Monthly Meeting January 14th at 7PM at HRPO

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

Speaker: Jim Gutierrez, Sunspots, Hot Spots and Relativity

What's In This Issue?

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President's Message

First off, I thank you for placing your trust in me for another year.
Another thanks goes out to Scott Cadwallader and John R. Nagle for fixing the Library Telescope. The telescope was missing a thumbnut witch Orion Telescope replaced, Scott and John, put the thumbnut back on and reset the collimation.

Let's don't forget the Total Lunar Eclipse coming up this January 20th. See HRPO announcement below.

We are planning 2019 and hope to have an enjoyable year for our members. I'd like to find more opportunity to point our telescopes at the night sky. If there is anything you'd like to see, do, or wish to offer let us know. Our webmaster has set up a private forum: "BRAS Members Only" Group/Section to the "Baton Rouge Astronomical Society Forum" (http://www.brastro.org/phpBB3/). The plan is to use this Group/Section to get additional information to members and get feedback from members without the need of flooding everyone's inbox. To join this Group e-mail Frederick J. Barnett (fred@eatel.net) our Webmaster/Astronomical League Correspondent(ALCOR) your name and Forum Username. If you do not have a Forum Account, please consider signing up for one.

MONTHLY SPEAKERS: One of the club's needs is speakers for our monthly meetings. If you are willing to give a talk or know of a great speaker let us know.

UPCOMING BRAS MEETINGS:
Business Meeting – HRPO, Wednesday, January 9, 7 P.M.
Monthly Meeting – HRPO, Monday, January 14, 7 P.M.

VOLUNTEERS: While BRAS members are not required to volunteer, if we do grow our volunteer core in 2019 we can do more fun activities without wearing out our great volunteers. Volunteering is an excellent opportunity to share what you know while increasing your skills.

SALE: BRAS is having a surplus telescope/equipment sale soon.

Articles: I want to invite members to write articles for our newsletter.

Members Corner: Share your interesting astronomy related trips, events, awards, and experiences by sending a write-up to Michele at newsletter@brastro.org

Member Pins: If you have not reserved yours yet, please come to a meeting to pick one up.

Outreach: Please check below for Ben's Outreach Requests. Also, be on the lookout for periodic email notices. Remember, Outreach to our community is a lot of what we do.

BRAG: Check below for BRAG's scheduled meeting.

Clear Skies

Steven M. Tilley, President

Back

TELESCOPE RAFFLE/FUNDRAISER.

Tickets are $5 each, drawing when enough money is raised! You need not be present to win.

" A vintage (c. 2001) Meade ETX 90EC with hard case. 90 Maksutov-Cassegrain reflector, 1250mm focal length (f13.8) on an electronic fork mount with built-in flip-mirror diagonal, additional right angle diagonal, and 8x21 finderscope. It includes two Meade super Plossl eyepieces (26mm &f 9.6mm), Yellow, Blue, Orange, and Neutral Density planetary filters, an ETX Autostar Controller for electronic alignment and goto positioning. It has built-in battery power from 8 AA batteries and a connector for an external power source. It is capable of tracking if it is set into polar alignment mode which requires an additional purchase of a field tripod or tabletop accessory.

At this time, everything has been checked out on the scope EXCEPT the GOTO function. (It's been too cloudy to get outside for a good test run.) We are assuming that it works, but just know that the scope is being raffled AS IS. This is a great opportunity to get your hands on a great little scope with accessories. You'll be able to take a look at it at the meetings."

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January 1st, 2019

NASA spacecraft reaches the most distant target in history, as New Horizons successfully explores Ultima Thule.

NASA's New Horizons spacecraft flew past Ultima Thule in the early hours of New Year's Day, ushering in the era of exploration from the enigmatic Kuiper Belt, a region of primordial objects that holds keys to understanding the origins of the solar system.

Congratulations to NASA's New Horizons team, Johns Hopkins Applied Physics Laboratory and the Southwest Research Institute for making history yet again. In addition to being the first to explore Pluto, on January 1st, 2019, New Horizons flew by the most distant object ever visited by a spacecraft and became the first to directly explore an object that holds remnants from the birth of our solar system," said NASA Administrator Jim Bridenstine. "This is what leadership in space exploration is all about."

This is quoted from Science News, and BRAS adds its congratulations.

https://www.sciencedaily.com/releases/2019/01/190101130547.htm

Back

Secretary's Summary of December Meeting

- 27 Members in attendance
- President Steven Tilley calls meeting to order at 7:00pm.
- Christmas potluck dinner was held.
- Steven then announced voyager is interstellar, and a members only section has been added on the BRAS forum.
- John Nagle announced Chris Deselles had agreed to be nominated as VP for 2019.
- Motion made to close nominations for 2019 officers. Motion passed.
- Officers are as follows:
  - Steven Tilley - President
  - Chris Deselles - Vice President
  - Krista Reed - Secretary
  - Trey Anding- Treasurer
- John mentions the observing notes for constellations restarting since he has cycled through all of them.
- Outreach chair, Ben Toman, handed out pins from Night Sky Network for participating in outreach and volunteering.
- Ben went over upcoming outreach opportunities.
- Treasurer, Trey Anding, asked members to pay dues and purchasing calendars
- Steven talked about membership pins for those who have not received theirs.
- Don Weinell announced the Rockefeller trip is the first weekend of February.
- Raffle tickets for the Meade ETX tickets were sold.
- Games were played.
- Survey conducted for light pollution around members homes was held.
- Comet Wirtanen was observed on the back pad. Thanks to Scott Cadwallader for finding it.
- Meeting adjourned roughly at 9pm.

Back

Minutes submitted by BRAS Secretary, Krista Reed.

POP Quiz:

HOW MANY GALAXIES ARE VISIBLE TO THE NAKED EYE?

Five thousand? Two Million? Ten Billion?
The answer is FOUR - although from where you are sitting, you can only see two. In the Northern Hemisphere, you can see the Milky Way and Andromeda (M31), while in the Southern Hemisphere you can see the Large and Small Magellanic Clouds.

BRAS Outreach Report

Hi Everyone,

Well, 2018 went out with a whimper as far as outreach was concerned. We were clouded out for Sidewalk Astronomy and the Makers Market was on the same night as the comet viewing event at the HRPO so we were unable to get volunteers for it. (If I recall, it was rather cloudy that night, so did not make much difference.)

THINGS ARE ALREADY STARTING TO LINE UP FOR 2019.
I'd really like to start using some more of our resources from the Night Sky Network (NSN). We now have just about every tool kit that they offer due to our past outreach efforts and we also have a good quantity of Galileo Scopes. And look what Santa brought (pictures on right).

Two toolkits came in the mail: **Our Galaxy, Our Universe** & **Shadows and Silhouettes**

There were 42 scheduled outreach events in 2018, and THAT'S A LOT OF OUTREACH!

We can pat ourselves on the back for that (Douglas Adams would be proud!),and only 4 (maybe 5) were fully bust due to weather. We couldn't even come close to accomplishing that much without our volunteers.. So let me say THANKS AGAIN TO YOU ALL. And members, if you've haven't yet come out to one of these events, you're missing out. Not only do we provide a vital community service, but it's a great way to share, learn and have fun as an amateur astronomer. I hope to see even more names popping up in my inbox to service our requests this year.

2019 Outreach Requests to date:...

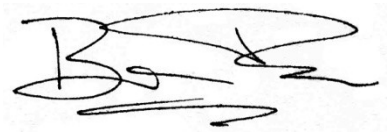
Tuesday, January 15th
6:30pm-8:30pm
Sidewalk Astronomy at Perkins Rowe

Tuesday, February 12th
6:30pm-8:30pm
Sidewalk Astronomy at Perkins Rowe

Saturday, March 9th
9am-4pm
Rockin' At The Swamp
Bluebonnet Swamp
Telescopes, demos, info table
(Several people needed for shifts throughout the day)

Freebie Handouts for Outreach Events!
100 each – Sombrero; Eagle Nebula; NGC 2440; Space Place Bookmarks

Clear skies,



Ben Tomen, Outreach Chairperson

BRAS Light Pollution Committee Report

This committee meets at 6:15, same day as the 7:00 BRAS Business Meeting
(normally on Wednesday before the Monthly Meeting)
Everyone is welcome to join in..

Meeting called to order by John Nagle
No new members, with 7 members in attendance
November minutes were published in the December newsletter

Old Business:

1. Natural Sky Conference – Chris Kersey says it was more successful than the first, and was more cohesive. Light tower, demonstrating type of lighting fixtures, worked well –operated by Scott Cadwallader. Tri-fold Poster Board was good.
2. Planning Commission and Permit Board offices not yet visited.
3. Working on developing a check-list for suspected violations of the UDC lighting codes.

New Business: Two lists of ideas submitted:

1. Find out the cost of light pollution to the taxpayers.
2. Make another model to demonstrate good lighting vs. bad lighting – use model railroad parts. Ask Ben how to build.
3. Find photos of decorative full cutoff lighting fixtures (so people can see that full cutoff fixtures does not have to be ugly). Could use manufacturer's websites.
4. Invite architecture students to public events at HRPO to get them to love looking at the night sky.
5. Start a "Use of Good Lighting" award for architecture students. (Maybe start a small scholarship?)
6. Invite the Baton Rouge Planning Commission, Metropolitan Council of Baton Rouge, and the BREC Commission to public events at HRPO to get them to love looking at the night sky.

   Second List:
7. Use informal word of mouth to spread information about light pollution (we are already doing this at all outreach events).
8. Persuade public lighting authorities to adopt night sky friendly artificial light (enforce UDC Lighting Code, with few variances).
9. Invite non-BRAS members to the dark site.
10. Network with local associations so as to continue and expand the Natural Sky Conference.
11. Give formal presentations in public places (restaurants, libraries, the Observatory, etc.).
12. Invite non-BRAS members to become members.
13. Network with other associations fighting light pollution all over the country.
14. Bring back BRAS' Dark Sky website (Working on it).

Homework assignment: Design the new Dark Sky website – what will go on it?

Minutes of this meeting read and approved
Meeting adjourned.

John R. Nagle

Submitted by John Nagle, Chairperson

Back

BRAS Astrophotography Group (BRAG)

No December meeting. Krista offered her house in New Roads for the January get together. Date TBA.
For more detailed information, contact Scott Louque, slouque at att dot net.

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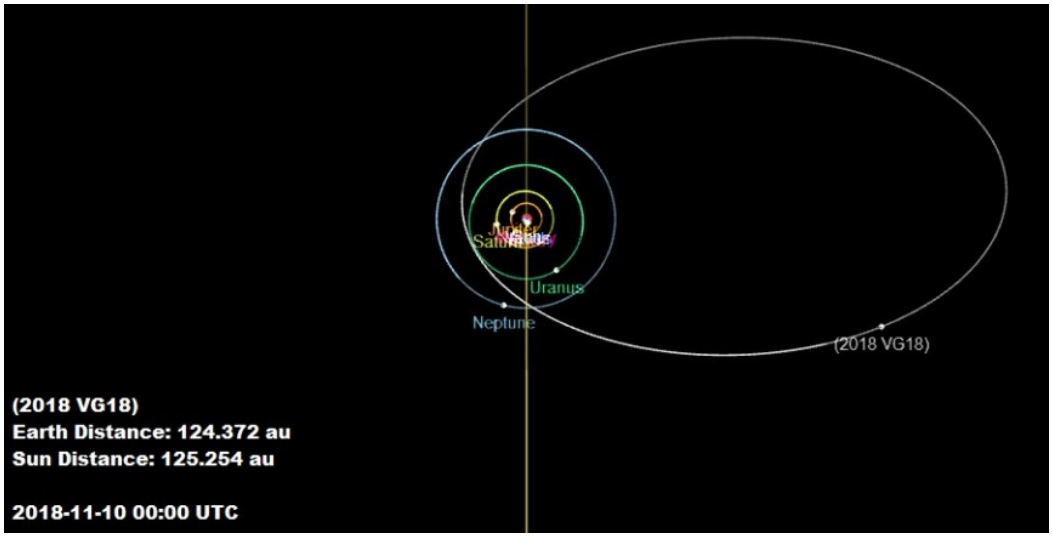
Flying "Rocks" and "Dirty Snowballs": Asteroid and Comet News
January 2019
Volume 1. Issue 1.



In December Comet 46P/Wirtanen reach an apparent magnitude of 4.0 and was barely visible to the naked eye from dark skies. During the comet's fly-by if was observed with radar from Arecibo Observatory. The radar team was able to determine the comet nucleus was approximately 0.9 miles (1.4 km) in diameter. This fly-by was the best-known radar opportunity for a comet for the next 30 years. (https://uanews.arizona.edu/story/ua-researcher-captures-rare-radar-images-comet-46pwirtanen)

On Monday, December 17, 2018, the Minor Planet Center announced the discovery of a distant solar system object 2018 VG18 (MPEC 2018-Y14 : 2018 VG18 https://www.minorplanetcenter.net/mpec/K18/K18Y14.html). This object was discovered by Scott S. Sheppard, David Tholen, and Chad Trujillo at a distance greater than 100 AU making it "the most-distant solar system object ever observed." It will be a few more years of observation before fully orbit determination can be done. The discoverers have nicknamed the object nicknamed "Farout." (https://carnegiescience.edu/news/discovered-most-distant-solar-system-object-ever-observed)

Orbit diagram for (2018 VG18) nicknamed "Farout"
Earth Distance: 124.372 AU
Sun Distance: 125.254 AU
2018-11-10 00:00 UTC

https://ssd.jpl.nasa.gov/sbdb.cgi?sstr=2018VG18
courtesy of NASA/JPL-Caltech

JPL Close Approach Data from November 19,2018 to December 11, 2018 Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal (LD (au)	Magnitude H(Estimated Diameter)
(2018 WJ)	2018-Nov-19	0.31 (0.00079)	27.6(7.9 m - 18 m)
(2018 WE1)	2018-Nov-25	0.28 (0.00072)	26(17 m - 37 m)
(2018 WZ1)	2018-Nov-27	0.28 (0.00073)	29.4(3.6 m - 8.0 m)
(2018 WA3)	2018-Nov-28	0.84 (0.00216)	27.9(7.1 m - 16 m)
(2018 WG2)	2018-Nov-30	0.52 (0.00134)	30.1(2.5 m - 5.6 m)
(2018 WV1)	2018-Dec-02	0.09 (0.00022)	30.2(2.4 m - 5.5 m)
(2018 XA4)	2018-Dec-11	0.97 (0.00249)	29.1(4.1 m - 9.2 m)

As of 2018-12-27, there is

789,069 discovered asteroid(MPC https://www.minorplanetcenter.net/)

19,363 discovered Near-Earth Objects (MPC https://www.minorplanetcenter.net/)

4037discovered Comets (MPC https://www.minorplanetcenter.net/)

889 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL https://cneos.jpl.nasa.gov/sentry/)

2,215objects 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")

The following objects were removed from NASA JPL's Sentry: Earth Impact Monitoring list in November

Object Designation	Removed (UTC)
2018 XV5	2018-12-23 15:57
2014 HD199	2018-12-22 15:34
2018 XE5	2018-12-21 16:02
2018 XW5	2018-12-21 16:00
2018 XY3	2018-12-19 17:00
2014 HN199	2018-12-12 15:30
2018 WZ1	2018-12-08 15:19
2018 WA2	2018-12-04 16:01
2018 WV1	2018-12-03 19:36
2018 WR1	2018-12-02 15:10
2017 RH16	2018-12-01 06:19

Free The Milky Way Campaign

used to be the 20/20 Vision Campaign, recently renamed by the Light Pollution Committee.

This campaign's goal was to raise the SQM measurement at HRPO's back viewing pad to 20.0 by HRPO's 20th anniversary. That date past, we decided to keep the effort going until the goal is reached, however long that takes.

Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum. There are also nine active polls. The Forum has reached 5700 posts.

Three New Book Reviews from BRAS President
Request for Light Pollution Studies
Saturn is Losing its Rings!
Expedition 57 Crew Returns
Venus Occults Magnitude Six Star
Apollo 8 Anniversary Transfixes Space Enthusiasts
G1 Activity Closes 2018
Parker Solar Probe Enters Sun's Corona
Fog Destroys View of Geminid Peak
Prediction Given for Ursid Burst
Farthest Solar System Object Spotted
New Horizons Reaches MU69
Comet Wirtanen Acquired by BRAS Members
Infant Star MM 1a Sprouts Companion

Back

Editor's Note

I just downloaded my free Kindle Ap for PC from Amazon, and the complimentary book they delivered along with it was a nice surprise:

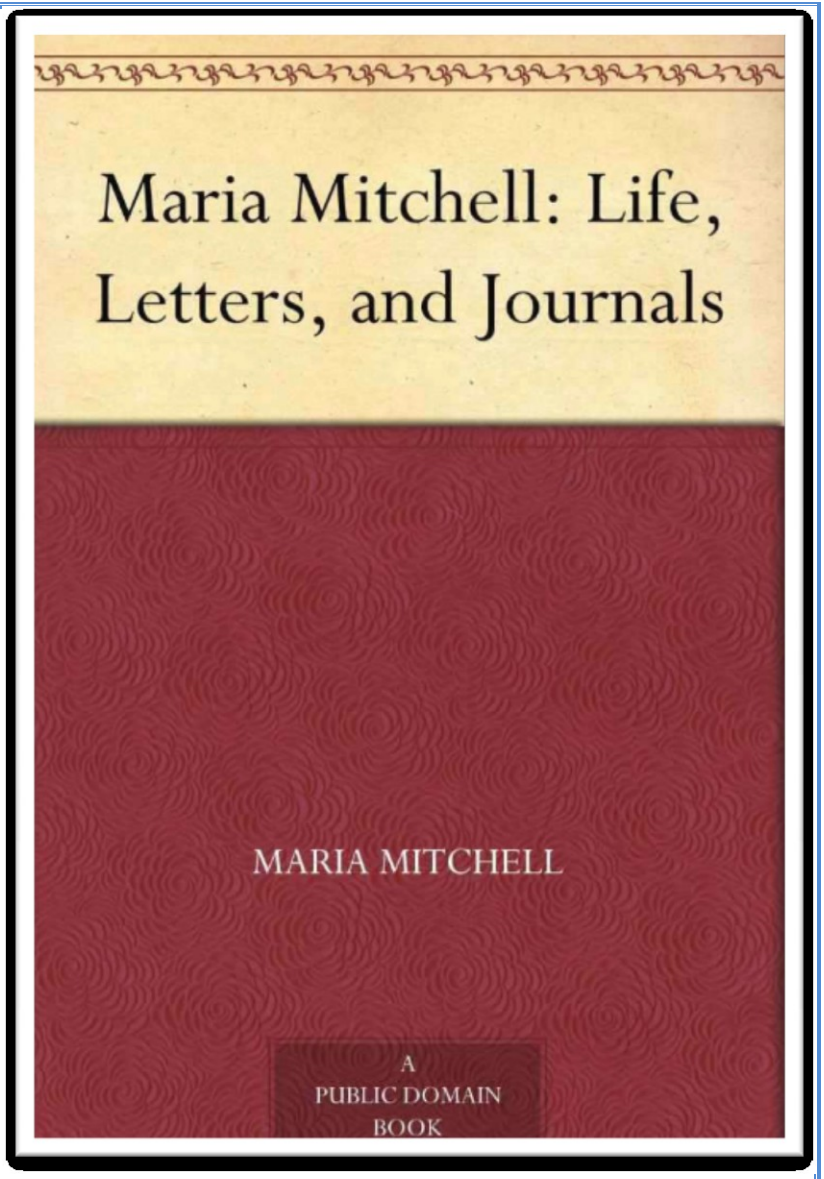
Maria Mitchell: Life, Letters, and Journals.

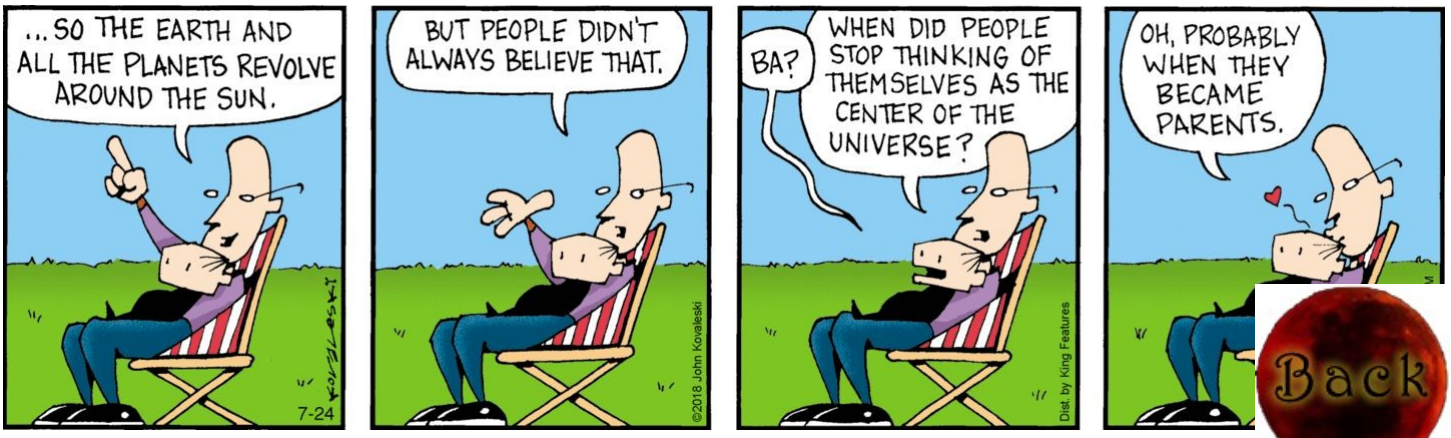
Miss Mitchell was the first American woman to work as a professional astronomer!.

*According to Wikipedia, "*Maria Mitchell was an American astronomer, who in 1847 by using a telescope, discovered a comet, which as a result became known as "Miss Mitchell's Comet." She won a gold medal prize for her discovery, which was presented to her by King Frederick VI of Denmark."
https://en.wikipedia.org/wiki/Maria_Mitchell

The 250 page book is personable, and full of interesting, playful anecdotes. I might even be tempted to turn it into an audiobook.

Not sure how long Google will be including this charming book along with your download, so if you don't have the Kindle for PC ap yet, better get it now. ***https://www.amazon.co.uk/kindle-dbs/fd/kcp***





Back

Messages from HRPO

Highland Road Park Observatory

SCIENCE ACADEMY

Saturdays from 10am to 12pm
For ages eight to twelve. $5/$6 per child.
5 January: "Surveying the Sun"
12 January: "Surveying the Moon"
19 January: "Winter Day"

Back

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

11 January: "2018—Space Year in Review" Kepler and Dawn came to an end…InSight arrived at Mars….New Horizons finally spied Ultima Thule…a comet from outside the Solar System visited…the exoplanet hunter TESS left Earth…the Parker Solar Probe entered the Sun's corona. These are only a handful of stories that will make 2018 forever memorable!
18 January: "Wonders of the Winter Sky" BREC Education Curator Amy Brouillette will take the audience on a fascinating tour of Baton Rouge's winter season. She'll highlight the celestial gems and events that will sparkle throughout the next three months—gems visitors will be able to see live if they continue to visit HRPO!
25 January: "Protecting the Power Grid" There are several different ways entire sections of our nation's Grid can be damaged or destroyed. Indeed, it's happened before…at least on a small scale. What about a large-scale event? Many believe it's a matter of when, not if. Are we prepared?

ONE-TIME CALLS FOR VOLUNTEERS

*Saturday 12 January, 7pm to 10pm. *Three or four volunteers.* **Evening Sky Viewing Plus.** Front desk greeting; physical science demonstrations; marshmallow roast; telescope operation. Low to moderate difficulty.
*Saturday 19 January, 12pm to 2pm. *Two or three volunteers.* **Solar Viewing.** Telescope operation for Sun viewing; front desk staffing. Moderate difficulty.
*Saturday 19 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.
*Sunday 20 January, 8pm to 2am. **Total Lunar Eclipse.** *Three or four volunteers.* Front desk greeting; merchandise sales; devices for nighttime viewing; demo tables; science task comparing views of dim objects before and during the eclipse. Low difficulty.
*Saturday 2 February, 5:30pm to 7:30pm. *Three or four volunteers.* **Learn Your Binocular.** 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 2019:

Orion, Dec. 29th to Jan.7th, and Jan. 27th to Feb. 5th.

Instructions to participate in this project are at…
http://www.brastro.org/phpBB3/viewtopic.php?f=29&t=2929

Adult Astronomy Courses

Saturdays from 3:30pm to 7:30pm

For ages eighteen and older.

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

5 January: Learn Your Sky
19 January: Learn Your Telescope
2 February: Learn Your Binocular

SPECIAL ALERT: DAYLIGHT TIME DISCUSSION

The conversation in the Louisiana State Legislature to eradicate the back-and-forth of Daylight to Standard is probably ending this month. There are two options if the twice-yearly switch is ended: to remain on Standard time year-round, or to remain on Daylight time year-round.

NOTICE:

HRPO's 8TH Annual Donation Drive Successful!!!

Thanks to all who donated.

The **Celestron NexStar 8SE** will be here soon!

Back

TOTAL LUNAR ECLIPSE

Sunday 20 January from 8pm to 2am

Free admission. For all ages.

TIMELINE

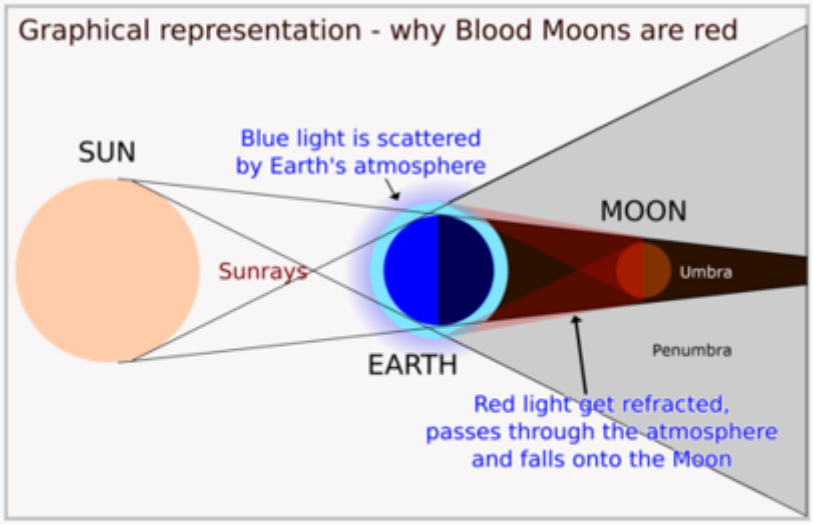
Partial Eclipse Begins: 9:33pm CST
Total Eclipse Begins: 10:41pm CST
Total Eclipse Ends: 11:43pm CST
Partial Eclipse Ends: 12:50am CST

OTHER CELESTIAL OBJECTS

From west to east: Mars, Uranus, the Perseus Double Cluster, Algol, the Pleiades Star Cluster, the Orion Nebula, the Beehive Cluster, Mizar and Alcor.

WHERE THE PUBLIC CAN VIEW ON HRPO PROPERTY

The public should not set up lawn chairs or blankets without receiving direction from HRPO personnel. Visitors may use only the lawn area south of the 16OGS building. They *should not* use any concrete for sitting or lying as that creates a tripping hazard.



The Moon does not completely darken as it passes through the umbra because Earth's atmosphere refracts sunlight into the shadow cone.

diagram from Wikipedia page on Lunar Eclipse

RETAINING NIGHT VISION

Please encourage the general public to keep headlights off. Encourage the outfitting of white flashlights with red construction paper, a red stretch balloon, red cellophane (several layers may be needed to make the light suitably dim) or a thin coat of red nail polish.

SOME MISCELLANEOUS RULES

- No glass containers are allowed.
- Pets must remain under control and on a leash at all times.
- Running is not allowed outside at night, or inside at any time.
- Alcohol, smoking and loud music are not allowed.

NASA photo of a total lunar eclipse in 2015.

Lunar eclipses occur when Earth's shadow blocks the sun's light, which otherwise reflects off the moon. There are three types — total, partial and penumbral — with the most dramatic being a total lunar eclipse, in which Earth's shadow completely covers the moon, and reflected light turns it red … sometimes called a "Blood Moon". The upcoming total lunar eclipse is on **Jan. 20-21, 2019** and will be visible from North and South America, Europe and Africa.

Observing Notes: January

by John Nagle

Ara – The Alter

Position: RA 17.00, Dec. -55.00°

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. This is the last of that class. Henceforth I will recycle the constellations and mythology, but the Sky Happenings calendar and associated information will be new each month. Also, for easy reference I will soon post a list of the month and year each constellation was published in Night Visions, (all issues are available on the BRAS website).

Named Stars:

Choo (Alpha Ara), "Club", "Staff", mag. 2.84, 17 31 50.52 -49 52 33.5, is a spectroscopic binary star of the Be type – a blue-white dwarf star, and a fast rotator – 375 km per second. In an optical alignment only, there is a companion star at 11th magnitude (TYC-8350-202-1) 46" to the south-southeast.
Tseen Yin (Delta Ara), "The Dark Sky" (along with Zeta Ara), mag. 3.60, 17 31 05.98 -60 41 01.0, is a blue-white B type main sequence dwarf star with a 12th magnitude companion star.
Tso Kang (Epsilon¹ Ara), "The Left Watch", mag. 4.06, 16 59 35.05 -53 09 37.8, is a binary star. The primary is an orange giant star. The secondary star, **Epsilon² Ara**, mag. 5.27, 17 03 08.71 -53 14 11.9, is a binary star also with the primary a yellow-white main sequence dwarf star, and its companion, at magnitude 8.6, is only 0.6 arc seconds away. There is third component, a 13th magnitude star found 25 arc seconds from the primary star.

Deep Sky:

NGC 6193, "Firebird Cluster", mag. 5.2, 16 42 44 -48 47 48, 15' in size, 27± stars, **C 82, Cr 310, vdB-Ha 195, ESO 226-020, Δ 413, Lund 716**, contains two massive blue "O" type stars (**HD 150135** at mag. 6.8, and **HD 150136** at mag. 5.6) with only 10" of separation. This cluster is only about 3 million years old and surrounds **NGC 6188**. Located 8˚ west of **Alpha Arae** and 1˚ north, or 2.7˚ south-southeast of **Epsilon Normae**.
NGC 6397, mag. 5.3, 17 42 12 -53 40 57, 25.7' in size, 400k stars, is a globular cluster. **C 86, Bennett 98, ESO 181-004, Mel 176, Δ 366**, contains blue straggler stars. Located 40" east of **Epsilon Arae**. One of the first globular clusters formed.
Cr 320, mag. 5.9, 16 57 56 -45 56 12, 7' in size, 10 stars, located within **NGC 6250.**
NGC 6250, mag. 5.9, 16 59 18 -47 57 50, 9' in size, ± 60 stars, **Cr 320, vdB-Ha 206**, **ESO 277-020, Lund 785**. 11' to the northeast is **vdB-H 76**, and 15' to the southeast is **vdB-H 79.**
Ho 22, mag. 6.7, 16 46 36 -47 05 00, 3' in size, ± 8 stars, **Lund 720. Van den Bos 1825** (double star) is 30' southwest of the center of **Ho 22**, and 6' to the northwest is **NGC 6204**.
Cr 327, mag. 6.9, 17 25 14 -49 57 35, 10' in size, 65 stars, located within **IC 4651**.

IC 4651, mag. 6.9, 17 24.7 -49 57, 12' in size, ± 80 stars, **Mel 169, Cr 327, vdB-Ha 224, Raab 120, Δ 402, Lund 716.**
Cr 313, mag. 7.2, 16 49 28.1 -53 43 42, 15' in size, 40 stars, within **NGC 6208**.
NGC 6208, mag. 7.2, 16 49 50 -53 49 00, 18' in size, 60 stars, **ESO 179-014, Cr 313, Δ 364, vdB-Ha 198, Lund 727.**
Cr 311, mag. 7.4, 16 44 07.3 -47 27 45, 12' in size, 40 stars, within **NGC 6200**.
NGC 6200, mag. 7.4, 16 45 30 -47 29 45, 12' in size, 40 stars, **ESO 277-008**. Located in **ARA OB1/2**.
Cr 328, mag. 7.8, 17 25 29.1 -48 25 22, 7.1' in size, located within **NGC 6352**.
NGC 6352, mag. 7.8, 17 26 54 -48 26 17, 8' in size, is a globular cluster. **C81, Mel 170, Bennett 94, ESO 228-003, Δ 417.**
NGC 6362, mag. 8.1, 17 33 49 -67 03 38, 10.7' in size, is a 10 billion year old globular cluster. **Bennett 95, ESO 102-008, Mel 172, Δ 275**.
Cr 312, mag. 8.2, 16 46 09.5 -47 01 01, 5' in size, 20 stars, within **NGC 6204.**
NGC 6204, mag. 8.2, 16 42 32, -47 02 57, 5' in size, 45 stars, **Cr 312, vdB-Ha 196, ESO 277-010, Δ 442, Lund 728.** Located in **ARA OB1/2.**
H 13, mag. 9.0, 17 01.7 -48 06, 15' in size, 70 stars.
Cr 307, mag. 9.2, 16 35 20 -51 00 00, 6' in size, 22 stars, 391, Δ 392, vdB-Ha 193, Lund 709.
ARA OB1/2 Association is a star forming region with nebulosity; contains the "rim" nebulae. The heart of which is **NGC 6193**, with parts of **NGC 6188** forming the "rim" nebulae. An OB Association is a loose aggregation of between 10 and 1,000 massive, luminous stars of types O and B scattered throughout a region of up to several hundred light years.
IC 4656, 17 37 42 -63 44 00, 2.2' in size.
NGC 6188, "Rim Nebulae", 16 41 18 -48 46 00, 20'x12' in size, **Ced 136, 136A, Gum 53, RCW 108**, is an emission nebula lit by two stars – **HD 150135** and **HD 150136** (located in **NGC 6193**). The eastern border of **NGC 6188** has 4 distinct rims.
IRAS 16594-4656, "Water Lily Nebula", 17 03.1 -47 00, **PK 340-03.1, 2 mass-6C3**, is a pre-planetary nebula.
We 1, "Ara Cluster", 16 47 04 -45 51 09.4, is a 3 million year old super star cluster containing 6 yellow hyper-giant stars; Westerlund 1-26 (a red supergiant star), one of the largest stars known; 4 red super-giant stars; 24 Wolf-Rayet stars; many OB super-giant stars; and 1 luminous blue variable star.
Deep Sky beyond magnitude 10 contains the following;
8 NGC; 3 IC; 1 Cr; 6 He2, 2 He3, 34 ESO; 3 PK, 1 Sp; 1 Cn; 1 FSR; 6 PGC; 1 Alessi; 2 Allen; 1 H; 2 Ho; 4 IRAS; 2 Ly, 3 PC; 2 Ru, 2 Sa (Sanduleak); 8 Sa (Sandqvist); 1 R; 2 SDC; 1 vdBH; and 1 vdB-Ha.

Other Stars:

Kappa Ara, mag. 5.19, 17 26 00.03 -50 38 00.7, is a triple star system.
Mu Ara, mag. 5.12, 17 44 08.72 -51 50 00.9, is a main sequence yellow dwarf star with 4 planets in orbit. Named "**Cervantes**" in a Name Exo Worlds Public Vote.
Iota Ara, mag. 5.21, 17 23 16.08 -47 28 05.4, is a Be star.
HD 157661, mag. 5.28, 17 26 51.96 -45 50 34.7, is a multiple star system.
HD 150136, mag. 5.65, 16 41 20.42 -48 45 46.7, is a triple star system with 2 "O" type stars being a spectroscopic binary in a 2.6 day orbit. The X-ray luminosity is extremely intense. Located in **NGC 6193**, and illuminates the **NGC 6188** nebula.
V 539 Ara, mag. 5.68, 17 50 28.39 -53 36 44.6, is a slowly pulsing "B" type star.
V 862 Ara, mag. 5.95, 17 31 23.28 -56 55 15.47, is a Be type star.
Rho[1] Ara, mag. 6.30, 16 56 08.85 -50 40 29.2, is a Be type star.
HD 156411, mag. 6.67, 17 19 51.40 -48 32 57.5, has one planet in orbit.
HD 156385, mag. 6.92, 17 19 29.90 -45 38 23.9, is a Wolf-Rayet star.
HD 154857, mag. 7.25, 17 11 15.72 -56 40 50.9, has two planets in orbit.
HD 154672, mag. 8.21, 17 10 04.91 -56 26 57.4, has one planet in orbit.

Back

HD 152079, mag. 9.20, 16 53 29.74 -46 19 58.6, has one planet in orbit.
Gliese 674, mag. 9.36, 17 28 39.95 -46 53 42.7, has one planet in orbit.
Gliese 676A, mag. 9.59, 17 30 11.20 -51 38 13.1, is part of a binary system (two red dwarf stars) containing 4 planets. **Gliese 676B**, 17 30.2 -51 38.
Stars of interest beyond magnitude 10:
SAO 244567, V 839, mag. 10.75, 17 16 21.08 -59 29 23.3, is the center star of the "**Stingray Nebula**", **He3-1357**.
CPD-56 8032, V 837, mag. 11.04, 17 09 00.86 -56 54 48.1, is a Wolf-Rayet star and the central star of a planetary nebula.
GX 339-4, V 821, mag. 15.5, 17 02 49.36 -48 47 22.8, is an X-ray nova star and a variable star with a period of 1.7557 days (varies from mag. 15.4 to 20.4).
BPM 25114, V 820, mag. 15.62, 17 47 46.9 -52 07 10, is a variable white dwarf star.
Westerlund 1-26, mag. 16.79, 16 47 05.40 -45 50 36.8, is a red super-giant star in **We 1**, and is one of the largest stars known – 1500 times the size of the **Sun**.
4U 1636-53, V 801, mag. 17.5, 16 40 55.5 -53 45 05, is an X-ray burster star.
SGR 1627-41, 16 35 52 -47 35.2, is a soft gamma repeater star.
OY Ara, HD 149990, 16 40 50.27 -52 25 51.3, is a nova star.
CXOU J164710.2-455216, 16 47 10.20 -45 52 16.8, is an anomalous X-ray pulsar star located in **Westerlund 1**.
PSR J1644-4559, 16 44 49.28 -45 59 09.5, is a pulsar star.
XTE J1650-500, 16 50 00.98 -49 57 43.6, is a low-mass X-ray binary star, and a black hole candidate.
XTE J1701-462, 17 00 58.46 -46 11 08.8, is a low-mass X-ray binary star.
Also beyond magnitude 10 are the following stars:
15 Herschel; 6 variable; 5 Δ (Dunlop); 1 CapO; 1 BrsO; 2 CorO; 2 λ (See); 3 Hld (Holden); 1 Rmk (Runker); 1 Slr; 1 Rst (Rossiter); 1 Co; 3 Hd, 10 I (Innes); 1 vdBH; and 1 vdB-Ha.

Sky Happenings:January, 2019 Calendar

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

Jan 1st - Just after midnight, ***New Horizons*** will make its closest approach to the possibly binary ***Kuiper Belt*** object nicknamed ***Ultima Thule***,
Dawn: The waning crescent **Moon** glides past **Jupiter**, in the southeast in **Libra**,
The **Moon** passes 1.3˚ north of **Venus** at 4 PM CST.
Jan 1st/2nd- Midnight – **Saturn** is in conjunction with the **Sun.**
Jan 2nd - **Earth** is at perihelion (91.4 million miles or 147,099 km from the **Sun**) at 11 PM CST.
Jan 3rd - The **Moon** passes 3˚ north of **Jupiter** at 2 AM CST,
Quadrantid meteor shower peaks.
Jan 5th - **New Moon** occurs at 7:28 PM CST,
Venus is at greatest western elongation (47˚) at 11 PM CST.
Jan 6th - **Uranus** is stationary at 8 PM CST.
Jan 8th - The **Moon** is at apogee (252,850 miles or 406,117 km from **Earth**) at 10:29 PM CST.
Jan 10th - The **Moon** passes 3˚ south of **Neptune** at 4 PM CST.
Jan 11th - **Pluto** is in conjunction with the **Sun** at 6 AM CST.
Jan 12th - The **Moon** passes 5˚ south of **Mars** at 2 PM CDT.
Jan 14th - **First Quarter Moon** occurs at 12:46 AM CST,
The **Moon** passes 5˚ south of **Uranus** at 6 AM CST.
Jan 15th - **Venus** passes 8˚ north of **Antares** at 3 PM CST.
Jan 17th - The gibbous **Moon** is 1.6˚ of **Aldebaran** at 1 PM CST.
Jan 20th - A **Total Lunar Eclipse** starts at 8:37 PM CST and ends at 1:48 AM CST on the 21st,
Full Moon occurs at 11:16 PM CST.
Jan 21st - The **Moon** is at perigee (222,042 miles or 357,342 km from **Earth**) at 2 PM CST.
Jan 22nd - **Venus** passes less than 2½˚ north of **Jupiter**, in **Ophiuchus**, in the early morning hours

before dawn. Red **Antares** is a little more than 8˚ to the right of the pair.

Jan 23rd - Dawn: Just before sunrise, **Saturn** makes its reappearance, very low in the southeast, 7˚ west of **M 44** – the **Beehive Cluster**.

Jan 27th - **Last Quarter Moon** occurs at 3:10 PM CST.

Jan 29th - **Mercury** is in superior conjunction with the **Sun** at 9 PM CST.

Jan 30th - Dawn: **Venus** and **Jupiter** are flanked by the waning crescent **Moon** and **Saturn**, The **Moon** passes 3˚ north of **Jupiter** at 6 PM CST.

Jan 31st - Dawn: The **Moon** is between **Jupiter** and **Venus** with **Saturn** lower, in the southeast, The **Moon** passes 0.09˚ north of **Venus** at 12 noon CST.

Planets:

Mercury – In the opening days of 2019, **Mercury** (at mag. -0.4) glimmers at about 5½˚ above the southeast horizon 30 minutes before sunrise in a long diagonal line (as the bottom left planet) equally spaced with **Jupiter** and **Venus**. After the 3rd or 4th, **Mercury** is lost in the strong twilight glow. **Mercury** reaches superior conjunction with the **Sun** on the night of January 29th/30th.

Venus – Venus rises a little after 2:30 AM CST at year's beginning, more than 3½ hours before sunup. The planet will reach greatest western elongation (47˚) and will climb 25˚ high in the southeast an hour before sunrise on the night of the 5th/6th. The sunrise altitude of **Venus** will decrease from 31˚ to 23˚ during the month, and the planet will also dim from magnitude -4.6 to -4.3. On the 6th, a telescope will show a 25" diameter disk that will appear 50% lit. On **New Year's Day, Venus** will pass 1.3˚ south of the waning crescent **Moon**. On the 22nd, the planet will pass 2½˚ north of **Jupiter**, and have a close conjunction (0.1˚) with the waning crescent **Moon** on the 31st.

Mars – Mars stands out in the relatively dim background stars of **Pisces**, shining at magnitude 0.5 in early January, and fades to magnitude 0.9 by month's end, with its disk shrinking from 7½" to 6" wide. On January 26th, the planet slides 0.9˚ south of 4th magnitude **Epsilon Piscium**. **Mars** is bracketed by Uranus and **Neptune** all month. **Mars** sets around 10:20 PM CST on January 1st, and by 10PM CST by month's end.

Jupiter – Jupiter rises about 2 hours before the **Sun**, among the background stars of **Ophiuchus**, very low in the southern sky where it will spend the entirety of 2019. The planet will brighten from magnitude -1.8 to -1.9 during the month. A thin waning crescent **Moon** passes 3˚ north of the planet on the 3rd and the 31st. On the 12th, **Jupiter, Saturn**, and **Antares** form a tall triangle. On the 19th, **Venus** is 3¾˚ above **Jupiter**, with **Antares** at just about the same altitude as **Jupiter**, forming a squat right triangle. On the 22nd, **Jupiter** will be 2˚ south of **Venus.** On the 26th, **Jupiter, Venus,** and **Antares** form a horizontal line, with a little more than 4˚ separating the two planets, and around 8˚ between **Jupiter** and **Antares**. For transits and occultation of the Galilean moons, see page 51 of the January issue of ***Sky and Telescope***.

Saturn – Saturn is in conjunction with the **Sun** on January 2nd, and is not visible when it passes less than 2˚ from **Mercury** on the 13th. **Saturn** will emerge into visibility, low in the southeastern sky, in morning twilight around the third week of January, at magnitude +0.6. On the 31st, **Saturn** will be 7˚ high in the southeast 45 minutes before sunrise.

Uranus – Uranus spends January in eastern **Pisces**, appearing 60˚ above the southern horizon (at magnitude +5.8) as twilight fades into darkness in early January, and 50˚ high in the southwest in late January. Look for **Uranus** 1.2˚ north of 4th magnitude **Omicron Piscium** in the first half of the month. During the 2nd half of the month, the planet edges eastward, reaching a point 1.4˚ north-northeast of **Omicron Piscium** by the 31st. **Uranus** will display a disk measuring 3.6" across, and has a distinctive blue-green color.

Neptune – Neptune lurks among the background stars of **Aquarius**, low in the southwest evening sky, where it will remain throughout 2019. In early January, it stands 30˚ high at the end of twilight, dropping to 15˚ high at the end of the month. **Neptune** lies midway between **Lambda Aquarii** and **Phi Aquarii** (both at 4th magnitude) in eastern **Aquarius**. A trio of 5th and 6th magnitude stars – **81, 82**, and **83 Aquarii** form a right triangle in this area. **Neptune**, at magnitude 7.9, lies 14' southeast of **81 Aquarii** on January 1st. The planet ends the month 55' southeast of **81 Aquarii** and 46' north of **83 Aquarii**. Only **Neptune** shows a distinct disk that spans 2.2", and displays a subtle blue-grey color.

Pluto – Pluto is in conjunction with the **Sun** on January 11th.
Moon – The **Moon** is totally eclipsed on the night of January 20th/21st. The waning lunar crescent is 5˚ to the upper right of **Venus** on January 1st, and around 7˚ to the lower left of **Venus** on the 2nd. The slim lunar crescent is 3˚ to 4˚ to the left of **Jupiter** on the 3rd, and around 3˚ above a low hanging **Mercury** ½ hour before sunrise on the 4th. A thick, waxing crescent **Moon** is some 5˚ to the lower left of **Mars** on the 12th. The waning lunar crescent is 6˚ to 7˚ to the upper right of **Jupiter** on January 30th, and on the morning g of the 31st it will be between **Jupiter** and **Venus**.

Earth – Earth reaches perihelion, a minimum of 0.98 au (specifically, 147,099,761 km or 91.4 million miles from the **Sun**) on January 2nd at 11 PM CST.

Asteroids **–** Asteroid **433 Eros** will pass the **Earth** at 19 million miles distance on January 15th. **Eros** heads south along the **Perseus-Auriga** border before entering **Taurus** near month's end. Avoid searching for it between January 15th and 19th, due to a waxing gibbous **Moon. Eros**' position, ***by my estimates***, are as follows: On January 1st – about 7˚ east of **Alpha Per**; on the 6th – about 8½˚ west of **Capella (Alpha Aurigae)**; on the 11th – about 5˚ east-northeast of **Epsilon Per;** on the 16th – about 7˚ southeast of **Epsilon Per**; on the 21st – about 1¾˚ west of **Iota Aurigae**; on the 26th - 5˚ west of **Beta Tau**; and on the 31st – about 5˚ west-southwest of **Beta Tau**.

Comets **–** Comet **46P/Wirtanen** is expected to glow at magnitude 7 in early January as it crosses from northeast **Lynx** into western **Ursa Major**. Use the 3rd magnitude **Omicron Ursa Majoris** – the nose of the great bear – as your guide. **Wirtanen** slides 1˚ south of **Omicron UMa** on January 10th. The comet may dip to 9th magnitude by month's end. My estimates of its position are as follows: on January 1st – about 1½˚ south of **18 Lynx**; on the 3rd – about ½˚ west of **24 Lynx**; on the 5th – about 1½˚ east and slightly north of **24 Lynx**; on the 7th - about 2½˚ west-southwest of **Omicron UMa**; on the 9th – about 1½˚ south-southwest of **Omicron UMa**; and on the 11th – about 1½˚ south-southeast of **Omicron UMa**. Comet **Wirtanen** passed within 0.08 au (7,440,000 miles) of **Earth** in December.

Comet **21P/Giacobini-Zinner** is along the **Columba-Canis Major** border, moving north at magnitude 12.

Comet **38P/Stephan-Oterma** will be at magnitude 9 to 10, moving north from **Lynx** to the border with **Ursa Major** (west of **Iota UMa** and **Kappa UMa**), in the morning sky.

Comet **64P/Swift-Gehrels**, at about magnitude 10 to 11 in December, is traveling from northwest **Aries** into **Taurus** north of the **Pleiades** during January.

Meteor Showers **–** The **Quadrantid Meteor Shower** peaks on the night of January 3rd/4th. Scientists expect the shower to peak around 8 PM CST. Unfortunately, the radiant is below the horizon, and won't climb high until the early morning hours on the 4th. The radiant is located in northeastern **Bootes**, low in the northwest sky at dusk, and skims the northern horizon, and then will begin to rise higher into the northeast sky. Maximum rate at peak is 120 meteors per hour.

There are several minor meteor showers during January:

January Leonids – Peaks on January 3rd, weak, difficult to separate from background, sporadic
Alpha Hydrids – Peaks on January 3rd, weak, sporadic, difficult to separate from background
Xi Coronae Borealids – Peaks on January 16th, weak, sporadic, hard to separate from background
Lambda Bootids – Peaks on January 16th, weak, sporadic, difficult to separate from background
Gamma Ursa Minorids – Peaks on January 18th, at least 3 meteors per hour at maximum
January Xi Ursae Minorids – Peaks on January 18th, weak
Eta Corvids – Peaks on January 22nd, weak
January Comae Berenieids – Peaks on January 23rd, weak

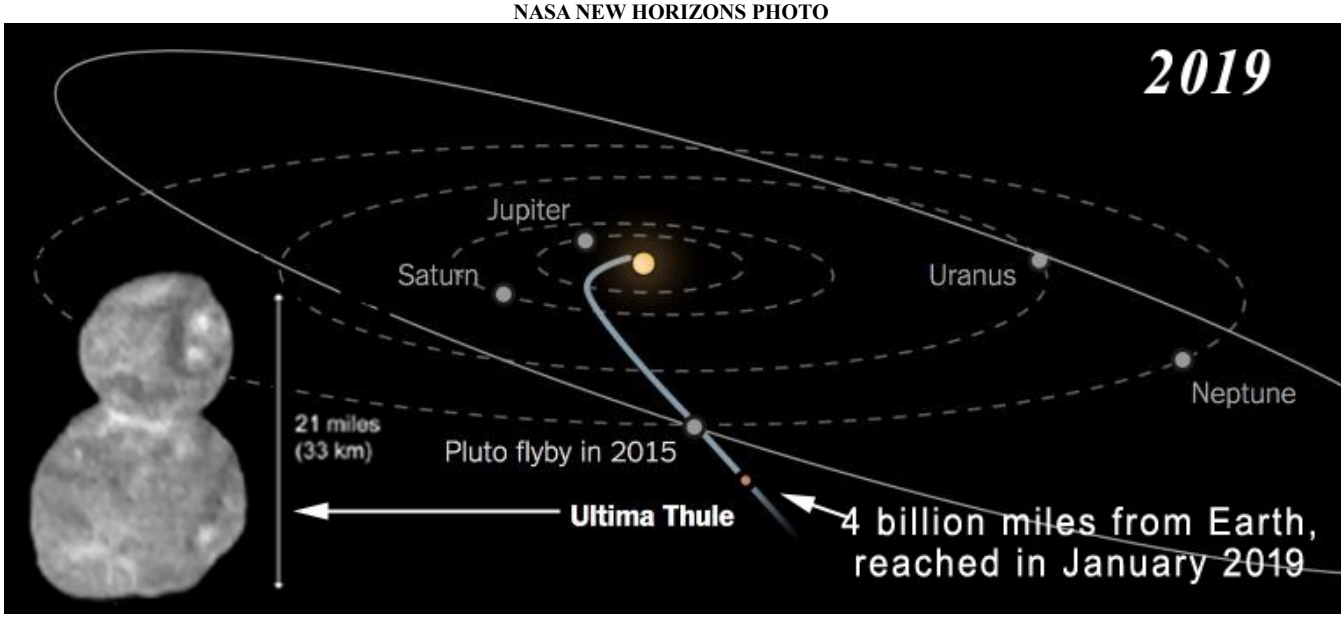
When to View the Planets:

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

DARK SKY VIEWING - PRIMARY ON JANUARY 5TH, SECONDARY ON JANUARY 12TH

Ultima Thule, the farthest space object ever visited from Earth to date, 4 billion miles from Earth

NASA NEW HORIZONS PHOTO



Mythology:

Ara – the Altar

Altars feature frequently in Greek legends, for heroes were always making sacrifices to the gods, so it is not surprising to find an altar among the stars. But this altar is a special one, for it was used by the gods themselves to swear a vow of allegiance before their fight against the Titans, according to Eratosthenes and Manilius. That clash was one of the most significant events in Greek mythology.

At that time the ruler of the universe was Cronus, one of the twelve Titans. Cronus had overthrown his father, Uranus, but it was prophesied that he would be deposed by one of his own sons. In a desperate attempt to forestall the prophesy, Cronus swallowed his children as they were born; Hestia, Demeter, Hera, Hades, and Poseidon, all ultimately destined to become gods and goddesses. At last, his wife, Rhea, could not bear to see anymore children swallowed. She smuggled the next child, Zeus, to the cave of Dicte in Crete, and gave Cronus a stone to swallow instead, telling him it was the infant Zeus.

On Crete, Zeus grew up safely. When he reached maturity, he returned to his father's palace and forced Cronus to vomit up the children he had swallowed, who emerged as fully grown gods and goddesses. Zeus and his brother gods then set up an altar and vowed on it to overthrow the callous rule of Cronus and the Titans.

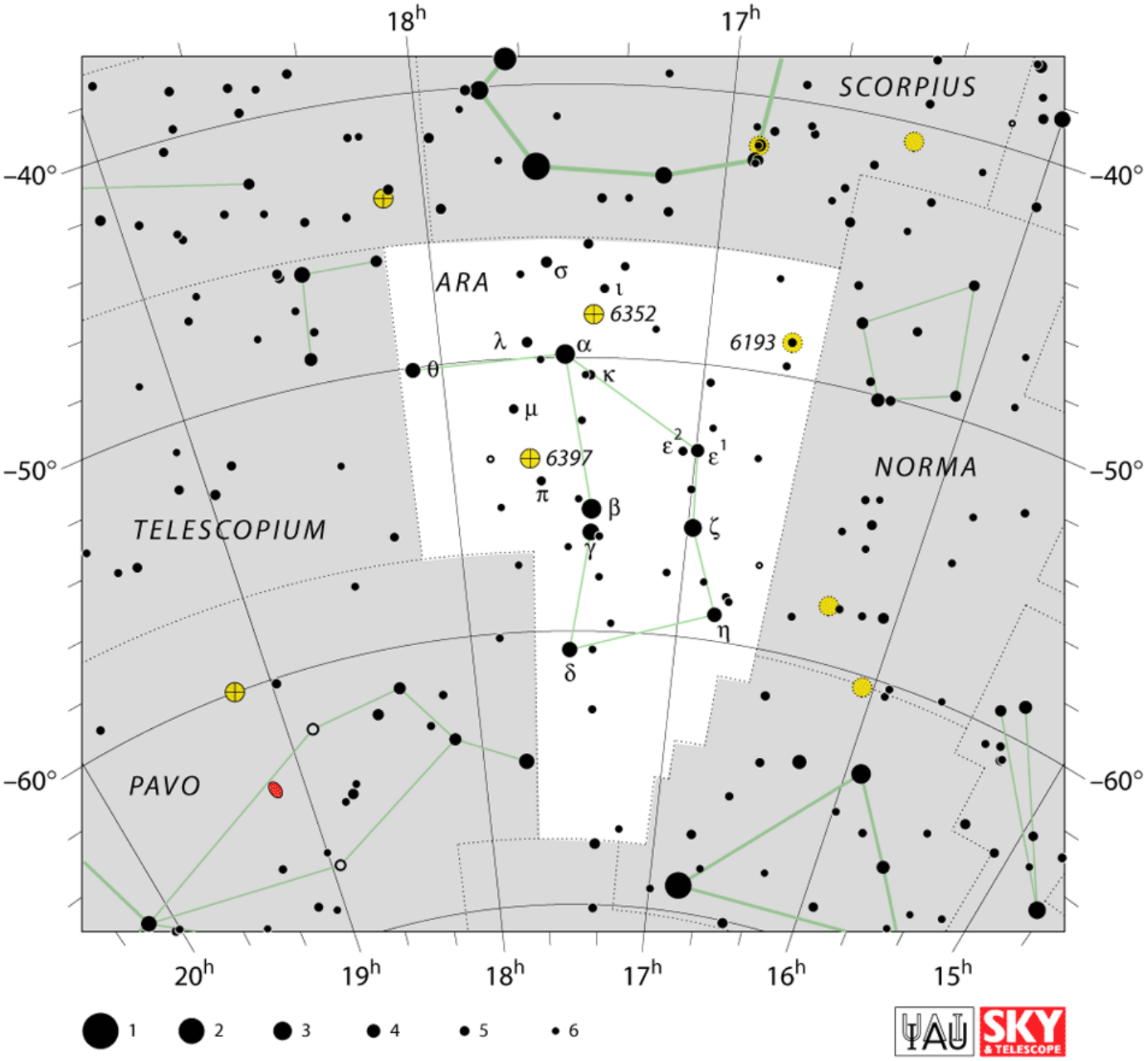
The battle raged for 10 years between the Titans, led by Atlas, on Mount Othrys, and the gods led by Zeus on Mount Olympus. To break the deadlock, Mother Earth (Gaia) instructed Zeus to release the ugly brothers of the Titans, whom Cronus had imprisoned in the sunless caves of Tartarus, the lowermost region of the underworld. There were two sets of brothers, the Hecatoncheines (hundred-hand giants), and the one-eyed Cyclopes, and they wanted revenge against Cronus. Zeus stole down to Tartarus, released the monstrous creatures and asked them to join him in the battle raging above. Delighted by their unexpected freedom, the Cyclopes set to work to help the gods. They fashioned a helmet of darkness for Hades, a trident for Poseidon, and above all, thunderbolts for Zeus. With these new weapons and their monstrous allies, the gods routed the Titans.

After their victory, the gods cast lots to divide up the universe. Poseidon became Lord of the Sea, Hades won the Underworld, and Zeus was allotted the Sky. Zeus then placed the altar of the gods in the sky as the constellation Ara in the lasting gratitude for their victory over the Titans.

The Greeks regarded Ara as a sign of storms at sea. According to Aratus, if the altar was visible while other stars were covered by clouds, mariners could expect southerly gales.

Originally the Greeks visualized the altar with its smoke rising northwards, but since the atlas of Johann Bayer in 1603, it has been depicted with its top facing southwards.

Atlases also show Ara as the altar on which Centaurus is about to sacrifice Lupus, the Wolf.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The End

Back