

# Night Visions

June 2023

*Newsletter of the **Baton Rouge Astronomical Society***

*"Cosmic Cliffs", Webb's picture of young stars forming within NGC 3324, the Carina Nebula. See Page 10 for details.*

***Monthly Meeting June 12<sup>th</sup> at 7:00 PM, in person***

*You may also join this meeting via [meet.jit.si/BRASMeet](https://meet.jit.si/BRASMeet)*

*(Monthly meetings are held on 2<sup>nd</sup> Mondays of the month, at Highland Road Park Observatory)*

***PRESENTATION: TBA***

## ***What's In This Issue?***



President's Message  
BRAS Meetings Calendar  
Monthly Meeting Minutes  
Business Meeting Minutes  
Outreach Report  
Light Pollution Committee  
Globe At Night  
ALCON 2023

[Article: Webb Telescope Images](#)

**HRPO EVENTS**

**OBSERVING NOTES: Lupus – The Wolf**

***Like this newsletter? See PAST ISSUES online back to 2009***

***Baton Rouge Astronomical Society Facebook Page***

***BRAS YouTube Channel – Monthly Speakers via Jitsi***



## President's Message

Summer will officially be here on June 21<sup>st</sup> – the **Summer Solstice**. This is a time when people are relaxing and go on vacations – it also means less attendance and participation by BRAS members.

### **BUT THIS YEAR**

More, not less, participation is needed in July for ALCon 2023. (Note: **BRAS is required to have 15% of our membership register for ALCon**. We need more members to register!). We need volunteers to:

- help with on-site registration and check-in
- help with the Wednesday night Meet and Greet at LSU's Nicholson Hall event,
- help at the Thursday night event at LASM,
- help at the Friday BBQ/Gumbo/Jambalaya dinner at HRPO, and various other duties to make this ALCon go smoothly.

**PLEASE, PLEASE, PLEASE** register for ALCon and volunteer to help your club.

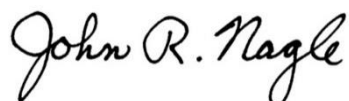
HRPO is being "spruced up" in preparation for the ALCon's Friday night dinner. The dome has been cleaned and some work has been done on the entrance to the parking area.

Summertime means not as many outreach events – Sidewalk Astronomy at Perkins Rowe is suspended until September. Ben sends out a notice for an outreach event, I hope you'll volunteer to help him out too.

BRAS will be acquiring a laptop computer to help with outreach events – to show information and show live video from cameras connected to a telescope. There will be some programs for Astrophotography also installed on it. BRAS will also acquire a set up to include cameras, microphones, and a controller for the BRAS on-line activities.

I will see you at the membership meeting on June 12<sup>th</sup> – remember to register for ALCon 2023!

Clear Skies!



### Calendar of Upcoming Meetings

**Monthly Member Meeting – 7 pm Monday, June 12<sup>th</sup>** at the Observatory, in person and via Jitsi

**Light Pollution Committee: 6 p.m.** before the Monthly meeting.

**Monthly Business Meeting: 7 pm Wednesday, June 28<sup>th</sup>** (last Wednesday of the month - Members Only), at the Observatory, in person and via Jitsi

**MOON (Members Only Observing Night) TBA**

**ALCon 2023 ("Astronomical Gumbo") Committee Meeting**  
Two meetings: TBA, online.



## Monthly Meeting Minutes – May 8<sup>th</sup>

- Welcome by the president, John Nagle.
- John introduced Dr. Colin Turley from LSU's Department of Physics and Astronomy as the speaker for the evening. The title for his topic was "How Space Can Kill You". This was a lecture about why going to space is so difficult for humans. This also touched on the impact of meteors and the various theories about the end of the universe as we know it.
- Ben spoke about outreach which is detailed elsewhere in the newsletter.
- The ALCON 2023 Committee is still looking for volunteers for July's ALCON 2023 event; please let John or Steven know if you are interested. There are bunches of little things that still need doing. This should take only a small commitment of time (a free T-shirt may be involved). LSU has finished the refurbishing of the 11.5-inch Clark refractor so this will be available for viewing at the Wednesday night (July 26<sup>th</sup>) event at LSU. There was some discussion about putting more content out on Facebook and taking advantage of the search engine optimization. It was also announced that there is a vegetarian option available now for the Saturday night banquet on July 29<sup>th</sup>. There was also some discussion about the various speakers for the convention and when they are scheduled to speak; please check the ALCON2023.org website for details.
- Don announced that all the Arkansas state parks are booked for the eclipse next April. The reason Texas is not booked up yet is that you can only make reservations six months in advance there.
- John announced that he was going to be at the Texas Star Party the 3<sup>rd</sup> week in May.
- A raffle was held with coffee and cookies available for onsite attendees.

Submitted by Roz Readinger, Secretary



2022 USA Forever Stamp

### 2023 Officers:

**President:** John Nagle

president@brastro.org

**VP:** Joel Tews

vice-president@brastro.org

**Secretary:** Roz Readinger

secretary@brastro.org

**Treasurer:** Trey Anding

treasurer@brastro.org

### BRAS Liaison for BREC:

Chris Kersey

### BRAS Liaison for LSU:

Greg Guzik

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Open





## Business Meeting Minutes – May 31<sup>st</sup>

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

1. Laptop – information given to Trey and he will purchase it.
2. Donated telescopes – Chris has provided a partial list. We will draft a policy for donated equipment.
3. State of HRPO meeting of partners – no response to e-mails to set up meeting.
4. AL Election – the Secretary position is open, only one person running. Also two changes to the By-Laws are up for vote. Will go over everything at membership meeting.
5. BRAS website – talks going on for a new webmaster. website has not been updated since January.
6. MOON night on June 3<sup>rd</sup> – HRPO closed so we can have it starting at about 8 PM.
7. State of HRPO for ALCon – dome has been cleaned, some work on the entrance to the parking area has been done.
8. Had a short update on ALCon.
9. As of yet, no speakers are scheduled for June and July – we are working on it and if you have any suggestions, please let us know.
10. Tracking down who ordered the slick flyer/card for BRAS information so we can order more.
11. The cord on the AVX to Handset is bad, we will order a new one.

*Submitted by John Nagle for Roz Readinger, Secretary*

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## BRAS subreddit and a Discord server.

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

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

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

.For Discord help, access **techsupport-faq**,

or message Amy or Justin: <https://discord.gg/6N8r8DDj>

It also has voice channels so that you can speak to people through Discord.

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

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## ASTRONOMICAL LEAGUE FACEBOOK PAGE,

become a member, keep up with the news.

<https://www.facebook.com/Astronomical.League/>

**BIENVENUE EN LOUISIANE! (WELCOME TO LOUISIANA!)**

Join us for this unique and exciting amateur astronomy gathering!



**July 26–29, 2023**

Hilton Baton Rouge  
Capitol Center Hotel  
201 Lafayette Street  
Baton Rouge, LA 70801

# ALCON 2023

### KEYNOTE SPEAKERS

- ★ David Eicher—writer, editor-in-chief of *Astronomy Magazine*
- ★ Fred Espenak—co-author of *Totality: The Great American Eclipses of 2017 and 2024*
- ★ David Levy—author, comet hunter



### FIELD TRIPS

- ★ Irene Pennington Planetarium
  - ★ LIGO (Laser Interferometer Gravitational-Wave Observatory) Livingston\*
  - ★ Louisiana State University Physics & Astronomy
  - ★ Highland Road Park Observatory
- \*Spaces are limited for this trip!

**SPEAKERS** ★ Pranvera Hyseni ★ Guy Consolmagno ★ Dan Davis ★ And many more!

Brought to Baton Rouge by the **Baton Rouge Astronomical Society**

★ ★ Registration is now open! Check [alcon2023.org](https://alcon2023.org) ★ ★





## Outreach Report for April 2023

Hi Everyone,

We had a nice, easy May and after the hustle and bustle of the previous months, it was OK by me! The only thing we really have to report on was the Sidewalk Astronomy at Perkins Rowe on May 30th.

Chris R. and Coy decided to thumb their noses at the lengthening days and went by earlier in the day with their Solar Observing setups.

Unfortunately, it was rather cloudy and that curtailed much of the observing efforts. I had rolled the dice by not cancelling the event because the evening was showing 50% or more cloud cover. Well...the evening viewing session paid off! Even though we felt a few sprinkles as we brought out our scopes, Scott and I set up against all odds. Around 7pm, the clouds parted and we had a beautiful daylit Moon that just kept getting better and better as it grew darker. With Summer vacation in full swing, there were lots of people hanging out in the park and walking the area. We were actively engaged with folks most of the time. Chris K. stopped by to say hi, too!

There were so many people hanging out that night and it was so much fun showing off the Moon even in the daylit sky, I almost felt like maybe we should just keep doing Sidewalk Astronomy all Summer long, too! (I still may do some reconnaissance on other Tuesdays to see if that is normal or if it was an anomaly. If it IS normal, maybe we should join the crowd. WITH our scopes!!)

By the time this comes out, we will have had one outreach so far in June. You can see the other 2 on the books that are coming up. The one at Grace Life Fellowship I am being told could have as many as 600 people. We'd be doing Solar observing and any other objects we could get during the day. If you feel like helping out, just let me know!



*Scott being swarmed by folks enjoying some great views of the Moon*



*Ben shows off the Moon with the little Celestron Firstscope, his very first telescope that he still uses for some outreach to show people they can get decent views of the Moon for under \$100*



## Upcoming Events:

**Thursday, June 8th**

2pm-3pm

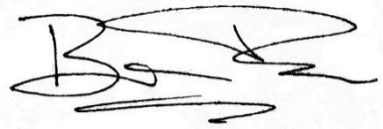
West Feliciana Parish Library

**Thursday, June 29th**

5pm-7:30pm

Grace Life Fellowship Family Night

Clear Skies, Ben Toman



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## TEXAS STAR PARTY 2023 REPORT, BY JOHNNAGLE

I attended the TSP from May 13<sup>th</sup> through 19<sup>th</sup> at the Prude ranch in Ft. Davis, Texas. It was my 4<sup>th</sup> time in a row. There were many very interesting afternoon talks including on spectroscopy, sprites, and an update on the Kosovo Observatory and Planetarium. As usual, I set up my table and showed my Observing Notes. Two of the evening talks stand out – one on the Juno Project and one on the New Horizons Project given by Dr. Stern, who remembered the talk he gave to BRAS years ago when he visited Baton Rouge (see pictures below). Everyone was gung-ho about astronomy. During one evening talk, a storm blew in – it lasted a few hours but didn't dampen enthusiasm. As soon as it ended people were back out on the observing fields.



*L to R: Scott L. John N, Dr. Stern and Ben T. when the good doctor visited us in Baton Rouge in 2015.*



*Dr. Stern giving us his lecture in the Meeting Hall at TSP.*



## ***LPC (Light Pollution Committee) Report (April)***

This committee meets at 6:00, same day as the 7:00 BRAS Member Meeting  
Everyone is welcome to join in.

1. Form letter for new construction/projects is still being worked on – the letter has been outlined but will need to be tailored for the individual circumstances. If you see any new construction, try to get the name of the companies involved, and please let the committee know about it.
2. There is a section of the UDC (Unified Development Code – it takes the place of Ordinances) on measurement of light for possible violations that needs to be clarified. There has been an e-mail sent to the UDC Committee for clarification.
3. Chris is handling complaints HRPO has received about lighting on roads to the DOTD.
4. Scripts for LP on the BRAS You Tube channel are being written – the first will be a basic description of what LP is. If you would like to volunteer to be in a video on LP, please let us know.
5. Outreach in parks in North Baton Rouge – we will have to contact the supervisor for each park to set up an outreach event at that park.
6. Entergy contact – Chris is contacting Entergy about LP concerns.

John Nagle, LPC Chair Pro-Tem

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## **Globe At Night**

**The target for the Globe at Night program is Boötes and Heracles from June 9th through June 18th**

If you would like to participate in this citizen science program, you can find instructions

[ahttps://www.globeatnight.org](https://www.globeatnight.org)

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

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## **SPACE WEATHER ALERTS**

**Instant solar flare alerts:** The sun is starting to flare again.

Sign up for [Space Weather Alerts](#) to receive text messages when explosions are underway.

Basic plan \$49.95/year

Alerts include: Coronal Mass Ejections (CME), Geomagnetic Storms Predicted (class G1-G4), Planetary K-index (K5-K9, K4 for Pro Plan), Solar Flare alerts (X-Ray Flux levels and Scales), Solar wind speed alerts (500, 600, 700 and over 800 km/s), B Sub Z South-pointing episodes, Cracks in Earth's magnetic field.



## 2023 Astronomical League Convention Update!

*We now have our own ALCON Web Page. Check it out. Bookmark and watch it grow.*

<https://alcon2023.org/>

## HELP! We Need More Sponsors!!!

From now on, we will be doing planning and work by way of subcommittees, making use of small group meetings, e-mail, phone, etc, without the need to have the full committee meeting. We have a lot to get done. If you like to help, please EMAIL Steven M. Tilley [smtilley@alcon2023.org](mailto:smtilley@alcon2023.org)

We are looking for Sponsors, please check with the ALCon 2023 committee before, so we do not re-ask anyone.

### The 2023 ALCON Sponsorship Levels

Level	Price	Benefits
Galaxy	Above \$5000	Same as "Solar System" plus a 10-minute presentation[time slots are limited] during the conference.
Solar System	\$2000 to \$5000	Same as "Star" plus a large logo displayed on all conference signs and all slides used in the conference room between speakers. One full page for sponsor information in the Convention Program.
Star	\$1000 to \$1999	Same as "Planet" plus small Logo displayed on all conference signs and on schedule display. 1/4 page in Conference Program for logo and sponsor information
Planet	\$500 to \$999	Same as "Moon" plus Name displayed on Conference Hall display during breaks. 1/8 page in Conference Program for logo and sponsor
Moon	\$100 to \$499	Name listed in Conference program and can provide items for inclusion in attendee bags.

After you sign someone up, let us know and have them send a check made out to "Astronomical League" with **ALCon 2023** in the memo line, to the attention of

Carroll Iorg (AL President)  
**Astronomical League**  
**9201 Ward Parkway, Suite #100**  
**Kansas City, MO 64114**

**Click this link to watch the 3.5 minute video with interviewers explaining the images.**

**[NASA Reveals Webb Telescope's First Images of Unseen Universe | NASA](#)**



**Then click this link to see more images:**

**[Gallery \(webbtelescope.org\)](https://webbtelescope.org)**

NASA revealed the first five full-color images and spectrographic data from the world's most powerful space telescope, the James Webb Space Telescope, a partnership with ESA (European Space Agency), and CSA (Canadian Space Agency). The world got its first look at the full capabilities of the mission at a live event streamed from the agency's Goddard Space Flight Center in Greenbelt, Maryland, on July 12, 2022.

**Credits: NASA**

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# Messages from HRPO

Highland Road Park Observatory



## **FRIDAY NIGHT LECTURE SERIES**

7:30pm / For ages fourteen and older. / No admission fee.

7:30pm / For ages fourteen and older. / No admission fee.

2 June = "The Plutonian System" Thirty-five years ago James Christy discovered Charon. This was the beginning of our knowledge of the fascinating trans-Neptunian system. With the images and data from New Horizons we are in a new age of Plutonian understanding.



## **EVENING SKY VIEWING**

No admission fee. For all ages.

Friday 2 June from 8:30pm to 10pm

Saturday 10 June from 7:30pm to 10pm

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



## **SCIENCE ACADEMY**

Saturdays from 10am to 12pm.

for Cadets aged eight to twelve \*\$5 per Cadet per week (\$6 if out-of-parish)  
walk-ins welcome, but advanced registration via WebTrac strongly recommended  
[activity #531990] \* parents may stay with or leave Cadet  
Four Cadet minimum and sixteen Cadets maximum per session.

3 June = "Venus"

10 June = "Exploring Weather II"





## **VENUSIAN ELONGATION**

*Saturday 3 June from 7pm to 8:30pm / No admission fee; for all ages.*

Periodically Venus reaches its greatest angular separation in the sky (elongation) from the Sun. This is the safest way to view Venus by amateurs. Come join us at the Burbank Soccer Complex! The planet will appear as a “half-Venus”. The Full Moon, Mars and a very bright pass of the International Space Station are also expected!



## **DISPLAY PREMIERE: “The Histories and Mysteries of Glass”**

*Friday 9 June from 5:30pm to 8:30pm*

*for ages eleven and older / no admission fee*

Glass was first manufactured thousands of years ago. It is actually a *supercooled liquid* which can be transformed not only into works of beauty and contemplation, but also into fiberglass products and optical devices. HRPO proudly rotates a wide variety of vintage and modern glass materials. This is a perpetual display until further notice.



## **LIGHT POLLUTION COMMITTEE**

*Monday 12 June from 6pm to 7pm*

*for ages fourteen and older / no admission fee*



## **BATON ROUGE ASTRONOMICAL SOCIETY MEETING**

*Monday 12 June from 7pm to 9pm*

*for ages fourteen and older / no admission fee*



## **THE DAYLIGHT DETOUR**

*Friday 16 June from 6pm to 9pm.*

*No admission fee. For all ages. No viewing during this event.*

Whether it's taking advantage of a prorated BRAS membership; getting the status of all current NASA, LSU and HRPO plans; obtaining the latest information on asteroid Apophis; learning HRPO history or how to register for the big ALCON Conference in July; or finding out the celestial events for the next twelve months, this “alternate route” (planned due to Daylight Time) is your stop!



## **STEM EXPANSION: “Space Weather”**

*Saturday 17 June from 3:30pm to 7:30pm*

*For ages twelve to sixteen. / \$15 each per in-parish registrant; \$18 each per out-of-parish registrant. Advanced registration via WebTrac required [activity #531993].*

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



## **FORCES OF NATURE CAMP**

*19 June to 23 June / 8am to 5pm daily. For ages eleven to thirteen.*

*\$125 per EBR-parish camper / \$150 per other-parish camper*

*[Cost covers entire session; limit thirty per session.]*

This one-week-only session focuses on the four forces of nature: the weak nuclear force, the strong nuclear force, gravity and the electromagnetic spectrum (gamma rays, x-rays, ultraviolet, color, infrared, microwaves and radio). Campers will investigate the spacecraft and instruments studying these forces, perform indoor and outdoor experiments demonstrating the presence of these forces in our lives and build basic devices connected to these inquiry! There will be special guests throughout the week to explain the process for obtaining an Amateur Radio Service license. Parents may register in person at HRPO or online at Webtrac. The activity number is 231180.



## **AMERICAN RADIO RELAY LEAGUE FIELD DAY**

*Saturday 24 June from 2pm to 10pm / No admission fee. For all ages.*

*(Solar viewing from 2:30pm to 4:30pm.)*

One section of the electromagnetic spectrum gets all the love, as tens of thousands of “hams” ascend to the radio waves with “phone” (voice) and CW (Morse) in this exciting contact contest that stretches from coast to coast! Get on the GOTA station and make your own contact! Ham radio is awesome for parents and kids alike.



## **2023 HRPO DONATION DRIVE**

*24 June to 29 December / Goal: \$2000.*


Our annual fundraising drive has been successful for many years. The agreement (as always) is for the public to give us Drive money, as long as we say what we’re going to buy, and it is for public program use! The “wish list” will be on our website by 10 June!




## **DISPLAY PREMIERE: “Racing to the Stars”**

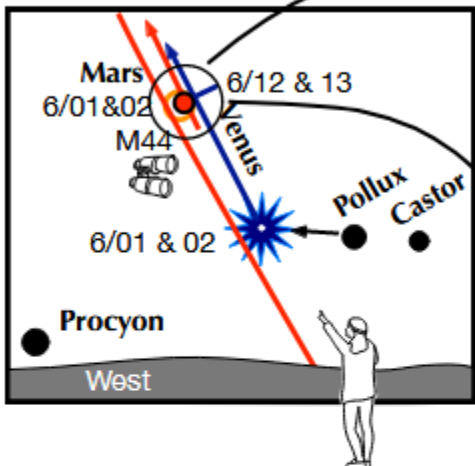
*Friday 30 June from 5:30pm to 8:30pm  
for ages eleven and older / no admission fee*

What’s your poison—Corvette, Stingray or Road Runner? Beginning with those manufactured for the year 1979 (when Voyager encountered its first gas giant after leaving Earth), a variety of classic cars will be showcased going back to 1953—pre-Space Age! This display will rotate vintage car images and models for about one year.

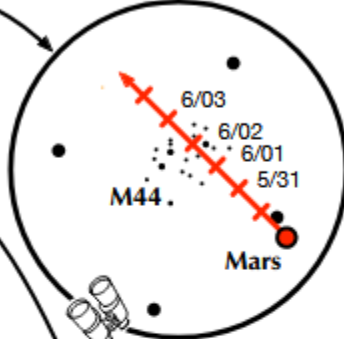


**A must see celestial planetary play:  
Two planets visit the Beehive**






**West**



**View through  
10x50 binoculars**

Beginning on June 1, look to the west-northwest 90 minutes after sunset.

- The twin stars of Gemini, Castor and Pollux, will be found forming a horizontal bar low above the horizon.
- Brilliant Venus shines to their left effectively forming the very bright third member of a set of triplets!
- On the same evening and the next, red Mars slides in front of M44, aka the Beehive Star cluster, positioned above Venus. Use binoculars to find Mars sitting amid the many stellar bees.
- Ten nights later, it is Venus' turn to stay at the Beehive for two consecutive nights. The planet travels along the outskirts, farther from Beehive central than Mars moved. Again, bring out the binoculars. How does the glare of brilliant Venus affect the scene?

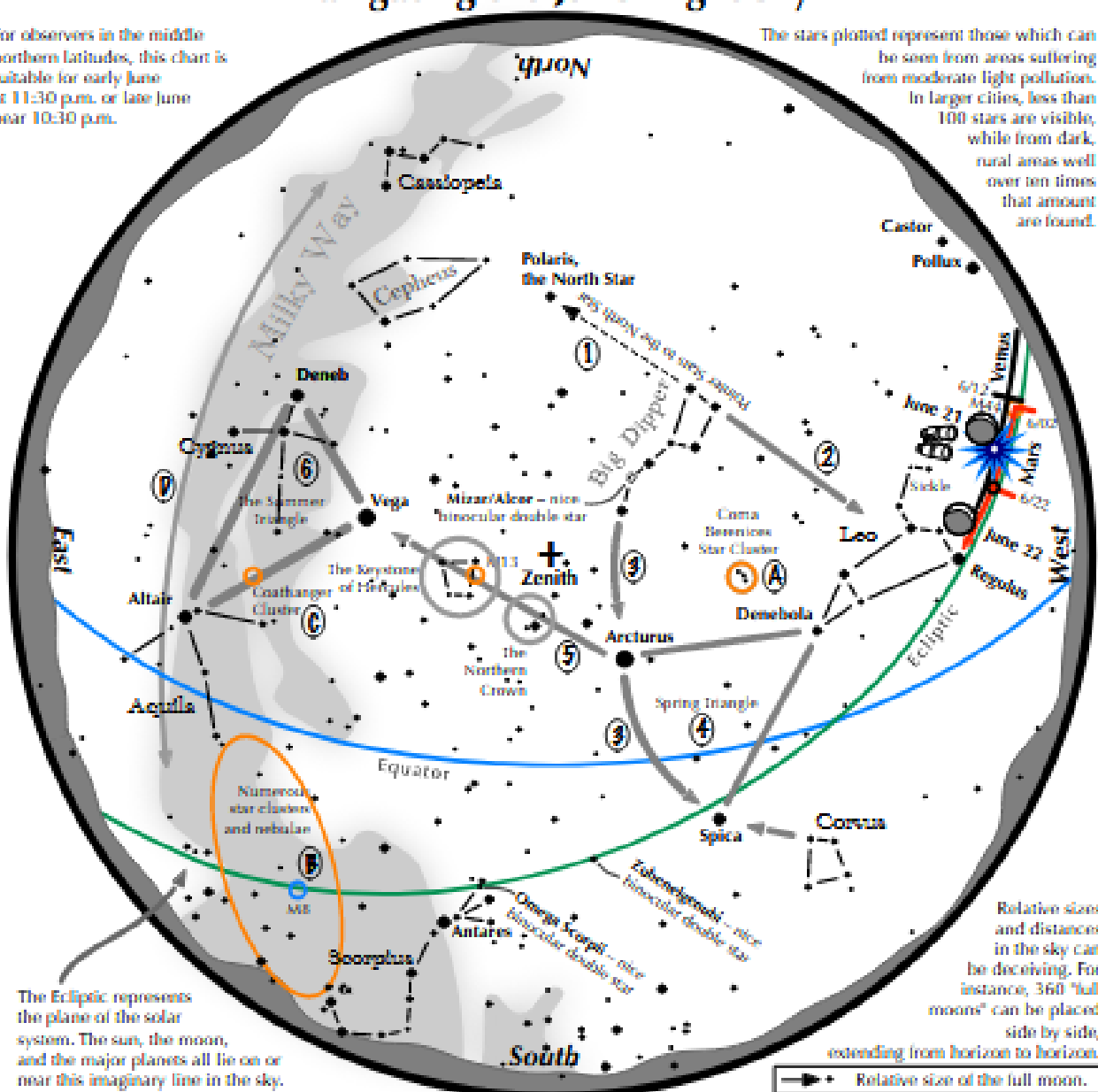




## Navigating the June Night Sky

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



**Navigating the June night sky: Simply start with what you know or with what you can easily find.**

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Draw another line in the opposite direction. It strikes the constellation Leo high in the west.
- 3 Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.
- 4 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 5 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 6 High in the east are the three bright stars of the Summer Triangle: Vega, Altair, and Deneb.

### Binocular Highlights

- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars of Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays.

**Astronomical League** [www.astroleague.org/outreach](http://www.astroleague.org/outreach); duplication is allowed and encouraged for all free distribution.





# **OBSERVING NOTES**

## **JUNE - 2023**

### **Lupus – The Wolf**

Position: RA 15, Dec-45°

*Note: For six years I wrote these Observing Notes, featuring the 60 constellations we can see before midnight from Baton Rouge, containing objects above magnitude 10. For the next three years I expanded that information and put all my research in the same format, ending last April, 2022. Beginning with last May, Named Stars, Deep Sky and Other Stars are expanded to include new discoveries, and updated when more accurate information is available. Monthly updates will be made to Sky Happenings and all that appears below that title.*

#### Named Stars

##### ***Named Stars***

**Men** (Alpha Lup), from “Yang Men” from the Chinese for “The South Gate”, and on the Euphrates River it was probably known as “Kakkab Su-gub Gad-Elm” “the star left hand of the Horned Bull”, mag. 2.30, 14 41 55.77 -47 23 17.3, is a blue-white giant star and a Beta-Cephei variable star. Also known as **HD 129056**, **HIP 71860**, **Gould 27 Lupi**, and **SAO 225128**.

**Kekouan** (Beta Lup), from the Chinese for “Imperial Guards”, and “Ke-Kwan” for “the calvary officer”, mag. 2.68, 14 58 31.95 -43 08 01.9, is a blue-white giant Beta-Cephei variable star. Also known as **HD 132058**, **HIP 73283**, **Gould 41 Lupi**, and **SAO 225335**.

**Thusia** (Gamma Lup), “the Sacrifice”, mag. 2.80, 15 35 08.46 -41 10 00.1, is a blue-white sub-giant star and a close binary star. The primary component is itself a spectroscopic binary star with an orbital period of 2.8081 days. The secondary star has an orbital period of 147 years and a separation of 0.68”. Also known as **HD 138690**, **HIP 76297**, **Gould 113 Lupi**, **h4786**, and **SAO 225938**.

**Qizhènjì’ngjün** (Kappa<sup>1</sup> Lup), mag. 3.88, 15 11 56.16 -48 44 15.7, is a double star with the secondary at magnitude 5.8 and a separation of 26.8” at a PA of 144°. Also known as **HD 134481**, **HIP 74376**, **Δ177**, **Gould 62 Lupi**, and **SAO 225525**.

##### ***Deep Sky:***

**NGC 5662**, mag. 5.5, 14 34 56.2 -56 38 24, 39.6’x39.6’ in size. Also known as **C1431-563**, **OCI 928**, and **vdBH 162**.

**Cr 289**, mag. 6.5, 15 04 02.2 -54 23 47, 39’ in size, is an open cluster of 100 stars, part of **NGC 5822**.

**NGC 5822**, mag. 6.5, 15 04 12.2 -54 21 58, 44.2’x44.2’ in size, is an open cluster of 150 stars; detached, weak concentration of stars; small range in brightness; central star is **HD 132944** at magnitude 9.06; very large. Located 3° southwest of **Zeta Lupi**. Also known as **Cr 288**, **C1501-541**, **Mel 130**, **vdBH 168**, **OCI 937**, **Lund 670**, **Raab 104**, and **Lo2104**.

**NGC 5986**, mag. 6.92, 15 46 03.0 -37 47 11.1, 9.8’x9.8’ in size, is a globular cluster; medium concentration of stars; very bright, large, and round. Located 2.5° west-northwest of **Eta Lupi**. Also known as **C1542-554**, **Mel 131**, and **vdBH 169**.

**Hogg 18**, mag. 8.0, 14 50 41.4 -52 15 51, 5’ in size, 34 stars, is an open cluster. Also known as **Lund 667**, **OCI 933**, **vdBH 166**, and **C1447-520**.

**NGC 5927**, mag. 8.01, 15 28 00.69 -50 40 22.9, 12’x12’ in size, is a globular cluster with a medium concentration of stars; quite bright; large, round, and well resolved. **NGC 5946** is 1’ east (in **Norma**).

Also known as **C1524-505**, **vdBH 173**, **GCl 35**, **Mel 134**, and **EQ 1324-505**.

**NGC 5749**, mag. 8.8, 14 48 49.0 -54 30 07, 16.7'x16.7' in size, 30 stars, is an open cluster. Also known as **C1445-543**, **Cr 283**, **Lund 666**, and **vdBH 165**.

**NGC 5882**, mag. 9.4, 15 16 49.95 -45 38 58.61, 0.21'x0.21' in size, is a planetary nebula; very small, round; photo magnitude 10.5; central star is magnitude 13.4. Also known as **CD-45 9789**,

**ESO 274-007**, **GSC 08294-00398**, **He2-122**, **IC 4108**, **IRAS 15134-4527**, **PK 327+10.1**,

**PNG 327.8+10.0**, **StWr 4-13**, **VV 71**, **Sa2-118**, **VV' 122**, **ARO 505**, **Wray 16-171**, and **HD 135456**.

**NGC 5824**, mag. 9.56, 15 03 58.61 -33 04 06.7, 1.8'x1.67' in size, is a globular cluster with a high concentration of stars; a pretty, bright, and small cluster; stellar nucleus. Also known as **C1500-328**, **1E1500.7-3251**, **GCl 31**, and **EQ 1500-3288**.

**NGC 5873**, mag. 9.7, 15 12 50.86 -38 07 31.58, 0.11'x0.11' in size. Also known as **CD-37 10033**,

**ESO 328-034**, **GSC 07822-00489**, **HD 134743**, center star magnitude 15.52, **He2-121**, **ARO 533**,

**IRAS 15096-3756**, **PK 331+16.1**, **PNG 331.3+16.8**, **Sa2-117**, **WRAY 16-170**, **VV 76**, **VV' 121**, and

**StWr 4-7**.

Deep Sky Objects (incomplete list) in Lupus: 20 NGC; 10 IC; 4 Cr; 11 He-2; 6 SL; 72 ESO; 1Al; 1 SDC; 1 Magakian; 1 IRAS; 3 Bennett; 8 Dunlop; 4 Mellott; 1 FSR; 4 Sa-2; 8 vdBH; 4 AM; 1 GN; 1 PGC; 1 SN; 12 MCG; 1 Lo; 4 WRAY; 3 ARO; 1 VV; 3 VV'; 21 PNG; 3 Radio Galaxies; 2 Slo; 1 Slr; 1 Frr; 5 StWr; 2 Str; 2 Sa; 1 SA; 1 Hogg; 1 B; 1 Bernes; 25 PK; 1 K1; and 13 C(luster) for a total of 267 objects.

## Other Stars:

**Nu<sup>2</sup> Lupi**, mag. 5.65, 15 21 49.57 -48 19 01.1, has three planets in orbit. Also known as **HD 136352**, **HIP 75181**, **Gould 85 Lupi**, and **SAO 225697**.

**HX Lupi**, mag. 6.06, 14 22 38.72 -48 19 11.4, is a rotating ellipsoidal variable star. Also known as **HD 125721**, **HIP 70270**, **Gould 4 Lupi**, and **SAO 224870**.

**HIP 74890**, mag. 7.05, 15 18 17.0 -41 25 14, has one planet in orbit. Also known as **HD 135760**.

**HD 126525**, mag. 7.85, 14 27 33 -51 55 59, has one planet in orbit. Also known as **HIP 70695**.

**SAO 206462**, mag. 8.71, 15 15 48.44 -37 09 16.0, has a circumstellar disk. Also known as **HD 135344B**.

**HD 135778**, mag. 9.0, 15 17 56.0 -30 28 41, has one planet in orbit. Also known as **HIP 74865**.

**WASP-178**, mag. 9.95, 15 09 05.0 -42 42 18, has one transiting planet in orbit.

Stars Beyond magnitude 10 that are of interest:

**HIP 70849**, mag. 10.4, 14 29 18.56 -46 27 49.7, has one planet in orbit.

**GQ Lupi**, mag. 11.4, 15 49 12.14 -35 39 04.0, has one planet or a brown dwarf star in orbit.

**He2-113**, mag. 11.88, 14 59 53.48 -54 18 07.5, is a protoplanetary nebula. Also known as **HIP 73391**.

**WASP-132**, mag. 12.4, 14 30 26.0 -46 09 33, has one transiting planet in orbit.

**SSSPM J1549-3544**, mag. 14.78, 15 48 40.23 -35 44 25.5, was previously misclassified as a white dwarf star.

**4U 1543-47**, mag. 14.9, 15 47 08.6 -40 40 10, is a low mass X-ray binary star. Also known as **IL Lupi**.

**Lupus-TR-3**, mag. 17.4, 15 30 18.67-42 28 46.5, has one planet in orbit.

Stars (incomplete list) in Lupus: 30 Greek; 10 Numbered; 70 Lettered; 14Δ; 7 CorO; 1 CapO; 10 I; 14 h; 5 Howe; 3 See; 1 R; 1 Pz; 4 B; 1 Rmk; 3 Hd; 5λ; 1 Arg; and 4 HdO for a total of 184.

## Sky Happenings: June 2023

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

**June 1<sup>st</sup>** - Dusk: In the west-northwest **Venus**, in **Gemini**, will form a tidy line with **Castor** and **Pollux**.

**June 2<sup>nd</sup>** - Evening: **Mars** hovers above the **Beehive Cluster (M44)** in the west.

**June 3<sup>rd</sup>** - **Antares** is 1.5° south of the **Moon** at 5 PM CDT,



- Full Moon** occurs at 10:42 PM CDT.
- June 4<sup>th</sup>** - **Mercury** passes 3° south of **Uranus** at 12 AM CDT (midnight),  
Double shadow transits on **Jupiter** at 12:09 AM CDT,  
**Venus** reaches greatest eastern elongation (45°) at 6 AM CDT.
- June 6<sup>th</sup>** - Asteroid **Parthenope** is at opposition at 4 AM CDT,  
The **Moon** is at perigee (226,714 miles or 364,861 km from **Earth** at 6:06 PM CDT.
- June 7<sup>th</sup>** - Double shadow transit on **Jupiter** at 1:28 PM CDT.
- June 9<sup>th</sup>** - **Saturn** is 3° north of the **Moon** at 3 PM CDT.
- June 10<sup>th</sup>** - **Last Quarter Moon** occurs at 2:31 PM CDT.
- June 11<sup>th</sup>** - Double shadow transit on **Jupiter** at 2:47 AM CDT  
**Moon** passes 2° south of **Neptune** at 3 AM CDT.
- June 13<sup>th</sup>** - **Venus** is 0.6° north of the **Beehive Cluster (M44)** at 10 AM.
- June 14<sup>th</sup>** - **Jupiter** is 1.5° south of the **Moon** at 2 AM CDT,  
Double shadow transit on **Jupiter** at 4:06 PM CDT.
- June 15<sup>th</sup>** - **Uranus** is 2° south of the **Moon** at 5 AM CDT,  
The **Moon** is 1.8° south of the **Pleiades** at 8 PM CDT.
- June 16<sup>th</sup>** - The **Moon** passes 4° north of **Mercury** at 4 PM CDT.
- June 17<sup>th</sup>** - **Mercury** passes 4° north of **Aldebaran** at 9 AM CDT,  
**New Moon** occurs at 11:37 PM CDT.
- June 18<sup>th</sup>** - Double Shadow transit on **Jupiter** at 5:25 AM CDT,  
**Saturn** is stationary at 10 AM CDT.
- June 19<sup>th</sup>** - Dusk: The **Moon**, two days past new, will form a triangle with **Castor** and **Pollux**, low on the west-northwest horizon.
- June 20<sup>th</sup>** - Asteroid **Juno** is in conjunction with the **Sun** at 3 AM CDT,  
**Pollux** is 1.7° north of the **Moon** at 5 AM CDT.
- June 21<sup>st</sup>** - **Summer Solstice** occurs at 9:58 AM CDT (longest day of the year) for the official start of Summer for the **Northern Hemisphere**,  
Dusk: In the west the waxing crescent **Moon**, **Venus**, and **Mars** are in a tight triangle,  
**Venus** is 4° south of the **Moon** at 8 PM CDT.
- June 22<sup>nd</sup>** - The **Moon** passes 4° north of **Mars** at 5 AM CDT,  
The **Moon** is at apogee (251,895 miles or 405,385 km from **Earth**) at 1:30 PM CDT,  
Evening: The **Moon**, in Leo, is about 5.5° to the right of **Regulus**.
- June 26<sup>th</sup>** - **First Quarter Moon** occurs at 2:50 AM CDT.
- June 27<sup>th</sup>** - Dusk: In the south-southwest the **Moon**, in **Virgo**, is less than 3° to the upper left of **Spica**.
- June 28<sup>th</sup>** - Evening: In the west, **Mars** and **Venus** are less than 3.5° apart.
- June 30<sup>th</sup>** - Evening: The waxing gibbous **Moon** is roughly 2.5° to the right of **Antares** in the south.

## Planets:

**Mercury** – **Mercury**, on June 1<sup>st</sup> (just 3 days past greatest elongation), will rise less than an hour after **Jupiter**, 13° east of the giant planet. **Mercury** will brighten from magnitude 0.4 on the 1<sup>st</sup> to -0.1 on the 9<sup>th</sup>. On the 4<sup>th</sup>, **Uranus** will be 3° due north of the planet with the planet standing 4° above the horizon 40 minutes before sunrise. The planet will reach magnitude -0.2 on the 10<sup>th</sup> when it will be 7° south of **M45**. On the 16<sup>th</sup>, the waning crescent Moon is less than 5° above the planet – now at magnitude -0.7 and so low that the planet is a challenge to observe. The planet will be too close to the Sun for observation late in the month, reaching superior conjunction in the beginning of July.

**Venus** – **Venus** will reach its best for the year as an evening object this month. Soon after sunset the planet is high in the evening sky, reaching greatest eastern elongation on June 4<sup>th</sup>. The planet will be visible all month, starting at magnitude -4.4 and ending the month at magnitude -4.7. On the 1<sup>st</sup>, the planet is in **Gemini** 30° above the western horizon 30 minutes after sunset, lined up with **Castor** and **Pollux**. The planet will crossover into **Cancer** on the 3<sup>rd</sup> and stand 10° from **Mars** (**Mars** is next to the **Beehive Cluster**). A telescope will reveal a 50% illuminated disk. In the second week of June, the planet will approach the **Beehive Cluster**, coming within 1.1° of it on the 12<sup>th</sup>, and 0.8° north of **M44** on the 13<sup>th</sup>. On

the 21<sup>st</sup>, the crescent **Moon** will be less than 3° from the planet, with **Mars** (in **Leo**) only 4.5° from the planet, and **M44** will be 7° west of the planet. By the 30<sup>th</sup>, the planet will be only 32% illuminated and will span 34", setting shortly before 11 PM local daylight time.

**Mars** – **Mars** will dim to magnitude 1.7 during June as it crosses **Cancer** and moves into **Leo** after midmonth. The planet is in **M44** on the 1<sup>st</sup> and 2<sup>nd</sup> at magnitude 1.6. You can catch the planet early, soon after 9 PM local time. By the end of the month, the planet will be setting an hour before midnight. The planet will display a 5" wide disk. On the 21<sup>st</sup>, **Mars**, **Moon**, and **Venus** will form a right triangle, with the lunar crescent about 3° to the above right of **Venus**, and **Mars** about 4.5° to the above left of **Venus**.

**Jupiter** – **Jupiter** is in Aries, rising just before 4 AM local time on June 1<sup>st</sup> and about 2 hours earlier on the 30<sup>th</sup> - its magnitude will increase slightly from -2.1 to -2.2 during the month. Early in the month it will be a challenge to observe due to its low altitude at the onset of twilight. By the 30<sup>th</sup> the planet will stand 30° high in the east as twilight begins. There will be five double shadow transits on **Jupiter** this month. The first will start with **Io**'s shadow starting ingress at 11:37 PM CDT on June 3<sup>rd</sup>, followed by **Europa**'s shadow's ingress at 12:09 AM CDT on the 4<sup>th</sup>. **Io** will start ingress at 12:29 AM CDT, with **Io**'s shadow's egress at 1:47 AM CDT. **Europa** will start ingress at 1:57 AM CDT, with **Europa**'s shadow's egress at 2:31 AM CDT. **Io** will egress at 2:38 AM CDT followed by **Europa**'s egress at 4:19 AM CDT. The second event, on the 7<sup>th</sup>, starts with **Io** starting ingress at 12:34 PM CDT, and its shadow's ingress at 1:28 PM CDT. **Europa**'s shadow will start transit at 1:28 PM CDT also. **Io**'s shadow will egress at 2:44 PM CDT. **Europa** will start ingress at 3:21 PM CDT with **Io**'s egress at 3:32 PM CDT. **Europa**'s shadow will egress at 3:50 PM CDT with **Europa** egressing at 5:43 PM CDT. The third event, on June 11<sup>th</sup>, will start with **Io**'s shadow starting transit at 1:31 AM CDT, and **Io** starting transit at 2:28 AM CDT. **Europa**'s shadow will start transit at 2:47 AM CDT. **Io**'s shadow will exit transit at 3:40 AM CDT, with **Io** exiting transit at 4:38 AM CDT. **Europa** will start transit at 4:47 AM CDT. **Europa**'s shadow will exit transit at 5:09 AM CDT, with **Europa** exiting transit at 7:08 AM CDT. The fourth event starts at 2:28 PM CDT on June 14<sup>th</sup> with **Io**'s shadow starting ingress, with **Io** starting ingress at 3:28 PM CDT. **Europa**'s shadow will ingress at 4:06 PM CDT. **Io**'s shadow will egress at 4:37 PM CDT. **Io** will egress at 5:37 PM CDT, with **Europa** starting ingress at 6:11 PM CDT. **Europa**'s shadow will egress at 6:27 PM CDT, with **Europa** egressing at 8:32 PM CDT. The fifth event will start at 3:25 AM CDT on the 18<sup>th</sup> with **Io**'s shadow starting transit. **Io** will start transit at 4:28 PM CDT. **Europa**'s shadow starts transit at 5:25 AM CDT with **Io**'s shadow exiting transit at 5:34 AM CDT. **Io** will exit transit at 6:37 AM CDT. **Europa** will start transit at 7:36 AM CDT followed by **Europa**'s shadow exiting transit at 7:46 AM CDT. **Europa** will exit transit at 9:56 AM CDT.

**Saturn** – **Saturn** will rise at 1:30 AM local time on June 1<sup>st</sup> and will be well above the horizon in the east by midnight on the 30<sup>th</sup>. Located in the middle of **Aquarius**, the planet rises to about 40° elevation by sunrise. The planet shines at magnitude 0.8 early in the month. Through a telescope, its yellowish disk is 17" across. The rings tilt will reach a minimum for the year this month at 7.3°, to our line of sight, with the long axis subtended to 40" while the narrow axis is just shy of 5". **Titan**, the planet's brightest moon, will shine at magnitude 8.6. The moon will be due north of the planet on the 5<sup>th</sup> and 21<sup>st</sup>, and due south on the 13<sup>th</sup> and 29<sup>th</sup>. The moon **Iapetus** will reach western elongation on the 24<sup>th</sup>, shining a little brighter than normal. On the 3<sup>rd</sup>, **Iapetus** will pass 34" north of the planet. On the 4<sup>th</sup>, it will stand 18" east of **Titan** before dawn.

**Uranus** – **Uranus**, in Aries, has a narrow window to observe it before twilight encroaches. The planet is about 16° east of **Jupiter**, also in Aries, just 10° southwest of **M45** – the **Pleiades**. The planet will shine at magnitude 5.9 and will require binoculars to spot. On the 15<sup>th</sup>, the planet will be 1.6° southwest of the waning crescent **Moon** – but catch it shortly after moonrise at about 3:50 AM local time. The planet lies about 2° from the 4<sup>th</sup> magnitude **Delta Arietis** – in late June the planet will wander south of the star.

**Neptune** – **Neptune** will stand 20° above the eastern horizon at around 4:30 AM local time as June opens. The planet lies about 20° east of **Saturn**, just over the border from **Aquarius** in southwest **Pisces**. The planet is 4.5° southeast of 4<sup>th</sup> magnitude **Lambda Piscium**. Binoculars will be needed to observe as it shines at magnitude 7.8. The planet forms a triangle with the 5<sup>th</sup> magnitude star **20 Piscium** and 6<sup>th</sup> magnitude **24 Piscium**. By June 25<sup>th</sup>, the planet's easterly motion slows to a halt with the planet standing 1° north of **24 Piscium** for about three weeks.

**Moon** – Favorable librations: **von Braun Crater** on June 4<sup>th</sup>; **Xenophanes Crater** on June 5<sup>th</sup>; **Pascal Crater** on June 6<sup>th</sup>; and **Gioja Crater** on June 7<sup>th</sup>.

Greatest North declination on the 19<sup>th</sup> (+27.8°)

Greatest South Declination on the 6<sup>th</sup> (-27.8°)

Libration In Longitude: East Limb Most Exposed on the 14<sup>th</sup> (+5.4°)

West Limb Most Exposed on the 1<sup>st</sup> (-6.2°) and the 29<sup>th</sup> (-7.1°)

Libration In Latitude: North Limb Most Exposed on the 8<sup>th</sup> (+6.6°)

South Limb Most Exposed on the 21<sup>st</sup> (-6.7°)

**Sun** – The **Summer Solstice** (and the longest day of the year) occurs at 9:58 AM CDT marking the official start of **Summer** for the **Northern Hemisphere**.

**Asteroids / Minor Planets** – All positions given are from the *RASC Observer's Handbook, 2023 USA Edition*, unless otherwise noted.

Asteroid **1 Ceres** – **Ceres's** positions: On June 5<sup>th</sup> – 12 03.86 +11 40.2, at magnitude 8.2 in **Virgo** on June 15<sup>th</sup> – 12 09.72 +10 06.9, at magnitude 8.4 in **Virgo**; and on June 25<sup>th</sup> – 12 17.23 +08 27.1, at magnitude 8.5 in **Virgo**. **Ceres's** positions, *by my estimates*, are as follows: On June 1<sup>st</sup> – about 3.6° north and a touch west of **Omicron Virginis**; on the 5<sup>th</sup> – about 3° due north of **Omicron Virginis**; on the 10<sup>th</sup> – about 2.2° north and a touch east of **Omicron Virginis**; on the 15<sup>th</sup> – about 2° northeast of **Omicron Virginis**; on the 20<sup>th</sup> – about 2.2° east and a touch north of **Omicron Virginis**; on the 25<sup>th</sup> – about 3.6° east and a touch south of **Omicron Virginis**; and on the 30<sup>th</sup> – about 0.6° west of **NGC 4365**, or 2° east and a little south of **M49**.

Asteroid **2 Pallas** – **Pallas**, on June 5<sup>th</sup>, will be at 08 54.80 +08 04.5, at magnitude 9 in **Cancer**.

Asteroid **15 Eunomia** – **Eunomia's** positions: On June 5<sup>th</sup> – 19 34.96 -26 06.1, at magnitude 9.5 in **Sagittarius**; on the 15<sup>th</sup> – 19 28.73 -25 52.6, at magnitude 9.3 in **Sagittarius**; and on the 25<sup>th</sup> – 19 20.13 -25 36.7, at magnitude 9.1 in **Sagittarius**.

**Comets** – All positions given are from ALPO unless otherwise noted.

Comet **237P/Linear** – **Linear's** positions, *by my estimates*, are as follows: On June 1<sup>st</sup> – about 5.8° east and a touch south from **Kappa Aquilae**; on the 5<sup>th</sup> – about 5.8° east and a touch north from **Kappa Aquilae**; on the 10<sup>th</sup> – about 6° east and a little north from **Kappa Aquilae**; on the 15<sup>th</sup> – about 6.2° northeast of **Kappa Aquilae** or 4.2° southwest of **Theta Aquilae**; on the 20<sup>th</sup> – about 4° southwest of **Theta Aquilae**; on the 25<sup>th</sup> – about 4° southwest of **Theta Aquilae** or 3.5° south and a little east of **Eta Aquilae**; and on the 30<sup>th</sup> – about 2.5° south and a touch east of **Eta Aquilae**.

**Meteor Showers** – All information given about meteor showers is provided by the International Meteor Organization.

There are no **Major (Class I)** meteor showers active in June.

There are no **Minor (Class II)** meteor showers active in June.

There is one **Variable (Class III)** meteor shower active in June: the **June Boötids**, active from June 25<sup>th</sup> through June 29<sup>th</sup>, peaks on June 27<sup>th</sup>.

There are seven **Weak (Class IV)** meteor showers (the maximum zenith hourly rate is <2) active in June: the **Daytime Arietids**, active from May 29<sup>th</sup> through June 17<sup>th</sup>, peaks on June 4<sup>th</sup>, the **June Iota Pegasids**, active from June 25<sup>th</sup> through June 27<sup>th</sup>, peaks on June 25<sup>th</sup>, the **Phi Piscids**, active from June 13<sup>th</sup> through July 5<sup>th</sup>, peaks on June 25<sup>th</sup>, the **Microscopiids**, active from June 25<sup>th</sup> through July 16<sup>th</sup>, peaks on July 6<sup>th</sup>, the **July Chi Arietids**, active from June 26<sup>th</sup> through July 22<sup>nd</sup>, peaks on July 7<sup>th</sup>, the **c-Andromedids**, active from June 21<sup>st</sup> through July 28<sup>th</sup>, peaks on July 12<sup>th</sup>, and the **Northern June Aquilids**, active from June 26<sup>th</sup> through July 22<sup>nd</sup>, peaking on July 15<sup>th</sup>.



# Mythology

## Lupus – The Wolf

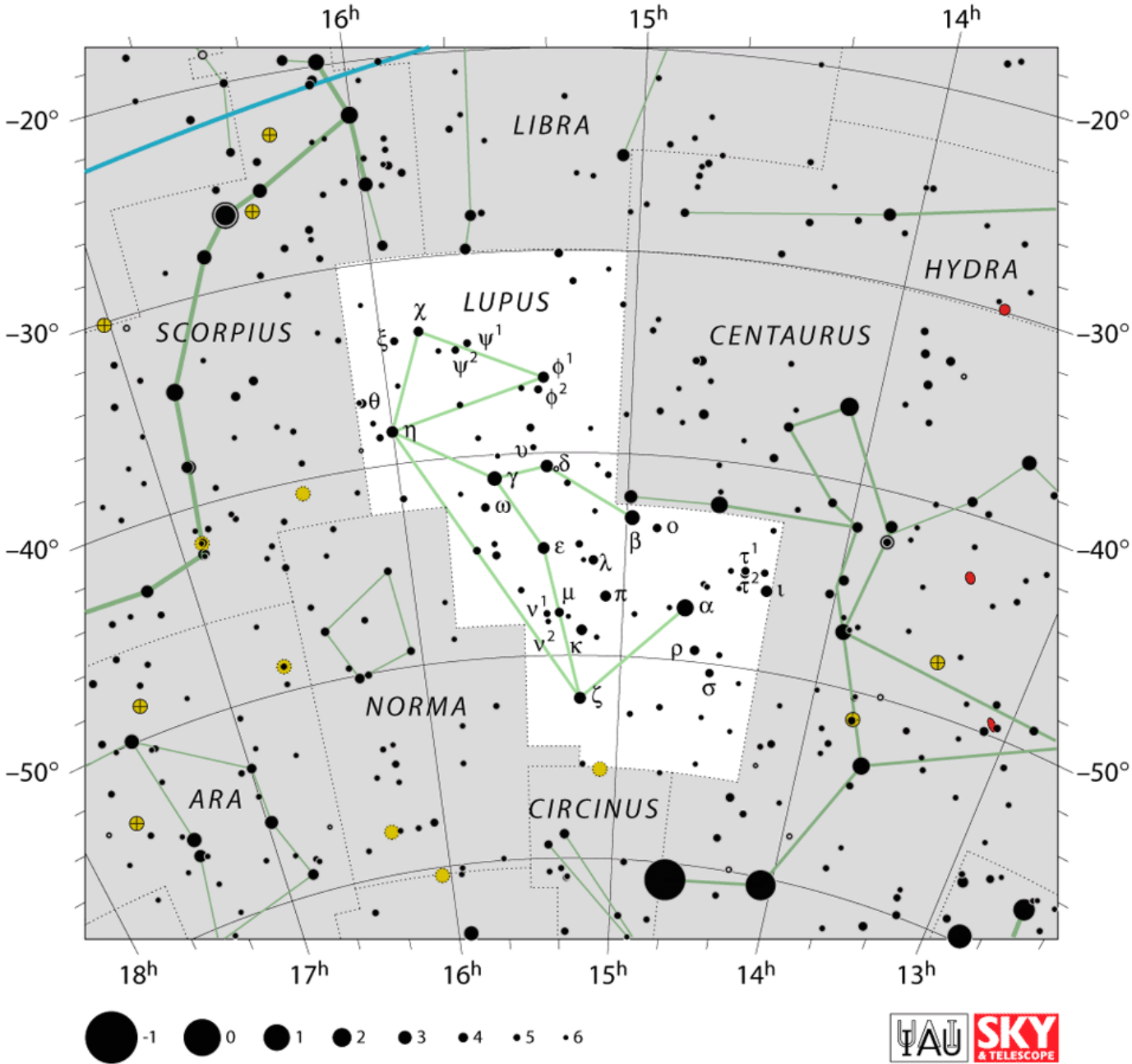
The ancient Greeks called this constellation Therium, representing an unspecified wild animal, while the Romans called it Bestia, The Beast. It was visualized as impaled on a long pole called a thyrsus, held by the adjoining constellation of Centaurus, the Centaur. Consequently, the constellation of the centaur and the animal were usually regarded as a combined figure.

According to the historian George Michanowsky in his book “The Once and Future Star”, the Babylonians knew this constellation as UR-IDIM, meaning “wild dog”. Eratosthenes said that the centaur was holding the animal toward the altar (the constellation ARA) as though about to sacrifice it. Hyginus referred to the animal as simply “a victim”, while Germanicus Caesar said that the centaur was either carrying game from the woods or was bringing a gift to the altar. The identification of this constellation with a wolf seems to have started in renaissance times.



One is tempted to recall the story of Lycaon, king of the Arcadians, who served the flesh of his own son to Zeus and was punished by being turned into a wolf (see the legend of Boötes). But that story has no connection to this constellation, which seems to have been overlooked by the mythologists. The fact that it is an imported constellation probably explains why the Greeks had no myth for it. The altar (constellation ARA) – Eratosthenes says that this is a sign of Chiron’s virtue (Centaurus).

*Inset: Fine Art print of the wolf constellation, available from Etsy  
<https://www.etsy.com/listing/575981480/fine-art-print-of-the-wolf-constellation>*



The End