 20 03.58 -28 51 14.7, is part of a wide binary system with **HD 20781**, and has a planet in orbit.

HD 20781, mag. 8.44, 03 20 03 -28 47 02, is part of a wide binary system with **HD 20782**. This is the first binary star discovered with both components known to have orbiting planets.

WASP-72, mag. 9.6, 02 44 9.6 -30 10 09, has a planet in orbit.

HD 20868, mag. 9.92, 03 20 42.69 -33 43 48.4, has a planet in orbit.

HIP 13044, mag. 9.94, 02 47 37 -36 06 27, is a red, horizontal branch star – a star in the stage of evolution that follows the red giant stage. The star is believed to be about nine billion years old or possibly even older. A planet was discovered orbiting the star in November of 2010, a hot **Jupiter**, believed to have originated outside the galaxy and then became part of the **Milky Way galaxy** when its galaxy of origin collided with and was absorbed by our galaxy.



LP-944-20, 03 39 35.22 -35 25 44.09, is a brown dwarf star.

UDF2457, 03 32 38.79 -27 48 10.0, is one of the most distant stars known in the **Milky Way**.

Sky Happenings: December 2017

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

- Dec. 1st** - Asteroid Dembowska is at opposition at 7 PM CST.
- Dec. 3rd** - **Mercury** is stationary at 2 AM CST,
 Morning: The **Moon** floats about 2° to the lower right of **Aldebaran**,
 The **Moon** passes 0.8° north of **Aldebaran** at 7 AM CST,
Full Moon occurs at 9:47 AM CST.
- Dec. 4th** - The **Moon** is at perigee (222,135 miles from **Earth**) at 2:46 AM CST.
- Dec. 8th** - The **Moon** passes 0.7° north of Regulus at 5 PM CST,
 Night: A waning gibbous **Moon** trails **Regulus**, in **Leo**, by about 5°, low in the east.
- Dec 10th** - **Last Quarter Moon** occurs at 1:51 AM CST.
- Dec. 12th** - **Mercury** is in inferior conjunction at 8 PM CST.
- Dec. 13th** - Dawn: The thin sliver of the waning crescent **Moon** hovers some 4° to 6° above orange **Mars**
 low in the east-southeast.
 The **Moon** passes 4° north of **Mars** at 10 AM CST.
- Dec. 13/14** The **Geminid Meteor Shower** peaks under a moonless sky in the morning.
- Dec. 14th** - Dawn: A slimmer crescent **Moon** slides down to about 9° below **Mars** and 4° above **Jupiter**,
 The **Moon** passes 4° north of **Jupiter** at 8 AM CST,
 The **Moon** passes 0.2° south of asteroid **Vesta** at 1 PM CST.
- Dec. 17th** - Asteroid **Massala** is at opposition at 10 AM CST.
- Dec. 18th** - **New Moon** occurs at 12:30 AM CST,
 The **Moon** is at apogee (252,651 miles from **Earth**) at 7:26 PM CST.
- Dec. 20th** - Dawn: Look toward the southeast and you will see **Jupiter** rising, hand-in-hand with **Alpha Librae**, less than 1° away.
- Dec. 21st** - **Winter Solstice** – the longest night of the year in the **Northern Hemisphere** – occurs at
 10:28 AM CST,
 Dwarf planet **Ceres** is stationary at 3 PM CST,
Saturn is in conjunction with the **Sun** at 3 PM CST.
- Dec. 22nd** - **Mercury** is stationary at 9 PM CST.
- Dec. 24th** - Asteroid **Pallas** is stationary at 12 AM CST,
 The **Moon** passes 1.4° south of **Neptune** at 7 AM CST.
- Dec. 26th** - **First Quarter Moon** occurs at 3:20 AM CST.
- Dec. 27th** - The **Moon** passes 5° south of **Uranus** at 12 noon CST.
- Dec. 30th** - Evening: The waxing gibbous **Moon** (in the east shortly after sunset) will be 0.5° away from **Aldebaran**. The **Moon** will occult **Aldebaran** starting around 5:20 PM CST (twilight), and **Aldebaran** will re-appear around 6:17 PM CST.



Planets:

Mercury – **Mercury** lurks low in the southwest after sunset during December's first week. On December 1st, **Mercury** and **Saturn** lie within 3° of each other and appear about 5° above the horizon a half-hour after sundown. Shining at magnitude 0.1, **Mercury** is slightly easier to see than the magnitude 0.5 **Saturn**. Both planets dip lower and disappear within a week, with **Mercury** sliding between **Earth** and the **Sun** into an inferior conjunction on December 13th, after achieving perihelion on December 12th. **Mercury** will then pass from an evening view to re-appear in the morning sky around December 20th. On the 21st, **Mercury** will be 6° above the southeast horizon 45 minutes before sunrise, shining at magnitude 0.6, showing a 8.7" diameter disk, appearing ¼ lit. The planet then brightens rapidly and climbs to make one of its best

appearances of the year. By December 23rd, **Mercury** rises at the start of astronomical twilight and is about 8° to the left of the noticeably fainter **Antares**. **Mercury** will appear highest on December 25th, shining at magnitude -0.3, on its way to greatest elongation (23° west) of the **Sun** on January 1st.

Venus – On December 1st, **Venus** appears just 2° high in the east-southeast 30 minutes before sunrise, at magnitude -3.9. **Venus** will be lost to view around December 12th, on its way to superior conjunction with the **Sun** on January 9th, and will return to view after sunset in late February.

Mars – **Mars** appears low in the east, rising along with the background stars of **Virgo** at around 3:15 AM local time in early December. On December 1st, it stands a mere 3° to the left of **Spica** at magnitude 1.7. **Mars** will brighten from magnitude 1.7 to 1.5 during December, with an apparent diameter merely increasing from 4.2” to 4.8”. A waning crescent **Moon** appears 5° above **Mars** on the 13th, with **Jupiter** 11° below **Mars**. On December 31st, **Mars** lies 3° west of **Jupiter**, with 3rd magnitude **Zubenelgenubi (Alpha Librae)** between them, after **Mars** crosses into **Libra** on December 21st. **Mars** and **Jupiter** will be in conjunction (0.2° apart) on January 7th.

Jupiter – Brilliant **Jupiter** rises about 80 minutes after **Mars** on December 1st, shining at magnitude -1.7 against the backdrop of **Libra**. Throughout the month, **Jupiter** brightens from magnitude -1.7 to -1.8, and its apparent diameter increases from 31” to 33”. On December 1st, 16° separate **Mars** from **Jupiter**, but the gap narrows by 3° each week. On December 14th, a slim waning crescent **Moon** lies 5° to **Jupiter**’s upper left. On December 31st, 3° separate **Mars** and **Jupiter**, with **Alpha Librae** between them. On January 7th, **Mars** and **Jupiter** will be in a close conjunction (0.2° apart).

Saturn – On December 1st, **Saturn** and **Mercury** are low in the southwest after sunset, lying within 3° of each other, and about 5° above the horizon a half-hour after sundown. **Saturn** will be lost for evening viewing on December 2nd, passing behind the **Sun** in conjunction on December 21st. **Saturn** will return to view in the morning sky in January.

Uranus – **Uranus** spends December in **Pisces**, glowing at magnitude 5.7, and setting after midnight. To find **Uranus**, locate magnitude 4.3 **Omicron Piscium** and magnitude 4.8 **Mu Piscium**. Half-way between these two lies a pretty trapezoid-shaped asterism comprising four 6th magnitude stars. **Uranus** lies 1° northeast of this asterism throughout December. **Uranus** shows a disk that spans 3.6”, and shows a distinct blue-green color.

Neptune – **Neptune** resides among the background stars of **Aquarius**, and appears nearly due south after sunset, glowing at magnitude 7.9. The planet spends the first half of December just 0.6° south of 4th magnitude **Lambda Aquarii**. **Neptune**’s slow eastward motion carries it to a position 0.5° southeast of **Lambda Aquarii** by year’s end. **Neptune** will show a pale blue-gray disk measuring 2.3” across. **Neptune** will set by midnight local time in early December, and by 10 PM local time by month’s end.

Pluto – **Pluto** is in **Sagittarius**, just south of the **Teaspoon Asterism**. On December 15th, **Pluto** will be at RA 19 17.6, Dec. -21 45, at magnitude 14.3, and an angular size of 0.1”.

Sun – The **Sun** arrives at the December solstice at 10:28 AM CST on December 21st, signaling the start of winter in the **Northern Hemisphere**.

Moon – The **Full Moon** is near **Aldebaran** (2° to the lower right) on the morning of December 3rd. The waning gibbous **Moon** will pose on either side of **Regulus**, before dawn on December 8th and 9th. The waning lunar crescent glows around 4° above **Mars**, in the east-southeast, on December 13th, and about 4° to the upper left of **Jupiter** on December 14th. The waxing gibbous **Moon** occults **Aldebaran** late in the evening of December 30th. Favorable libations: **Pythagoras Crater** on December 3rd; **Sylvester Crater** on December 4th; and **Petermann Crater** on December 5th.

Libration in longitude: East limb most exposed on the 11th (+7.4°)

West limb most exposed on the 27th (-7.9°)

Libration in latitude: North limb most exposed on the 2nd (+6.6°) and the 29th (+6.7°)

South limb most exposed on the 15th (-6.7°)



Asteroids – Asteroid **7 Iris** arcs through **Aries** during December. This region climbs ¾ of the way from the southern horizon to the zenith by 8 PM local time, and doesn’t set until well past midnight. **Iris** fades from magnitude 7.7 to 8.5 during December. Use 5th magnitude **Iota Arietis** and 6th

magnitude **4 Ari** as your guides to find **Iris**. On December 5th and 6th, drop 1° southeast of **4 Ari** to a pair of slightly unequal stars. **Iris** is the western “star” on the 5th, and the “southern” star on the 6th. A few nights later, **Iris** appears alone in a field of significantly fainter stars.

Comets – Comet **PANSTARRS (C/2016R2)**, a visitor from the **Oort Cloud**, appears reasonably bright (although it never comes real close to the **Sun** or **Earth**) because its icy nucleus is ejecting gas and dust at a higher than normal rate. Due to its large orbit, it moves fairly slowly and will be a fixture in the evening sky into mid 2018. The comet will pierce **Orion’s Shield** this month before skimming past the **Hyades** star cluster in early February, and the bright star **Capella** in late March and early April. Astronomers expect the comet to glow around 10th magnitude, so you will need a 4-inch or larger telescope to spot its glow. Earth crosses the comet’s orbital plane on December 12th and 13th – in the dark of the **Moon**. **PANSTARRS** lies within 1° of magnitude 4.4 **Pi² Orionis** on these two evenings. On the nights of the 15th and 16th, **C/2016R2** glides within a couple of degrees of open cluster **NGC 1662** near the **Orion-Taurus** border.

The interstellar visitor, now named **1I/O’umuamua**, made its closest approach to **Earth** on October 14th, coming within 24 million km, or about 60 times the distance to the **Moon**. A trio of researchers (Eric Gaides and Jonathan Williams from the University of Hawaii at Manoa, and Adam Kraus from the University of Texas at Austin) traced the path of **1I/O’umuamua** backwards along its route, taking into account the numerous variables along the way in so extended of a journey. They believe that the object originated in a nearby young stellar cluster. They point to the **Carina and Columba Associations**. They suggest the comet formed in a proto-planetary disk in the **Carina/Columba Associations** and was ejected by a planet about 40 million years ago, with an ejection velocity of 1-2 km per second. The three researchers wrote a paper titled “*Origin of Interstellar Object A/2017 U1 in a Nearby Young Stellar Association?*” submitted to **Research Notes of the American Astronomical Society**.

Meteor Showers – The **Geminid Meteor Shower** ranks as both the richest and most reliable of the annual meteor showers. It peaks on the night of December 13th/14th under a slim crescent **Moon** after it rises around 3:30 AM local time. The meteors appear to radiate from the constellation **Gemini**, which rises around sunset and climbs nearly overhead by 1 AM CST. The best views come on the morning of the 14th, between roughly midnight and 4 AM CST, when observers under a clear, dark sky can expect to see up to 120 meteors per hour.

The **Ursa Minorids** are predicted to peak at 15:00 UT on December 22th (9 AM CST). The thin, waning crescent **Moon** sets early on the evening of December 21st. The shower’s radiant is near **Beta Ursa Minoris (Kochab)**, the brightest corner star in the bowl of the **Little Dipper**. The **Ursids** remain one of the most under-observed showers. The parent object is comet **8P/Tuttle**, which, like other Halley-type comets, has produced a series of dust trails, each dating from a specific return of the comet. We are set to hit a dust trail ejected in AD 884.

When to View the Planets:

| <u>Evening Sky</u> | <u>Midnight</u> | <u>Morning Sky</u> |
|----------------------------|----------------------|----------------------------|
| Mercury (southwest) | Uranus (west) | Mercury (southeast) |
| Saturn (southwest) | | Venus (southeast) |
| Uranus (southeast) | | Mars (southeast) |
| Neptune (south) | | Jupiter (southeast) |

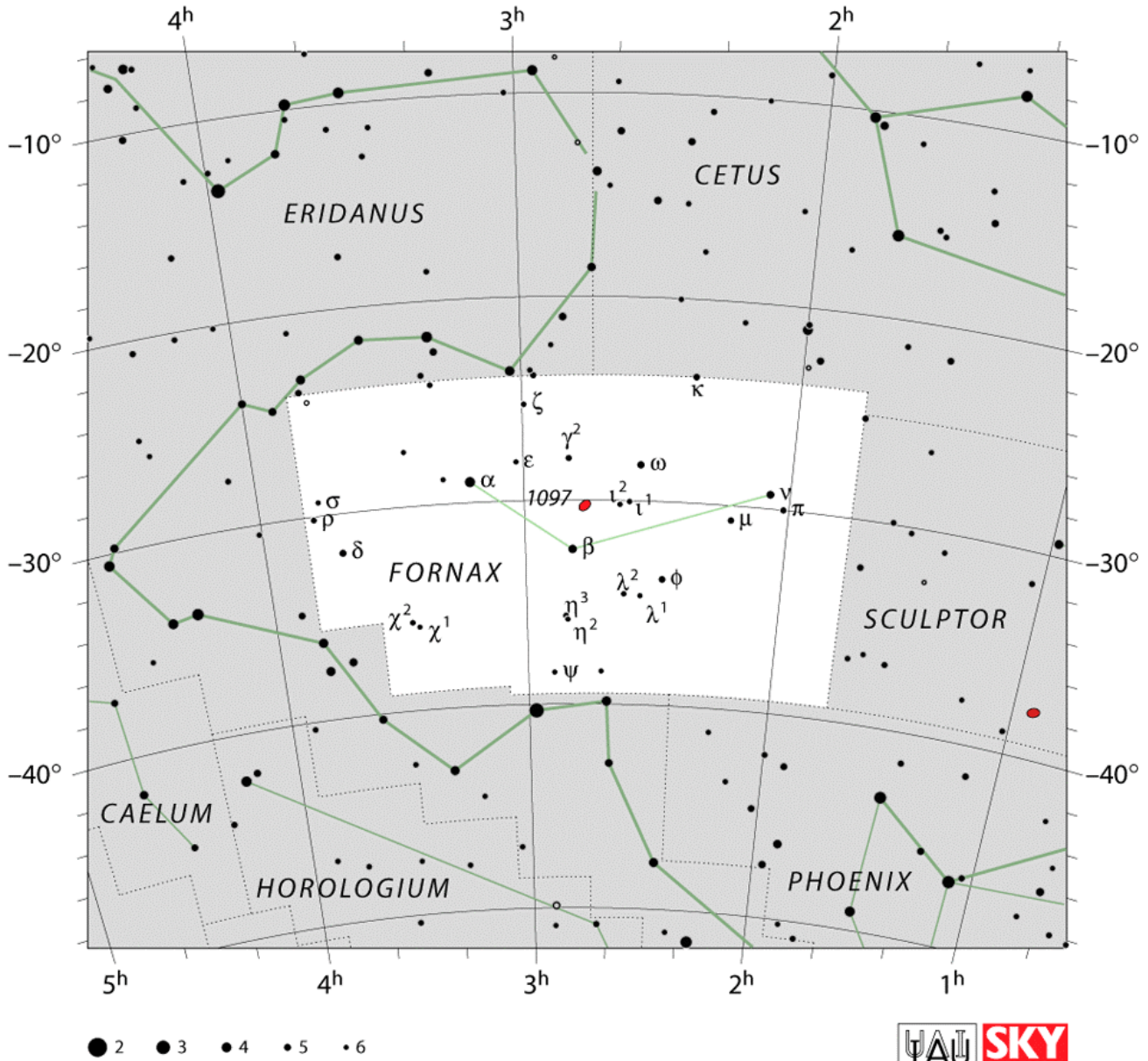
DARK SKY VIEWING - PRIMARY ON DEC. 16TH, SECONDARY ON DEC. 23RD

Mythology:

Fornax – the Furnace

An obscure constellation introduced by the Frenchman Nicolas Louis de Lacille after his trip to the Cape of Good Hope to observe the southern stars in 1751-1752. *Fornax* represents a chemical furnace. Bode showed it on his atlas as *Apparatus Chemicus*.

Fornax contains no stars brighter than fourth magnitude.



The End

