Monthly Meeting February 11th at 7PM at HRPO

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

Speaker: Chris Desselles on Astrophotography

What's In This Issue?

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

President's Message

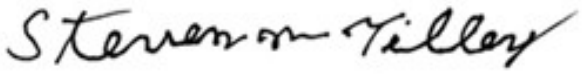
The highlight of January was the Total Lunar Eclipse 20/21 January 2019. There was a great turn out at HRPO, and it was a lot of fun. If any of the members wish to volunteer at HRPO, please speak to Chris Kersey, BRAS Liaison for BREC, to fill out the paperwork.

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:
Light Pollution Committee - HRPO, Wednesday, February 6, 6:15 P.M.
Business Meeting – HRPO, Wednesday, February 6, 7 P.M.
Monthly Meeting – HRPO, Monday, February 11, 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

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."

Secretary's Summary of January Meeting

- Welcome by President Tilley.
- Chris Desselles introduced the speaker for the evening, club member Jim Gutierrez, who gave an interesting talk entitled “Sun Spots, Hot Spots, and Relativity”.
- Chris D. is looking for presenters for future BRAS meeting lectures; please let him know if you can help out with this. He will be giving a lecture on astrophotography at the next BRAS meeting as well as at the following Friday Night Lecture at the Observatory.
- Steven encouraged all members to sign up for the “Members Only” area of the online forum in order to reduce email traffic.
- Various items from the BRAS holdings were displayed at this meeting so that people could see what was available for auction. If you saw something you liked and would like to place a bid, you were invited to send a description of the item along with a bid to John Nagle via email prior to the weekend before the next BRAS meeting.
- Trey mentioned that he had 9 Astronomy calendars for 2019 still available.
- Coy updated the group about the status of his article that should’ve been in the December Reflector; it will be in the March one instead.
- Don gave the update on the Rockefeller Star Party. He hadn’t talked to the people at the Refuge yet, but he was thinking that it was going to go on as scheduled the first weekend in February. He reminded everyone that the price per person was $10 a night and that you should make plans to arrive during the daylight hours as it’s very easy to miss in the dark. This is located a few miles west of the Cameron parish line on LA 82. He wasn’t sure which building the group was staying in or whether there was going to be a boat ride of some sort involved as there was last year. If you go, you will need to bring your own food, but he is planning on bringing his jambalaya pot and cooking that for Saturday evening. He had a few spots remaining on his signup sheet for those who were interested; updates would be handled via email.
- Scott asked that those interested in helping Ben for outreach opportunities contact him (Ben) as we have requests currently from now through July.
- New people at the meeting were recognized. Steven reminded everyone about the membership pins available.
- Chris Kersey reminded everyone about the lunar eclipse Sunday evening; he encouraged volunteers to sign up for this as well as other upcoming events via the clipboard posted on the back of the BRAS closet door.
- Merrill announced the deadline for the Texas Star Party lottery was Friday, January 18th.
- Craig brought a king cake and a raffle was held.
- Scott Cadwallader was presented with an Astronomical League award for Outreach II (Stellar).

Submitted by Roz Readinger, substitute secretary for Krista Reed

2019 Officers:

President: Steven M. Tilley
Vice-President: Chris Desselles
Secretary: Krista Reed
Treasurer: Trey Anding

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

Committees/Coordinators:
Light Pollution:
John Nagle
Newsletter:
Michele Fry
Observing Notes:
John Nagle
Outreach:
Ben Toman
Webmaster:
Frederick Barnett

BRAS Outreach Report

Hi Everyone,
I hope your 2019 is shaping up well so far. As far as BRAS Outreach, it didn't start out so well. We were once again clouded out for Sidewalk Astronomy. If only clouds were more interesting to look at though telescopes!

Aside from that little let down, the prospects for Outreach are looking up. (Ha ha.) As you'll see below, we've had several inquiries that we'll be fielding as well as attempting to continue our Sidewalk Astronomy programs.

Again, it's still the start of a new year. Ever thought of getting a little more involved with the club? Volunteering for outreach is a great way to do it. It's a fun time and you really don't have to have any prior experience. "But I don't know that much about astronomy," you say? You'd be surprised at how much you learn from helping out at an outreach. Remember, we're not getting into quantum or orbital mechanics, or even deep explanations of cosmic phenomena. We're generally talking to young kids and parents that know very little themselves about astronomy.

CHECK OUT OUR AWESOME OUTREACH BANNER!

I know I have learned so much just by being involved with our club's outreach events. So many times I've been standing by listening to another club member point out a constellation or named star, throw out a quick factoid about the solar system, or even just talking about how a telescope works. The next thing you know, I'm telling someone that same information I just learned. It seems like I never come away from an outreach without learning another cool thing about astronomy. Start storing all of that up and all of a sudden people think you know all about this stuff!

Recent Catholic High School Outreach event photo shows our banner and solor system display. Photo by Ben Tomen

So, give this list of events a perusal and let me know if you'd like to jump in and help out. If you are interested, let me know right away. Don't worry, we won't send you out there alone, but often times I need to know if we're going to have help. If no one volunteers, we have to cancel our participation. I think that our goal should be to never turn away a reasonable request for an outreach. We need your help if we're going to make that happen! As you can see, we have a lot to do, and I'm not even including a couple coming up in June and July yet.

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Upcoming Outreach Events

Thursday, February 7th
5:30pm-8pm
Oak Grove Primary School STEAM Night (Jefferson Hwy Prairieville)
Demo/info table
(I have enough people, but if you'd like to come out, feel free!)

Saturday, February 9th
4:00pm-8:00pm
Mid City Maker's Market
Telescopes
(2 or more people needed)

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

Thursday, February 28th
5:30-7:30pm
Westdale Hieghts Academic Magnet School STEAM Night
Demo/info and possible scopes on the basketball court
(3 or more volunteers needed)

Saturday, March 9th
9am-4pm
Bluebonnet Swamp Rockin' At The Swamp
Demo/info and solar observing
(6 or more volunteers to work shifts throughout day. Sign up for as long or little as you can.)

Saturday, March 9th
4pm-8pm
Mid City Maker's Market
Telescopes
(2 or more people needed, but we may not participate due to the Rockin' At The Swamp earlier)

Tuesday, March 12th
6pm-8pm
McKinley Middle Academic Magnet School STEAM Night
Demo/exhibit table w/ possible scope outside
(3 or more volunteers needed)

Tuesday, March 12th
7pm-9pm
Sidewalk Astronomy at Perkins Rowe

Sunday, April 7th
9:30am-5:00pm
Zippity Zoo Fest at Baton Rouge Zoo
Demos/exhibits and solar scopes
(6 or more volunteers needed for shifts throughout the day)

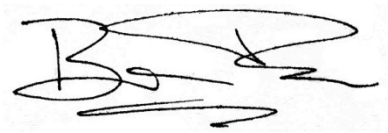
Tuesday, April 16th
7pm-9pm
Sidewalk Astronomy at Perkins Rowe

Thursday, April 25th
5:30pm-7:30pm
West Baton Rouge Parish Library's STEAM Fair
Demos/exhibits and possible telescope observing (maybe solar?)
(3 or more people needed)

Friday, May 10th
6pm-10pm
Hot Art Cool Nights at Mid City Maker's Market
Telescopes
(3 or more people needed)

Tuesday, May 14th
7pm-9pm
Sidewalk Astronomy at Perkins Rowe

Clear skies,



Ben Tomen, Outreach Chairperson

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Astronomy Ap Share

Sky Safari 6 Pro Planetarium App, shared by John Nagle

"This app simulates the night sky from anywhere on the planet Earth up to 1 million years into the future or past.
With this app, you can search for celestial objects (25 million stars, 740 thousand galaxies to the 18th magnitude, 630 thousand solar system objects – asteroids, moons, comets, etc.). You can set the screen to night vision (red). It has the latest NASA Moon and Mars maps. You can set the display for the following: magnitude limit for stars displayed; magnitude limit for deep sky objects; how constellations and their boundaries are displayed; what grid and reference lines are displayed; the precession epoch to display; color settings for what is displayed; and more. This is the app I use when I am observing."

So, members, what's your favorite Astronomy Ap, and how do you use it? Want to share? Send it to me at newsletter@brastro.org . . . . . ***Don't make me have to hunt you down.***

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, and 1 guest
December minutes were published in the January newsletter

The entire meeting was on the subject of the "Dark Sky Advocacy" web page(s) design and what to put on it.
Decided to use the same design as the BRAS web pages – Basic intro page with basic goals, left side to be a list of LP topics / information and links. Possible use of graphics discussed.
Homework given – How would you design the web page, and what should be contained in it.

Our guest this month was a high school student from St. Joseph's Academy who is doing a project on Light Pollution. We offered her our assistance via information and contacts.

Minutes of this meeting read and approved
Meeting adjourned.

John R. Nagle

Submitted by John Nagle, Chairman

From Christopher Kyba, Administrator

Loss of the Night Citizen Science Project

"I completed the analysis of the data from our sister "Globe At Night" project and I am afraid I have BAD NEWS. Over the period of 2006 to 2018 the sky worldwide got brighter . . . a lot brighter! The fault may not be LED street lights as it could also be due to increases in total numbers of lights and things like illuminated signs. But the trend is very clear. ***We need more people to participate in the Globe At Night project during the month of March to help fill in the data we need to submit for a research grant.***"

BRAS members who can step up and/or spread the word (anyone can participate), here's the link from our website to help you participate.

GLOBE at Night 2019:

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

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

February 2019

Volume 1. Issue 2.

January began with the flyby of the Kuiper belt object (486958) 2014 MU69 [nicknamed Ultima Thule] by NASA JPL 's New Horizons (486958) 2014 MU69 was Discovered 2014-06-26 by Hubble Space Telescope. New Horizons Confirm that (486958) is a contact binary and matches occultation profile obtained from Earth-based observations of occultations.(http://pluto.jhuapl.edu/News-Center/Press-Conferences/index.php?page=2019-01-02)

During the 2019-01-21 lunar eclipse, there was an Impact observed on the moon from in different locations.

Impact on the Moon during the Jan.21 lunar eclipse(https://youtu.be/FNvfBCu-jjI)

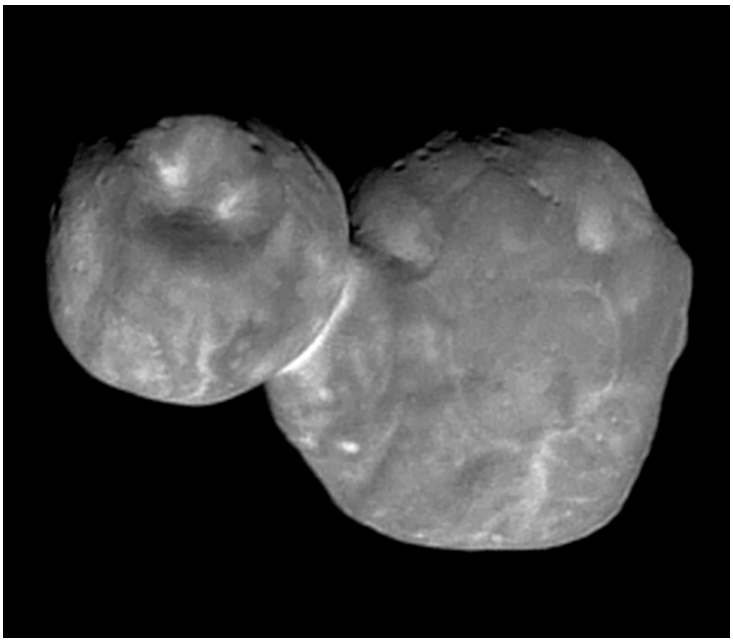
A Space Rock Hit The Moon During The Eclipse(https://youtu.be/Smp7TqccTpY)

Watch a Meteor Smack the Blood Moon in This Lunar Eclipse Video!(https://www.space.com/43075-blood-moon-2019-meteor-impact-video.html)

A meteor hit the moon during the lunar eclipse. Here's what we know.

(https://www.nationalgeographic.com/science/2019/01/meteor-hit-the-moon-during-blood-moon-eclipse-heres-what-we-know/)

JPL Close Approach Data from December 12, 2018 to January 27, 2019 Distance Nominal < 1 Lunar Distance



- The Kuiper belt object (486958) 2014 MU69
- Imaged by New Horizons 1 January 2019, 05:26

NASA / Johns Hopkins University Applied Physics Laboratory / Southwest Research Institute

Object	Close-Approach (CA) Date	CA Distance Nominal LD (AU)	Magnitude H(Estimated Diameter)
(2018 YL2)	2018-Dec-27	0.15 (0.00040)	29.3(3.7 m - 8.2 m)
(2018 YO2)	2018-Dec-28	0.51 (0.00131)	29.7(3.1 m - 6.8 m)
(2019 AW2)	2018-Dec-28	0.43 (0.00110)	25.1(25 m - 57 m)
(2019 AS5)	2019-Jan-08	0.04 (0.00010)	32.3(0.92 m - 2.1 m)
(2019 AE9)	2019-Jan-12	0.26 (0.00067)	27.2(9.9 m - 22 m)
(2019 BO)	2019-Jan-16	0.18 (0.00046)	28.0 (6.6 m - 15 m)
(2019 BV1)	2019-Jan-24	0.35(0.00090)	28.7(4.9 m - 11 m)

As of 2019-01-27, there is

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

19,627 discovered Near-Earth Objects (MPC) https://www.minorplanetcenter.net/)

4,046 discovered Comets (MPC) https://www.minorplanetcenter.net/)

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

2,232 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")

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

Object Designation	Removed (UTC)
2019 AZ13	1/26/2019 18:37
2015 EG	1/25/2019 22:44
2018 TB	1/21/2019 16:30
2015 HS182	1/20/2019 15:53
2019 AP11	1/18/2019 16:20
2019 AG7	1/18/2019 16:17
2019 AG11	1/18/2019 16:07
2018 XG5	1/17/2019 15:46
2019 AO8	1/15/2019 15:57
2019 AK3	1/9/2019 16:17
2019 AV2	1/7/2019 15:50
2019 AP3	1/7/2019 15:45
2018 XN5	1/4/2019 15:47
2018 VO9	1/4/2019 15:43
2018 XA	1/4/2019 15:42

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)

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.

BRAS President Recommends *Failure is Not an Option*
Suggestions for Transporting Large Telescopes
Request for Review of Astrophotgraphy Equipment
What Time is it on Saturn?
Meteoroid Impact During Total Lunar Eclipse
Active Region 2733 This Week
Connection Found Between GRBs and Supernovae?

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Messages from HRPO

Highland Road Park Observatory

SCIENCE ACADEMY

Saturdays from 10am to 12pm
For ages eight to twelve. $5/$6 per child.
2 February: "Weather Forecasting"
9 February: "Clouds"
16 February: "Storms"
"

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

15 February: "Astrophotography for Beginners" BRAS member Chris Desselles present a variety of techniques absolute beginners can use to take stunning images of celestial objects!

22 February: "Mercury and Venus" These two closer-than-Earth planets—one the fastest, one the hottest—are surveyed, together with an explanation of the next best times to view them!

ONE-TIME CALLS FOR VOLUNTEERS

Friday 1 February and/or Friday 8 February, 6pm to 8pm. *Two or three volunteers.* **Archive Display Nights.** Staffing tables showing patrons astronaut autographs, old newspapers and magazines and books, old telescopes, old artwork.

*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.

*Saturday 9 February, 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 23 February, 12pm to 2pm. *Two or three volunteers.* **Solar Viewing.** Telescope operation for Sun viewing; front desk staffing. Moderate difficulty.

*Saturday 26 February, 3:30pm to 7:30pm. *One volunteer.* **Overview & Expansion.** Basically, front desk duty while other personnel conduct this session for twelve- to sixteen-year-olds.

*Saturday 30 March, 2pm to 6pm. *One or two volunteers.* **NanoDays.** Front desk. Experiments and demonstrations related to nanotechnology. Low to moderate difficulty.

*Saturday 11 May, 3pm to 11pm. *Fifteen volunteers.* **International Astronomy Day.** HRPO's largest public offering. Front desk duty, telescope operation, physical science

demonstrations, children's ride monitoring, relaying messages, welcome table. Low to high 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.

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.

INTERNATIONAL ASTRONOMY DAY

Saturday 11 May from 3pm to 11pm
Thirteenth Consecutive Year!
Volunteers needed! HRPO will be calling!

RAFFLE TICKETS, $5 EACH

EXPECTED EXHIBITORS…
American Institute of Aeronautics and Astronautics
Baton Rouge Amateur Radio Club
Baton Rouge Metropolitan Airport
Baton Rouge Mosquito Abatement
Baton Rouge Zoo
Bluebonnet Swamp Nature Center
Civil Air Patrol
LIGO
Saint Joseph's Academy

POTENTIAL RIDES…
18" Dry Slide
Spacewalk
Obstacle Course
Hamster Ball

OTHER…
Adventure Quest
Face Painting
Homemade Comet
Scope-on-a-Rope

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Early volunteer sign-up is needed. It is extremely difficult to schedule a volunteer if that person reveals his availability with only two or three days to go. Sign-up now, please!

GLOBE at Night 2019:

Orion, January 27th through February 5th, and February 26th th through March 7th

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

Adult Astronomy Courses

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

For ages eighteen and older.

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

2 February: **Learn Your Binocular**

NanoDays

Saturday 30 March from 3pm to 7pm

For ages eight and older. No admission fee.

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

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Observing Notes: February

by John Nagle

Canis Major – the Great Dog

Position: 06 50, Dec. -22 19

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).

Note: This is the first re-cycled constellation. There has been a few additions to the original published in March, 2013

Named Stars:

Sirius (Alpha CMa), "scorching", "the Dog Star", mag. -1.46, 06 45 09.25 -16 42 47.3, is a blue-white binary star, and is also the brightest star in our night sky. The companion star. **Sirius B** (the **Pup**), is a white dwarf star, mag. 8.4, has an orbital period of 50 years and a separation that varies between 8.1 and 31.5 a.u. **Sirius** is a part of the "**Winter Hexagram**", along with **Rigel, Aldebaran, Capella, Pollux/Castor,** and **Procyon. Sirius** is also part of the "**Winter Triangle**" along with **Procyon** and **Betelgeuse**. Was **Sirius** a red star in ancient times? Testimony of Aratus, Cicero, Horace, Seneca, and Ptolemy – all of these ancient writers described **Sirius** with terms that can only be described as "ruddy", "reddish", "blazing as fire", etc. **Al Sufi,** in the 10th century, does not mention **Sirius** among the stars which he classified as red. There are two possibilities for the ancient description of **Sirius** being a red star; (1) **Sirius B** could have been in its red giant star phase, although what we know of this phase moving to the white dwarf phase says that it takes about 100,000 years instead of 2000 years; (2) There is a suggestion that the color-sensitivity or color balance of the average human eye has changed or evolved somewhat in the few thousand years, and that the ancient peoples did not see colors quite the same as we do today.

Murzim (Beta CMa), "The Announcer", "The Herald", mag. 1.98, 06 22 41.99 -17 57 21.3, is a pulsating blue-white giant star, whose pulsations are too slow to be noticed (7/100 magnitude every 6 hours and 2.6 seconds) by the naked eye. Marks the right fore-foot of the dog.

Muliphein (Gamma CMa), "dog's ear), mag. 4.12, 07 03 45.49 -15 37 59.7, is a blue-white bright giant star (B-type). **Gamma CMa** presents us with the interesting and unresolved problem of the supposed "Secular Vibrations" in the light of certain stars; the question of whether the star's light has perceptibly changed over many hundreds of years. Although labeled **Gamma CMa** by Bayer, this star is much fainter than the stars **Delta, Epsilon, Zeta, Eta**, and **Omicron CMa**. According to R. H. Allen, "Montanari said it entirely disappeared in 1679, and was not observed again for twenty-three years, when it reappeared to Miraldi, and since has maintained a steady luster, although faint for its lettering".

Marks the top of the dogs head. The star has ceased fusing hydrogen in its core, and is now quitting the main sequence for red giant territory in the H-R diagram.
Wezen (Delta CMa), "al-wazn", "the weight", mag. 1.83, 07 08 23.49 -26 23 35.5, is a yellow-white supergiant star, and is expected to become a red supergiant star within the next 100,000 years, and eventually a supernova. There is a 7.5 magnitude companion 2'45" away. **Delta CMa** marks the hind quarter of the dog.
Adhara (Epsilon CMa), "adara", "virgins", mag. 1.50, 06 58 37.55 -28 58 19.5, is a blue-white supergiant binary star, and is one of the brightest known extreme ultraviolet sources in the sky, and is the 22nd brightest star in the night sky. The secondary star is at magnitude 7.4, and has a separation of 7.5". The traditional name means "virgins", having been transferred from the group of stars (asterism "*the virgins"*) to **Epsilon Canis Majoris** alone.
Pharud (Zeta CMa), "al-furud", "the solitary one", mag. 3.02, 06 20 18.79 -30 03 48.2, is a light orange spectroscopic binary star. The primary is a blue-white B-type main sequence dwarf star, while the companion is an unseen star. Both stars orbit a common center once every 675 days. Marks the right hind foot of the dog.
Aludra (Eta CMa), "al-odra", "the Virgin", mag. 2.45, 07 24 05.71 -29 18 11.2, is a variable blue supergiant star, expected to go supernova within the next few million years. **Eta CMa** varies in brightness from magnitude 2.38 to 2.48 over a period of 4.7 days. **Eta CMa**, along with **Epsilon, Delta,** and **Omicron² CMa** form the asterism known as "*the Virgins*". There is a distant companion of 7th magnitude at 169" distance, but it does not form a true physical pair.
Hushiba (Kappa CMa), mag. 3.5, 06 49 50.47 -32 30 30.6, is a **Gamma Cas** variable star.
Isida (Mu CMa), "Isis", mag. 5.0, 06 56 06.65 – 14 02 36.4, is a binary star; the primary is a magnitude 5.3 yellow giant star, and the secondary is a magnitude 7.1 bluish main sequence star at a separation of 2.9".
Menkelb Prior (Omicron¹ CMa), mag. 3.89, 06 54 07.95 -24 11 03.2, is an orange supergiant star.
Menkelb Posterior (Omicron² CMa), "Thanih al Adzari", mag. 3.02, 07 03 01.47 -23 49 59.9, is a massive supergiant star that is now fusing helium in its core.
Unurgunite (Sigma CMa), mag. 3.9, 07 01 43.15 -27 56 05.4, is an irregular variable star.

Deep Sky:

M 41 (NGC 2287), "Little Beehive", mag. 4.5, 06 46 00 -20 44 00, 38' in size, is an open cluster of 100 stars; detached, weak concentration of stars; large range in brightness; very large, bright. **M 41** contains contrasting blue, yellow, and orange stars with a giant reddish star (**12 CMa**, mag. 6.07, 06 47 01.49 -21 00 55.5) in its center and a lot of bright blue giant stars in the cluster. **M 41** is located 4˚ south and ½˚ east of **Sirius**. There are distinct curved arms radiating from the center star, toward the north and east. **Cr 118, Mel 52, Raab 40, Lund 256**.
Cr 121, mag. 2.6, 06 56 20 -24 43 46, 50' in size, is an open cluster of 33 stars; detached, no concentration of stars; large brightness range. The brightest star is **Omicron¹ CMa**, located at the cluster's center. **Lund 268**.
Cr 140, mag. 3.5, 07 24 26.7 -31 51 00, 60' in size, sometimes called **"the Tuft in the Tail of the Dog"**, is an open cluster of 76 stars; detached, no concentration of stars; large range in brightness; magnitude of brightest star is 5.4. **vdB-Ha 2, Lund 327**.
Cr 132, mag. 3.6, 07 15 21.1 -31 51 00, 80' in size, is an open cluster of 80 stars; detached, no concentration of stars; large brightness range; magnitude of brightest star is 5.3 (**HD 56342**); a large cluster. **Lund 307**. There is a ghost reflection attached to the southwest side of the cluster.
NGC 2362, "Tau Canis Major Cluster", mag. 3.8, 07 18 42 -24 57.3, 7' in size, is an open cluster of 60 stars; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 4.4. **NGC 2362** surrounds the 4th magnitude star **Tau CMa** (**30 Canis Majoris**, sometimes called the "**Mexican Jumping Star**), a blue supergiant star. Located around 3˚ northwest of **Delta CMa.** The cluster is young – estimated to be about 1.8 to 4 million years old. **C 64, Cr 136, Mel 65, Raab 52,**

Mrk 17, H1 7-7, ESO 492-09, Lund 315.
vdB 95, mag. 5.38, 07 07 -11 18, is an open cluster.
NGC 2354, mag. 6.5, 07 14 16 -25 41.5, 19' in size, is an open cluster of 297 stars; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 9.1. **NGC 2354** is located 2˚ southwest of **NGC 2362**. **Cr 131**, **H1 6-7**, **Lund 306**.
NGC 2360, "Caroline's Cluster", "Open Box Cluster", mag. 7.2, 07 17 44 -15 38.5, 12' in size, is an open cluster of 80 stars; detached, weak concentration of stars; moderate range in brightness; very large; magnitude of brightest star is 10.4. **NGC 2360** was discovered by Caroline Herschel, and is located 3.5˚ west of **Gamma Canis Majoris**. **Cr134, Mel 64, Raab 51, H1 2-7, Lund 317.**
NGC 2384, mag. 7.4, 07 25 12 -21 01.4, 5' in size, is an open cluster of 12 stars; not well detached; large brightness range; magnitude of brightest star is 8.6 (**HD58509**). Open cluster **NGC 2383** is directly to the north. **Cr 142, Cr 143, Lund 333**.
NGC 2396, mag. 7.4,
NGC 2345, mag. 7.7, 07 08 19 -13 11.6, 12' in size, is an open cluster of 70 stars; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 8.6. **Cr129, Mel 61, Raab 48, Lund 301.**
NGC 2367, mag. 7.9, 07 20 05 -21 53 00, 5' in size, is an open cluster of 30 stars; detached, moderately rich in bright and faint stars; magnitude of brightest star is 9.4 (**HD 57370**). **Cr137, H2 7-8**, **RCW 14, Lund 318.**
Tr 7, mag. 7.9, 07 27 18 -24 02 00, is an open cluster of 30 stars. **Cr 146.**
GUM 3, mag. 7.98, 07 05 16.7 -12 19 34.5, **SAO 152349, GSC 5389; 3069, HD 53623, HIP 34178.**
NGC 2374, mag. 8.0, 07 23 57 -13 15.8, 19' in size, is an open cluster of 73 stars; detached, weak concentration of stars; large range in brightness; very large cluster; magnitude of brightest star is 10.8. **Cr 139, H3 5-8, Lund 328.**
Bas 11A, mag. 8.2, 07 17 08 -13 58.4, 8' in size, is an open cluster of 89 stars; magnitude of brightest star is 10.9. **Lund 1163**.
NGC 2383, mag. 8.4, 07 24 40 -20 56.9, 6' in size, is an open cluster of 40 stars; detached, strong concentration of stars; large range in brightness; pretty small; magnitude of brightest star is 9.8. Open cluster **NGC 2384** is directly to the southeast. **Cr 141, Lund 332**.
NGC 2204, mag. 8.6, 06 15 33 -18 40 00, 13' in size, is an open cluster of 353 stars; detached, no concentration of stars; magnitude of brightest star is 12.2. **Cr 88, Mel 44, Raab 34, H1 3-7, Lund 213**.
Haf 8, mag. 9.1, 07 23 03 -12 17.8, 5' in size, 21 stars, is an open cluster. **Lund 325**.
Haf 6, mag. 9.2, 07 20.1 -13 08, 7' in size, 66 stars, is an open cluster of low contrast. **IRAS 07176-1304, Lund 317.**
vdB 96, mag. 9.2, 07 19.6 -24 01, 10'x5' in size, is a nebulosity involving a chain of three 9th magnitude stars; brightest around the northwest star.
NGC 2243, mag. 9.4, 06 29 35 -31 16.9, 8.3' in size, is an open cluster of 368 stars. **C 98, Mel 46, Raab 36, Bennett 36A, Lund 222.**
Ru 18, mag. 9.4, 07 24 39 -26 11.3, 8' in size, is an open cluster of 40 stars. **Lund 331**.
Ru 20, mag. 9.5, 07 26 41 -28 49.9, 6' in size, is an open cluster of 30 stars. Brightest star is magnitude 8.8 (**HD 58959**). This is a doubtful cluster. **Lund 337**.

Objects of interest beyond magnitude 10:

NGC 22307, mag. 10.9, 06 16 22.1 -21 22 21.8, 3.9'x2.2' in size, is a galaxy interacting with **IC 2163**. **ESO 556-08, PGC 18749, MCG-4-15-20.**
NGC 2359, "Thor's Helmet", "The Duck Nebula", mag. 11.5, 07 18 31 -13 14 00, 13"x11" in size, is a very faint, large, ring shaped, filamentary emission nebula; the southern half is brightest. Formed around a central star, **HD 56925** (**Wolf-Rayet 7**), which is a hot giant star that is about to become a supernova. **IC 468** is attached to the northwest end. **Ced 94b, Sh2-298, LBN 1041, Gum 4, H2 1-5, HV21, RCW 5, Lund 94a, Lund 94b.**
IC 2163, "The Cosmic Owl", mag. 11.7, 06 16 28 -21 22 33.1, 2.2'x1.0' in size, is a galaxy interacting with **NGC 2207**. **ESO 556-09, PGC 18751, MCG-4-15-21**.

Canis Major Dwarf Galaxy, mag. 13.65, 07 12 35 -27 40 00, 2.6' in size, is an irregular galaxy, roughly elliptical in shape, containing about 1 billion stars, among them there is a significant number of red giant stars. The galaxy was discovered in 2003, but it is difficult to observe because it lies behind the plane of the **Milky Way**, obscured by stars, dust, and gas. This is the closest satellite galaxy to Earth.
Abell 15, mag. 15.6, 06 27 02 -25 22 50, 0.6' in size, is a planetary nebula. **ESO 490-01, PK 233-16.1, PNG 233.5-16.3**
Canis Major Overdensity, also referred to as the **Monoceros Stream**, and also the **Galactic Anti-center Stellar Structure**. There is an excess of giant M-class stars in the southeast region of **Canis Major**. This region has as many M giant stars as the remnant of the **Sagittarius Dwarf Galaxy** – thus, it is conjectured that this is a dwarf spherical galaxy merging with the **Milky Way**.
Asterism: Al J0624.3-3151, 06 24.5 -31 51, 10' in size, 7 stars.

Other Stars:

Nu² CMa, mag. 3.95, 06 36 41 -19 15 20.6, is an orange giant star with a companion star at magnitude 8.1, and has one planet in orbit around it in a period of 763 days.
Tau CMa, mag. 4.37, 07 18 42.49 -24 57 15.8, is a multi-star system. The primary (Aa, magnitude 4.9), a blue supergiant star, is a spectroscopic binary (Ab, magnitude 5.3), with a separation of 0.1". Component B has a magnitude of 10.2 and a separation from A of 8.6"; component C has a magnitude of 11.2 and a separation from A of 14.2"; component D has a magnitude of 8.2 and a separation from A of 84.8"; component E has a magnitude of 9.7 and a separation from A of 0.9". **Tau CMa** is the brightest star in the open cluster **NGC 2362**.
HD 47536, mag. 5.25, 06 37 47.54 -32 20 23.6, is an orange giant star with two planets in orbit, orbital period of 430 days and a separation of 1.6 a.u.; orbital period of 2,500 days.
NO CMa, mag. 5.40, 07 23 00.70 -31 55 25.6, is a Be type star.
LS CMa, mag. 5.64, 07 01 05.95 -25 12 56.3, is an eclipsing binary star.
IY CMa, mag. 5.74, 06 28 39.24 -32 22 16.7, is an eclipsing binary star, and a type Be star.
HD 50123 (HZ CMa), mag. 5.74, 06 50 23.35 -31 42 21.9, is a rotating ellipsoidal variable star.
HD 51411, mag. 6.36, 06 55 54.78 -31 47 24.7, is a type Be star.
HD 45184, mag. 6.37, 06 24 43.99 -28 46 47.3, has one planet in orbit with 0.06 a.u. separation, and an orbital period of 5.9 days.
HD 42927 (IP CMa), mag. 6.49, 06 12 46.33 -17 45 47.6, is a rotating ellipsoidal variable star.
W CMa, mag. 6.56, 07 08 03.44 -11 55 23.8, is a red giant carbon star and a semi-regular variable star.
EZ CMa, mag. 6.91, 06 54 13.04 -23 55 42.0, is a Wolf-Rayet variable star (**WR 6**), that has strong emission lines of nitrogen and helium. The variable period is 3.763 days, and the star illuminates the **Sh2- 308** bubble nebula.
HD 47186, mag. 7.8, 06 36 08.79 -27 37 20.3, has two planets in orbit with orbital periods of 4 days and a separation of 0.05 a.u,; and 3.7 years with a separation of 2.4 a.u.
VY CMa, mag. 7.95, 07 22 58.29 -25 46 03.5, is one of the largest stars known – a remote red supergiant with a radius of 1420±120 solar radii, and a mass of 9 to 25 solar masses.
HD 45364, mag. 8.07, 06 25 38.48 -31 28 51.4, has two planets in orbit with orbital periods of 228 days, separation of 0.68 a.u.; and 342 days and a separation of 0.90 a.u..
HD 45677 (FS CMa), mag. 8.50, 06 28 17.42 -13 03 11.1, is a main sequence star that has absorbed material from a companion, and has infra-red emissions indicating a compact shell of dust.
Z CMa, mag. 8.80, 07 03 43.16 -11 33 06.2, has two pre-main sequence stars – a FU Orionis star and a Herbig Ae/Be type star, which has brightened episodically by two magnitude to magnitude 8 in 1987, 2000, 2004, and 2008. The more massive Herbig Ae/Be star is enveloped in an irregular, roughly spheroid, cocoon of dust that has an inner diameter of 20 a.u., and an outer diameter of 50 a.u. Both stars are emitting jets of material.
HD 43197, mag. 8.95, 06 13 35.66 -29 53 50.2, has one planet in orbit, separation of 0.92 a.u., 328 day

orbital period.

Stars of interest beyond magnitude 10:

WASP-101, mag. 10.3, 06 33 24 -23 29 10, has a transiting planet in orbit.

HD 56925, mag. 11.40, 07 18 29.13 -13 13 01.3, is a Wolf-Rayet star at the center of **NGC 2359**.

RX J0720.4-3125, 07 20 24.96 -31 25 50.2, is a neutron star with a radius of around 5 Km. Its spectrum and temperature appears to mysteriously change over several years.

PSR B0628-28, 06 30 49.48 -31 25 50.2, is a pulsar star.

Sky Happenings: February, 2019

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

Feb. 1st - Morning: **Antares, Jupiter, Venus**, the waning crescent **Moon,** and **Saturn** form a graceful arc 35˚ long stretching from the southeast to the south-southeast in the brightening twilight. The ever-thinning **Moon** is on the other side of **Saturn** the following morning.

Feb. 2nd - The **Moon** passes 0.6˚ north of **Saturn** at 1 AM CST,
The **Moon** passes 0.6˚ north of **Pluto** at 2 PM CST. **Pluto** will be occulted, and it will be visible in the west and central **North America**.

Feb. 4th - **New Moon** occurs at 3:04 PM CST.

Feb. 5th - The **Moon** is at apogee (252,622 miles or 406,555 km from **Earth**) at 3:29 AM CST,
Asteroid **Herculina** is at opposition at 9 PM CST.

Feb. 6th - The **Moon** passes 1.1˚ north of asteroid **Vesta** at 2 AM CST.

Feb. 7th - The **Moon** passes 3˚ south of **Neptune** at 12 AM CST.

Feb. 10th - Evening: After sunset, look halfway up in the south-southwest to see the waxing crescent **Moon** hanging some 6˚ to the lower left of **Mars**,
The **Moon** passes 5˚ south of **Uranus** at 2 PM CST.

Feb. 12th - Dusk: **Mercury** re-emerges from its superior conjunction with the **Sun** – look toward the west-southwest after sunset to see it – binoculars will help,
First Quarter Moon occurs at 4:26 PM CST.

Feb. 13th - **Mars** passes 1.1˚ north of **Uranus** at 2 PM CST,
The **Moon**, one day past 1st quarter, is in the **Hyades**, 2˚ from **Aldebaran**.

Feb. 17th - Evening: The waxing gibbous **Moon** is in **Cancer**, nestled up against **M44**, the **Beehive Cluster.**

Feb. 18th - Morning: **Venus** passes 1.1˚ north of **Saturn**.

Feb. 19th - The **Moon** is at perigee (221,681 miles or 356,761 km from **Earth**) at 3:03 AM CST,
Full Moon (the largest for 2019) occurs at 9:54 AM CST.

Feb. 26th - **Last Quarter Moon** occurs at 5:28 AM CST,
Mercury is at greatest eastern elongation (18˚) from the **Sun** at 7 PM CST.

Feb. 27th/28th - Dawn: **Antares, Jupiter, Saturn**, and **Venus** form a long arc stretching from the south to the east horizon. The waning crescent **Moon** is 2˚ to the upper right of **Jupiter** on the 27th and halfway between **Jupiter** and **Saturn** on the last day of the month.

Planets:

Mercury – Mercury reappears from a superior conjunction with the **Sun** on February 12th in the west-southwest. On the 15th, the planet shines at magnitude -1.1, and stands 5˚ high in the west-southwest a half-hour after sunset, with a disk spanning 5.6" and appears nearly full. During the second half of the month, **Mercury**'s magnitude fades from -1.2 to -0.2, but the lapse between sunset and **Mercury**-set grows to about 1½ hours. The planet reaches greatest eastern elongation of 18˚ from the **Sun** on February 26th, standing 11˚above the western horizon about 45 minutes after sunset, with a 7.2" wide disk that is about 50% lit at magnitude -0.5. This is the best evening apparition for **North America** in 2019.

Venus – At the start of February, **Venus** rises at about 3 AM CST, and spends the month against the backdrop of **Sagittarius**. The planet starts the month near the western border of the **Archer** with

Ophiuchus, and ends the month near its eastern border with **Capricornus. Venus** will dim from magnitude -4.3 to -4.1 during the month, with its disk shrinking from 19" to 16", and its phase increasing from 62% to 72%. On February 4th, the planet is 2˚ north of the **Trifid Nebula (M20),** with the **Lagoon Nebula (M8)** 1.5˚ further south. On the 10th and 11th, open star cluster **M22** will lie 3˚ south of the planet. All three will fit nicely in the field of 7x50 binoculars. On the 18th, the planet will pass 1.1˚ north of **Saturn**, shining at magnitude -4.2. The two planets will remain within 2.5˚ of each other from February 16th to the 20th. **Venus** will then move 1˚ eastward per day, wrapping up the month 11˚ east of **Saturn** and 2.5˚ north-northwest of **M75**. The waning crescent **Moon** then stands midway between **Jupiter** and **Saturn** with **Venus** to their lower left.

Mars – Mars begins February among the background stars of **Pisces**, shining at magnitude 0.9, high in the southwest after dusk has faded out, and sets around 10 PM CST. The planet's eastward motion carries it into **Aries** on the 12th, with **Uranus** just over 1˚ to the south. On the 20th, magnitude 2.0 **Hamal** (**Alpha Arietis**) stands 10˚ due north of **Mars**. During February, **Mars** magnitude fades from 0.9 to 1.2, with its featureless disk spanning 6" in early February, and just 5" by month's end.

Jupiter – Jupiter rises in the southeast around 3 AM CST on February 1st, and some 90 minutes earlier on the 28th. The planet resides in the southern part of **Ophiuchus** (where it will spend most of 2019) near **Scorpius**. The planet's magnitude improves from -1.9 to -2.0 this month, with telescopes showing the globe growing from 33½" to 36" wide. The waning crescent **Moon** passes 2˚ north of the planet on February 27th. On the 6th, **Io** and its shadow transits **Jupiter**, with the shadow starting its transit at 4:45 AM CST, followed by **Io** itself just over an hour later. Both are set against the **North Equatorial Belt** and take more than 2 hours to cross the disk. For more on the moons of **Jupiter**, see ***Sky and Telescope***, February 2019 issue, page 51.

Saturn – At the start of February, **Saturn** will rise about 1½ hours before the **Sun**, but by the end of the month, the planet will rise by more than 2½ hours before the **Sun**. The planet will remain at magnitude +0.6 all month with its diameter growing slightly, but still less than 16" wide, and its ring system spanning 35" wide and tilted 24˚. On the 18th, the planet will pass 1.1˚ south of **Venus**, and will remain within 2.5˚ of **Venus** from the 16th through the 20th. **Saturn** will remain slightly south of the **Teaspoon** asterism in **Sagittarius** all month.

Uranus – On February 5th, **Uranus** passes from **Pisces** into **Aries**. On the 1st, the planet will lie 7˚ east-northeast of **Mars**, shining at magnitude 5.8. The gap between the two planets narrows by more than 0.5˚ per day. On the 10th, just 1.5˚ will separate them, with a crescent **Moon** passing 6˚ to the southeast of **Mars** in the evening. On the 12th, **Uranus** is 1˚ south-southeast of **Mars**, and on the following evening it is 1.1˚ due south of **Mars**. **Uranus** will show, in a telescope, a 3.5" disk, and a distinct blue-green color.

Neptune – Neptune is a tempting target in early February, lying 15˚ high in the west-southwest as twilight fades into darkness. The planet glows at magnitude 8.0. To find it, start at 4th magnitude stars **Phi** and **Lambda Aquarii**. Then look for a trio of 5th and 6th magnitude stars (**81, 82**, and **83 Aquarii**) midway between the pair of stars. On the 1st, the planet lies 0.8˚ due north of **83 Aquarii**, the brightest and southern most of the three. A week later, the planet appears 0.9˚ north and a bit east of this star. **Neptune** will be in conjunction with the **Sun** on March 7th.

Pluto – Pluto is in **Sagittarius**, west of the **Teapot** asterism. On February 15th, **Pluto** will be at RA 19 34.3 and Dec. -21 51, at magnitude 14.3, having an angular size of 0.1", at 34.556 a.u. from **Earth**.

Moon – On February 1st, the **Moon** is a slender waning crescent halfway between **Venus** and **Saturn** at dawn, and is 3˚ to the lower left of **Saturn** the next day. A thick waxing lunar crescent is 6˚ to the lower left of **Mars** on the evening of the 10th. The **Moon** is at perigee on the morning of the 19th, only about 7 hours before the **Full Moon**. The **Moon** is exactly at the **Last Quarter** at 8˚ due north of **Antares** at dawn on the 26th. On the 27th, the **Moon** glows 2½˚ above **Jupiter,** and almost halfway between **Jupiter** and **Saturn** the next morning. On the evening of February 11th, observers across **North America** are placed perfectly to watch a few points of light on the **Moon** evolve into the "***Lunar X***". Start viewing soon after sunset. Focus on a spot almost halfway between the equator and the south pole of the **Moon**. Use the twin craters **Aliacensis** and **Werner** as guides to the ***Lunar X***, which lies just to their northwest. If you take clips every 5 to 10 minutes, you can create a time-lapse of the ***X*** emerging, peaking, and disappearing, all in one evening.

Greatest northern declination will be on the 16th (+21.5˚), greatest southern declination will be on the 2nd

(-21.5˚). Favorable librations: **Pingre Crater** on the 14th; **Neumayer Crater** on the 20th; and **Helmholtz Crater** on the 21st.

Libration in longitude: Eastern limb most exposed on the 25th (+7.7˚)
Western limb most exposed on the 12th (-7.7˚)
Libration in latitude: Northern limb most exposed on the 11th (+6.8˚)
Southern limb most exposed on the 23rd (-6.7˚)

Asteroids – Asteroid **532 Herculina** will peak at magnitude 8.9 during the first two weeks of February. Early February sees the asteroid in **Leo**, north of the ***Lion's Sickle*** asterism, appearing high in the east at mid-evening. **Herculina**'s motion carries it into northern **Cancer** by month's end, when it will lie within a few degrees south of 3rd magnitude **Alpha Leonis**. The sparse star field area in this region should make the id of which star-like dot is the asteroid. You can even see it move within an hour when it pairs up with slightly fainter stars on the 9th and 14th of the month.

Asteroid **4388 Jurgenstock** (17th magnitude) will pass directly in front of (occult) **Alpha Canis Majoris** (**Sirius**) on the night of February 18/19. **Sirius** will dim significantly, if not disappear, for 1.8 seconds. The track in the **United States** crosses **New Mexico, Colorado, Nebraska**, and the **Dakotas.** It will occur around 11:30 PM CST.

Asteroid **301 Bavaria** (15.5 magnitude) will occult the 9.3 magnitude star **HD 144893 (HIP 79094),** which lies in the direction of **Scorpius**, early in the morning of February 11th, for part of **North America.** The predicted path crosses from **Colorado** through **South Carolina** to **Bermuda.** The 6.2 magnitude drop should occur within a minute or two of 4:17 AM CST. The involved star, shining about 3½˚ north-northeast of **Nu Scorpii**, will be standing fairly high in the night sky.

Comets – Comet **46P/Wirtanen**, as it recedes from **Earth**, dims noticeably. Optimists predict the comet to glow at 7th magnitude in early February, while pessimists have it a couple of magnitudes fainter. The comet is easy to find in the northeast on February evenings. Use magnitude 3.2 **Theta Ursae Majoris** as your guide. Your best **Moon**-free observing window comes during the first week of February. ***My estimates*** of position are as follows: February 1st- 1½˚ to 2˚ north-northeast of **18 UMa**; on the 3rd- about 2˚ east of **18 UMa**; on the 5th- about 1½˚ to 2˚ north-northwest of **26 UMa**; on the 7th- about 1˚ to 1½˚ north-northwest of **26 UMa**; on the 9th- about 0.6˚ west and slightly north of **26 UMa** or the same distance from **Theta UMa**; on the 11th- about 0.2˚ southwest of **Theta UMa**; and on the 13th- about 1˚ due south of **Theta UMa**. Also check out the 9th magnitude spiral galaxy **NGC 2841,** located about 2˚ west-southwest of **Theta Ursae Majoris**.

Comet **39P/Stephan-Oterma** will be at magnitude 11.5 on February 1st, fading to magnitude 15.4 by the end of March.

Comet **64P/Swift-Gehreis** will start February at magnitude 12.4 and fade to magnitude 14.3 by March 2nd.

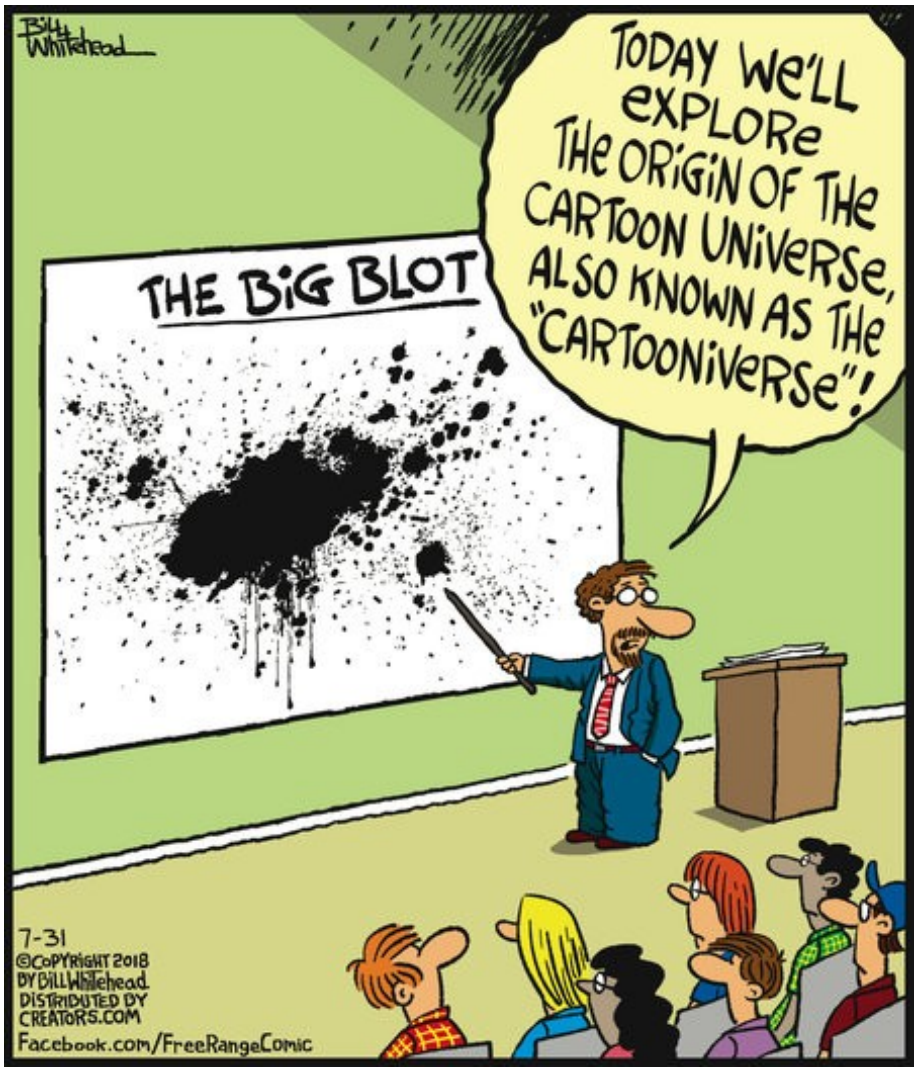
Meteor Showers – There are no major meteor showers in February. Minor showers are as follows:

The **Alpha Antiiids**, Jan. 24th – Feb. 17th, peaks Feb.1st, is a weak shower (it will be difficult to separate from sporadic background meteors);
The **February Epsilon Virginids**, Jan. 27th – Feb. 17th, peaks Feb. 3rd, weak shower;
The **Eta Draconids**, Feb. 3rd – Feb. 5th, peaks Feb. 4th, weak shower;
The **Pi Hydrids**, Feb. 3rd – Feb. 9th, is a dependable minor shower with a zenith hourly rate of at least 3 at maximum activity;
The **Alpha Centaurids**, Feb. 2nd – Feb. 19th, peak Feb. 8th, is a dependable minor shower;
The **Omega Centaurids**, Feb. 12th – Feb. 15th, peak Feb. 14th, a dependable minor shower;
The **Theta centaurids**, Feb. 12th – Feb. 16th, peaks Feb. 14th, a weak shower;
The **Beta Herculids**, Feb. 13th – Feb. 16th, peaks Feb. 14th, a weak shower;
The **February Mu Virginids**, Feb. 16th – March 4th, peaks Feb. 25th, a weak shower.

When to View the Planets:

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

DARK SKY VIEWING - PRIMARY ON FEBRUARY 2ND, SECONDARY ON FEBRUARY 9TH



Mythology:

Canis Major – the Great Dog

Canis Major is dominated by the star Sirius, popularly called the Dog Star, the most brilliant star in the entire night sky; almost certainly the constellation originated with the star alone. Aratus referred to Canis Major as the guard dog of Orion, following on the heels of its master, and standing on its hind legs with Sirius carried in its jaws. Manilius called it "the dog with the blazing face". Canis Major seems to cross the sky in pursuit of the hare, represented by the constellation Lepus, under Orion's feet.

Mythologists such as Eratosthenes and Hyginus said that the constellation represents Laelaps, a dog so swift that no prey could escape it. This dog had a long list of owners, one of them being Procris, daughter of King Erechtheus of Athens and wife of Cephalus, but accounts differ as to how she came by the dog. In one version the dog was given to her by Artemis, goddess of hunting; but a more likely account says that it is the dog given by Zeus to Europa, whose son Minos, King of Crete, passed it on to Procris. The dog was presented to her along with a javelin that could never miss; this turned out to be an unlucky gift, for her husband Cephalus accidentally killed her with it while out hunting.

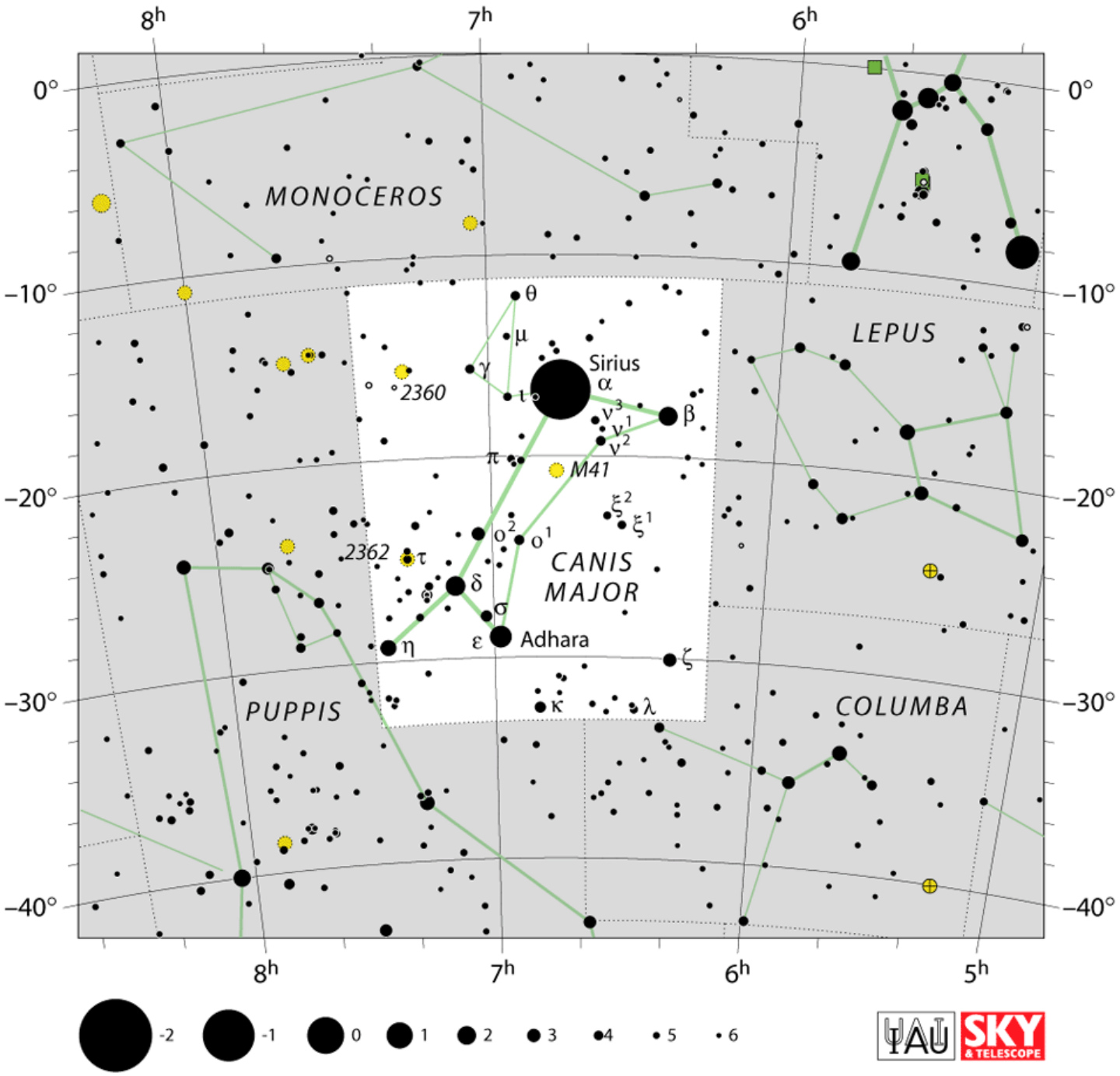
Cephalus inherited the dog, and took it with him to Thebes (not Thebes in Egypt, but a town in Boeotia, north of Athens) where a vicious fox was ravaging the countryside. The fox was so swift of foot that it was destined never to be caught – yet Laelaps, the hound, was destined to catch whatever it pursued. Off they went, almost faster than the eye could follow the inescapable dog in pursuit of the uncatchable fox. At one moment the dog would seem to have its prey within grasp, but could only close its jaws on thin air as the fox raced ahead of it again. There could be no resolution of such a paradox, so Zeus turned them both into stone, and the dog he placed in the sky as Canis Major, without the fox.

The name of the star Sirius comes from the Greek word *seirius*, meaning "searing" or "Scorching", highly appropriate for something so brilliant. In Greek times it's rising at dawn just before the Sun marked the start of the hottest part of the summer, a time that hence became known as "*the dog days of summer*". "It barks forth flame and doubles the burning heat of the Sun" said Manilius, expressing a belief held by the Greeks and Romans that the star had a heating effect. The ancient Greek writer Hesiod wrote of "heads and limbs drained dry by Sirius" and Virgil, in the "Georgias", said that "the torrid Dog Star cracks the fields".

Germanicus Caeser outlined clearly the effects that the rising of Sirius with the Sun was supposed to have."Healthy crops it strengthens, but those with shriveled leaves or feeble roots it kills. There is no star the farmer likes or hates more" according to Germanicus.

"Hardly is it inferior to the Sun, save that its abode is far away" wrote Manilius, anticipating the modern view that the stars are bodies like the Sun, only vastly more distant. Yet, in contradiction of the supposed heating effects of Sirius, Manilius continued:"The beams it launches from its sky blue face are cold". That description of the color of Sirius is in contrast to Ptolemy's surprising reference to it as reddish, which has caused all manner of arguments.

In fact, Manilius was nearly correct, for Sirius is a blue-white star, even larger and brighter than the Sun. It lies 8.7 light years away, making it one of the Sun's closest neighbors. It has a white dwarf companion star, visible only in te3lescopes, that orbits it every 50 years.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