JPL Image of surface of Mars, and JPL Ingenuity Helicioptor illustration.

Monthly Meeting June 14th at 7:00 PM, in person at last!!!

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

You can also join this meeting via meet.jit.si/BRASMeet

PRESENTATION: a demonstration on how to clean the optics of an SCT or refracting telescope.

What's In This Issue?

Observing Notes: Coma Berenices – Berenices Hair

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

BRAS YouTube Channel

President's Message

Spring is just flying by it seems. Already June, galaxy season is peeking and the nebulous treasures closer to the Milky Way are starting to creep into the late evening sky. And as a final signal of Spring, we have a variety of life creeping up at the observatory on Highland Road (and not just the ample wildlife that's been pushed out of the bayou by the rising flood waters, either).

Astronomy Day was pretty big success (a much larger crowd than showed up last spring, at any rate) and making good on the ancient prophecy, we began having meetings at HRPO once again. Thanks again to Melanie for helping us score such a fantastic speaker for our homecoming, too. From here on out, we'll be trying to go back to regular meetings the second Monday of the month at HRPO and online, either through Jitsi or YouTube channel. The business and light pollution meetings are likewise resuming at HRPO and through the Jitsi channel on the last Wednesday of the month.

An exception to this is going to be the July meeting. In deference to the nameless one's continuing desire to escape his wife's heavy gaze, we've decided July will be a great opportunity to have a good old-fashioned barbecue and stargaze out at HRPO. To facilitate attendance there, we're moving the July meeting to Sunday, 11 July. We'll have barbecue and potluck and then let members set up scopes for the duration of the evening. We're still working out times, so check next month's newsletter and pending emails for details.

There will be a few more things to look forward to with the club coming up soon, including the ever-popular Radio Field Day at the end of June (this year, featuring the raffle of the 8" Newtonian we donated to HRPO for said purpose), and then by the BRAS celebration of Asteroid Day soon after that. Hopefully, by the time the evening dark comes back in the fall, we should be settling back down in the comfort of routine. We've also started back up our off-campus outreaches, so look forward to details of those and of the resumption of our sessions to train people on the use of our outreach kits. Regular sidewalk astronomy should start back up in September, which is when we usually end our summer hiatus.

We still have a need for members to step up and help with some of our various projects as well. In addition to the pending need for volunteers for public outreaches, we'll also be needing more people to be willing to come and help out with our light pollution abatement efforts. The easiest way to help out it is to just go to the Globe at Night and fill out observations once a month. More adventurous people can help out with the committee and start trying to make waves around town.

One last note: all members can go to **our dark sky site** at any time, but you're reminded to be considerate of both the site, the locals, and your fellow astronomers while you're out there. It's semi-wild and on the edge of a swamp, so, you do go at your own risk. We're going to try to start organizing more club trips out there, so watch our social media messaging to see if we have anything coming up soon. These outings are usually short notice since they're weather dependent, so stay vigilant.

And that's it: please be sure to contact us if you have any suggestions for upcoming events or if there's something you've got in mind that you'd like the club to do.

Scott Cadwallader, President 2021

Sunday, June 20th is Summer Solstice, as well as Father's Day!!

Here's hoping everyone gets to kick back and bask in whatever pleases you!

May Member Meeting Minutes –May 10th, 2021
remotely via Jitsi

- Our guest speaker tonight is Dr. Alan Hale, co-discoverer of the Hale-Bopp Comet in 1995. He is a professional Astronomer, and talked about his career and comets.
- This Saturday, May 15th, is IAD. The NASA Stennis Test Facility, in Mississippi, will send a representative this year (the first time, and they asked to attend!).
- There was no LPC Meeting last month due to a lack of a quorum.
- Coy conducted the first successful large-scale public outreach for BRAS since May, 2020. He used an electronic-assisted device so multiple people could observe at once.
- Ben gave a list of upcoming Maker Market outreach events. He also reported that the Louisiana National Guard has again requested outreach events for their annual youth events. Scott added that these youth camps are held at excellent star gazing locations.
- Coy said that the new Nova in Cassiopeia is worth viewing, check with Steven Tilley about it.
- Ben says that the BRAS e-mail list (used for newsletter recipients) needs to be pared down. He also said that Santiago attended the Deep South Scrimmage Star Party, and reported that it went great.
- Scott said that Don Weinell was working on a site for a BRAS sponsored Star Party next year.
- John Nagle described the Wes-Tex (West Texas) Star Party (the Prude Ranch substitute for the cancelled Texas Star Party) that he had attended from May 2nd through the 9th, in Ft. Davis, Texas.
- Meeting ended at 8:50 PM.

Submitted by Thomas Halligan, Secretary

Monday, May 31

2021 Officers:

President: Scott Cadwallader
president@brastro.org
VP:
vicepresident@brastro.org
Secretary: Thomas Halligan
secretary@brastro.org
Treasurer: Trey Anding
treasurer@brastro.org

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

Committees/Coordinators:
AL Awards
Merrill Hess
lightpollution@brastro.org
John Nagle
newsletter@brastro.org
Michele Fry
observing@brastro.org
John Nagle
outreach@brastro.org
Ben Toman
webmaster@brastro.org
Frederick Barnett

May Business Meeting Minutes –May 26st, 2021
remotely via Jitsi

The meeting was held virtually, and in person (at HRPO) on May 26th, with 5 present at HRPO and 3 via jitsi. The following items were discussed:

- Update/replacing the BRAS computer at HRPO.
- Asteroid Day and the need to give HRPO a schedule of the event.
- Re-starting the ALCon Committee.
- Discussed the BRAS 40th Anniversary event, and what to possibly raffle for it.
- the Equipment Sale Book.
- the BRAS internet domain page and e-mails attached to it.
- AL's request for a Door Prize for ALCon 2021.
- Meeting programs for the rest of the year.
- A possible Star Party for 2022. Don Weinell is working on it.
- Authorized Chris Kersey to do business on behalf of BRAS related to HRPO.
- Upcoming outreach events.
- Agreed that all newsletter submissions need to be sent to the Editor by the 25th of the month. Michele amended to the 27th.

Submitted by Thomas Halligan

Upcoming BRAS Meetings:

Monthly Member Meeting:
7:00 Monday, June 14th, in person at the Observatory, plus via Jitsi remote access (open to the public).

Light Pollution Committee Meeting:
6 pm Wednesday, June 30th, via Jitsi. (Open to the public), followed by…….

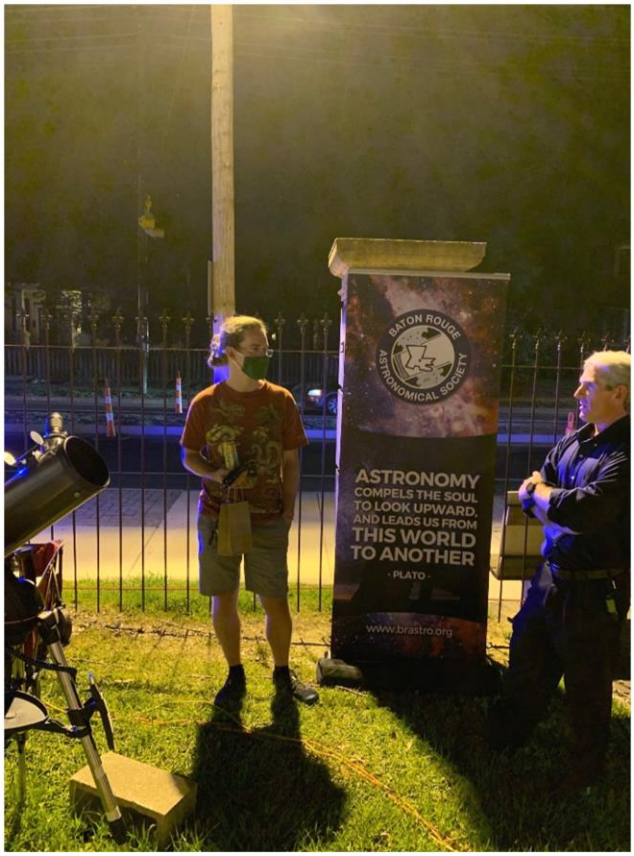
Monthly Business Meeting:
7 pm Wednesday, June 30th, (via Jitsi (Members Only)

MOON (Members Only Observing Night), TBA.

BRAS Outreach Report

Hi Everyone,

We have had another successful Outreach! A great time was had at the Baton Rouge Mid-City Makers Market at Circa 1857 on Government St. Sure, the event started at 6pm and it didn't get dark until 8:30pm, but that just gave Coy and Scott a perfect opportunity to do some solar and Mercury viewing. Coy's setup was particularly cool since he had a Hydrogen-Alpha telescope with a nice camera attached to it. Displaying the image on his laptop, he was able to point out features such as solar flares to people that otherwise may not have understood what they were looking at.



Scott showing a guest the view through his scope!

We don't have tons of room there because there are so many exhibitors/vendors packed into the area, but what we had was adequate and there were a lot of interested people walking by excited to take a look through a scope and see the cool equipment in action. The next MMM (Mid-City Makers Market) event will be June 18th and we'll be right on 1st quarter Moon. Here's hoping for another beautiful evening!

At the time I'm writing these notes, we also have 2 other Outreach possibilities. The 1st is another request for participation in the local KidCam camps at various locations around the area. I'm still waiting to hear back from them on exact dates/times. The 2nd is a request from the Louisiana National Guard for their camps they do with kids. We've done these in that past and they have been great. I have the dates and I'll leave them below, but I'm still waiting to hear back from them regarding some questions I had about the specifics for this year. (Will we be able to camp out again? Is there a preferred day for us to come? Etc.) As soon as those details come in, I'll send them along.

Upcoming Events

Friday, June 18th
6pm-9pm
Mid-City Makers Market
2 or 3 people for telescope viewing

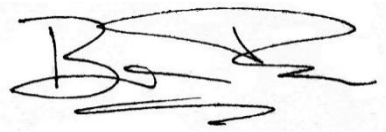
July 27-28th
TBD
Louisiana National Guard Kid Camps
Feliciana Retreat Center in Norwood, LA
4 or more needed for demos and activities during the day, possible evening observing

August 3rd-4th
TBD
Louisiana National Guard Kid Camps
Loranger, LA
4 or more needed for demos and activities during the day, possible evening observing

(Again, I'm awaiting word on specifics regarding the LA National Guard Camps. They ARE splitting the camp into two smaller camps this year. Hence the two different locations and set of dates. Each camp this year will only have a total of 60 kids ages 8-13. This should make it very manageable!)

Keep an eye out for more requests and further clarifications. I hope you will be able to come join in the fun!

Clear Skies,



Ben Toman

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Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum, which has reached 7000 posts.

Photography of BRAS Member Bill Buck Changing Venues
Still Time to Take MOVE2046 Survey
Mars and Pleiades Shone in Same Binocular FOV
Juno Sheds Light on Zodiacal Light
STARLINK Trains Zipped Through Baton Rouge March Sky
Shortwave Radio Storm at Jupiter Detected
Short-Lived Mountain Cloud at Mars Every Spring?
At Least Four G1 Storms in March
Vesta Reaches Opposition
Earth Safe from 99942 Apophis for At Least One Century
New Information About Comet 2I/Borisov
2021 NanoDays a Success

BRAS Light Pollution Committee Report

This committee meets at 6:00, same day as the 7:00 BRAS Business Meeting
(NEW SCHEDULE: Meetings will be the Wednesday before the 1st Monday of the month.)
Everyone is welcome to join in..

Meeting called to order by Chairperson John Nagle, 4 members present, 0 new members
No minutes were published in May newsletter – no meeting held

Old Business:

1. Discussed Light Pollution Petition and the possibility of sending out updates to the people who have signed the petition.
2. The Multi-Year Natural Sky Reclamation Plan is on hiatus.
3. Discussed the possibility of forming an IDA Chapter in Baton Rouge – the closest chapter to us is in Houston, Texas.
4. Discussed applying for HRPO to be designated as a Dark Sky Park by IDA.
5. Discussed having hybrid meetings all the time.
6. Merrill codifying BRAS Light Pollution stand into the LSU-BREC-BRAS UCA.
7. Need to contact home school groups about participating in the Globe at Night program.
8. Need to contact Civic Associations about Light Pollution.

New Business:

Need to talk to BREC about their Environmental Sustainability Program and Light Pollution.

Minutes of this meeting read and approved
Meeting adjourned.

John R. Nagle

A SpaceX fanatic created a website to find out when Starlink satellites are visible in your location. After 5 days, it went viral.

To plan when to see those pesky starlink satellites that are destroying our night sky go to SpaceX Starlink Satellites Tracker (findstarlink.com)
Local members, select **New Orleans, LA** as your location.
You can download the app for your phone or tablet too.

Image Credit: Marko Langbroek via SatTrackBlog

Globe At Night

The target for the Globe At Night program is **Hercules from June 1st through the 10th.**
If you would like to participate in this citizen science program, you can find instructions at
https://www.globeatnight.org
P.S. The "Loss of the Night" app can be used for information and for reporting your observations.

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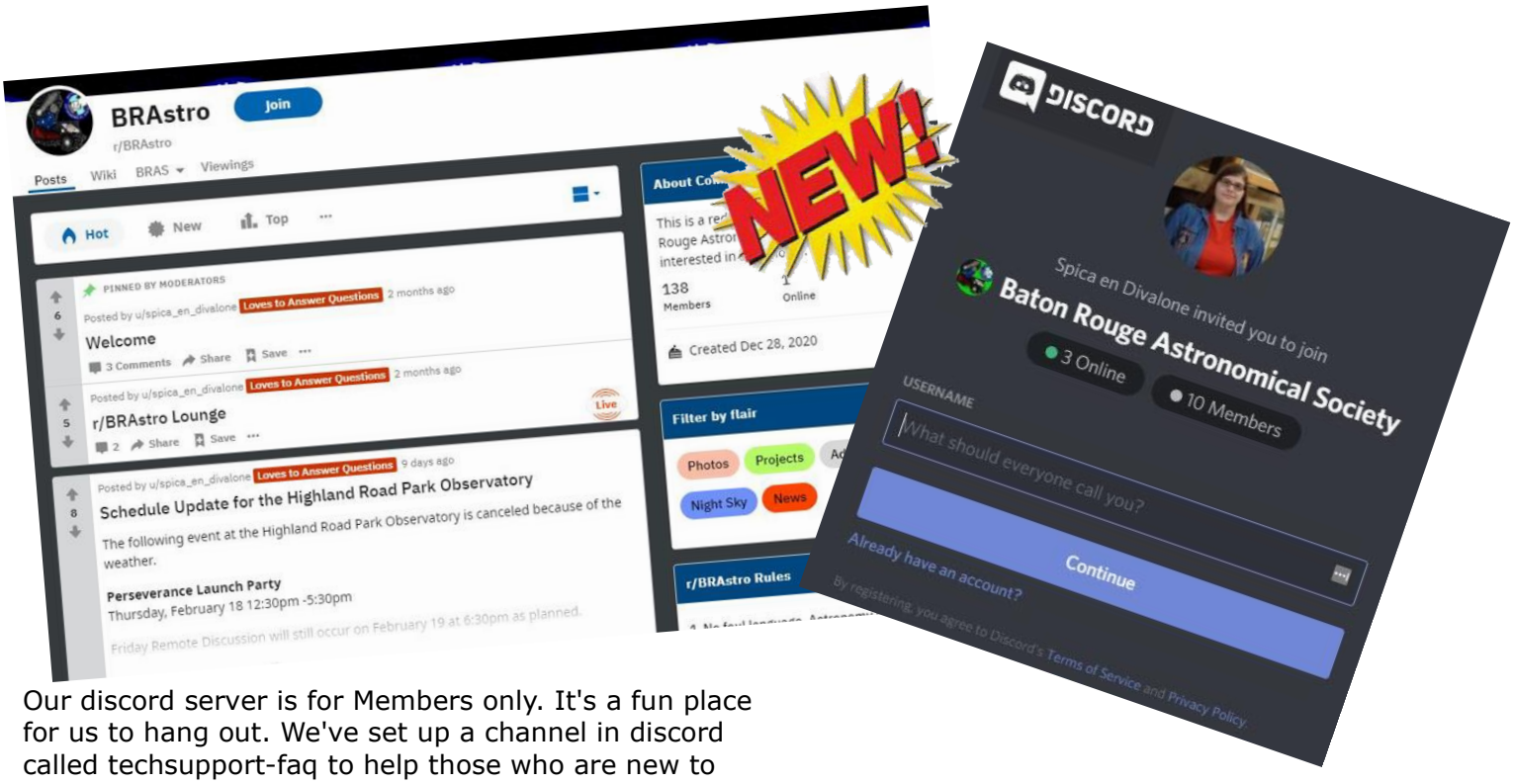
BRAS subreddit and a Discord server.

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

https://www.reddit.com/r/BRAstro/

If BRAS members want to identify themselves as club members, PM me to add a Flair next to your username.



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

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

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

Sincerely,
Amy & Justin Northrop

****

Flying "Rocks" and "Dirty Snowballs":

Asteroid and Comet News

June 2021
Volume 3, Issue 5.

JPL Close Approach Data from Mar 23,2021 to May 14, 2021, Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal (LD)	H (mag)	Diameter
(2021 FP2)	2021-Mar-23	0.84	30.1	2.5 m - 5.6 m
(2021 GE2)	2021-Apr-03	0.62	29.1	3.9 m - 8.8 m
(2021 GV)	2021-Apr-04	0.87	29.2	3.8 m - 8.6 m
(2021 GS)	2021-Apr-05	0.65	28.7	4.8 m - 11 m
(2021 GZ7)	2021-Apr-05	0.49	28.9	4.3 m - 9.6 m
(2021 GV4)	2021-Apr-08	0.82	29	4.3 m - 9.6 m
(2021 GL16)	2021-Apr-09	0.96	26.3	15 m - 33 m
(2021 GT3)	2021-Apr-10	0.67	26.4	14 m - 32 m
(2021 GQ5)	2021-Apr-11	0.97	28.5	5.3 m - 12 m
(2021 GW4)	2021-Apr-12	0.07	29.5	3.4 m - 7.6 m
(2021 GC13)	2021-Apr-13	0.89	29.1	4.0 m - 8.9 m
(2021 GC8)	2021-Apr-13	0.57	30.6	2.0 m - 4.5 m
(2021 GQ10)	2021-Apr-14	0.45	26.6	12 m - 28 m
(2021 GW16)	2021-Apr-14	0.08	30.1	2.5 m - 5.7 m
(2021 HC1)	2021-Apr-15	0.6	28	6.8 m - 15 m
(2021 GF10)	2021-Apr-15	0.3	28.2	6.2 m - 14 m
(2021 GN10)	2021-Apr-15	0.75	28.4	5.6 m - 12 m
(2021 HE1)	2021-Apr-17	0.59	28.9	4.4 m - 9.7 m
(2021 HN)	2021-Apr-19	0.66	26.9	11 m - 25 m
(2021 JW)	2021-May-02	0.67	27.5	8.3 m - 19 m
(2021 JV)	2021-May-04	0.36	27.4	8.8 m - 20 m
(2021 JS1)	2021-May-06	0.29	28.5	5.4 m - 12 m
(2021 JQ2)	2021-May-08	0.17	30	2.7 m - 6.0 m
(2021 JB6)	2021-May-13	0.27	28.8	4.7 m - 10 m
(2021 JU6)	2021-May-14	0.17	27.4	8.9 m - 20 m

As of 2021-05-31 there is

1,208 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL) (https://cneos.jpl.nasa.gov/sentry/)
2,679 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 from 2021-03-25 to 2021-05-27

Object Designation	Removed (UTC)
2021 AS3	2021-05-27 13:32:11
2021 GM1	2021-05-25 17:18:06
2021 EZ3	2021-05-24 20:09:40
2021 GV2	2021-05-24 20:05:33
2021 JF4	2021-05-24 13:33:58
2021 KV1	2021-05-23 13:32:20
2021 HE1	2021-05-22 07:34:45
2021 KP	2021-05-20 14:03:02
2021 JT5	2021-05-17 13:31:26
2017 HG4	2021-05-16 19:48:22
2021 JK3	2021-05-16 13:54:12
2017 QC36	2021-05-09 13:47:38
2021 JW1	2021-05-08 14:07:30
2021 JT	2021-05-07 14:28:44
2021 JD1	2021-05-07 14:03:30
2021 JC1	2021-05-07 14:00:53
2021 GF11	2021-05-07 13:38:15
2021 GD24	2021-05-06 14:16:05
2021 GS12	2021-05-06 14:10:56
2014 ES57	2021-05-04 22:33:41
2021 GL16	2021-05-01 14:20:09
2021 FN4	2021-04-30 14:25:16
2021 EU4	2021-04-30 14:04:53
2021 FC1	2021-04-25 13:59:59
2021 HR1	2021-04-24 14:04:23
2021 HV1	2021-04-24 14:03:41
2021 GK1	2021-04-24 02:35:30
2014 WZ365	2021-04-21 22:33:26
2021 GF10	2021-04-21 14:45:28
2021 GR7	2021-04-21 14:22:17
2012 RU16	2021-04-21 02:50:01
2006 QK33	2021-04-20 23:00:00
2006 WV	2021-04-20 11:38:25
2008 YC3	2021-04-19 14:49:12
2017 YE7	2021-04-19 10:59:50
2006 WP1	2021-04-18 22:02:26
2019 VC	2021-04-18 17:20:33
2018 AT2	2021-04-18 17:17:01
2020 BM6	2021-04-18 12:27:50
2018 EZ2	2021-04-18 10:46:44
2017 YK14	2021-04-18 08:19:04
2006 DN	2021-04-18 07:14:32

2006 WM3	2021-04-18 04:44:45
2016 TM	2021-04-18 00:16:23
2020 OM6	2021-04-17 23:59:39
2016 PM38	2021-04-17 23:43:03
2001 YN2	2021-04-17 09:53:33
2008 HC38	2021-04-17 08:57:56
2015 FN36	2021-04-17 07:11:34
2017 TD6	2021-04-17 01:52:24
2014 MV67	2021-04-16 23:56:44
2018 RW	2021-04-16 15:41:06
2012 UL171	2021-04-16 15:24:14
2017 UQ6	2021-04-16 14:31:48
2009 DM40	2021-04-16 12:25:31
2013 EC20	2021-04-15 23:10:36
2014 BZ2	2021-04-15 20:26:08
2010 YD	2021-04-15 17:23:39
2002 AN129	2021-04-15 07:15:17
2002 CA26	2021-04-15 06:40:33
2004 BK86	2021-04-15 06:19:28
2021 GT6	2021-04-14 14:04:21
2020 TJ3	2021-04-13 14:11:46
2020 UL3	2021-04-13 14:09:49
2021 GW4	2021-04-12 14:06:00
2021 GB6	2021-04-12 14:02:28
2021 GW3	2021-04-10 14:27:25
2021 GU2	2021-04-09 14:53:25
2019 BZ3	2021-04-08 14:23:30
2019 BV2	2021-04-08 14:07:44
2021 GQ1	2021-04-06 14:34:01
2021 FA	2021-03-31 14:09:08
2021 DG1	2021-03-31 14:03:04
2021 EM	2021-03-31 14:00:05
2021 FZ1	2021-03-28 13:58:09
99942 Apophis (2004 MN4)	2021-03-26 15:06:13
2021 FW2	2021-03-25 14:07:37

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)

BRAS Member AstroPhotos

If you want your astrophotos included here, send a .jpg to Michele at newsletter@brastro.org. by the 25th.
Be sure to name your file thus: your initials/date taken (yearmonthday)/image name. Ex. RR 20201126 M33.
Include a brief discription in the email.

Richard Rogers

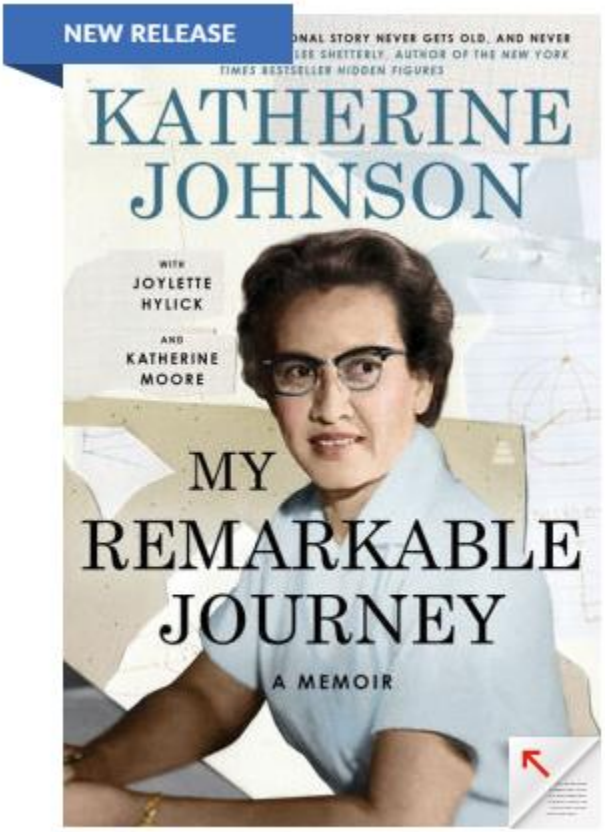
Whirlpool Galaxy – near the tail end of Ursa Major [Big Dipper] and nearly overhead this time of year (May 14th). M51 is a good target in May as it is almost overhead and away from the trees. It is around 31 million light years away – so the photons I captured left home when squirrel-sized monkeys were the most clever results of primate evolution [maybe still are…..]. The smaller galaxy [NGC 5195] is passing thru and behind M51 [according to the NASA Hubble site]. HD117815 [end star of the Dipper, circled] is the bright star to the lower right, a 7th magnitude sun-like star, 400 light years away.
IF you had brilliant night vision, this is what M51 and its near neighbors would look like through a low-power eyepiece at the telescope. The image was captured with a GSO 8 inch astrograph [F4] attached to a Nikon D300. It is a collection of about 75, 90-second images stacked and registered with Deep Sky Stacker and processed with Star Tools. The scope was autoguided with a Celestron Nexguide attached to an 80mm guide scope.

NASA Mathematician Katherine Johnson's

'My Remarkable Journey-A Memoir"

HOT OFF THE PRESS, published June 1st, 2021

Johnson is one of 3 black women who helped NASA launch John Glenn into space during the Space Race. These women were profiled in the New York Times bestseller book Hidden Figures (published in 2016),and in the film version of Hidden Figures, directed by Theodore Melfi, also released in 2016, which was nominated for three Academy Awards including Best Picture.



Johnson's calculations of orbital mechanics as a NASA employee were critical to the success of the first and subsequent U.S. crewed spaceflights.

Johnson passed away in February 2020 at the age of 101. My Remarkable Journey is co-written with her daughters Joylette Hylick and Katherine Moore, who joined TODAY to discuss her achievements. Read article below:

May 25, 2021, 9:09 AM CDT / Source: TODAY

By Maura Hohman

"For some people, being raised by a NASA mathematician would've been difficult, but for the daughters of Katherine Johnson, famously played by Taraji P. Henson in the Oscar-nominated film "Hidden Figures," there was lots of good." . . . . .

***"My Remarkable Journey - A Memoir"** is available for purchase from Barnes & Noble. ($19.99 hard cover, $10 cheaper than Amazon, and qualifies for free shipping), and on both Nook and Kindle for $12.99.*

More links:

NASA Mathematician Katherine Johnson's Memoir 'My Remarkable Journey' Published (forbes.com)

Katherine Johnson - Wikipedia

Katherine Johnson Biography | NASA

Hidden Figures | Prime Video (amazon.com) $3.99

Hidden Figures (2016) - Plot Summary - IMDb

Messages from HRPO

Highland Road Park Observatory

REMOTE DISCUSSIONS

All are for ages fourteen and older. Fridays at 6:30pm.
The Friday Night Lecture Series will replace the Remote Discussions in August.

4 June = "WWII: Midway"
These two presentations from Amy Northrop and James DeOliveira will investigate the science behind Allied intelligence operations in World War II, and how that led to an important defeat in the Pacific of the freedom-choking Axis.

11 June = "Skygazing: The Portal to STEM"
The deceptively simple act of going outside and looking up will do more than inspire art and deepen spirituality. The practical yet awesome and exciting viewing of celestial and atmospheric objects and phenomena transform the mathematical and theoretical abstract of science into a real connection to human existence. There are a myriad of home-based activities for pleasure, extra credit and extracurricular reasons; many of them cost little. Home-schooling parents, professional teachers, older students and scouting groups can benefit! [Postponed from 21 May.]

18 June = "The Amateur Radio Service"
The original social medium is over 100 years going strong, for the whole family, and has benefits and tricks and characteristics that very often allow it to outshine the internet! With a simple understanding of basic electronics, communication rules and expected responsibilities you and yours can make the "ham" waves the home of an incredible pasttime.

AMERICAN RADIO RELAY LEAGUE FIELD DAY

Saturday 26 June from 2pm to 10pm / No admission fee.

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!

OBSERVING NOTES APRIL

Coma Berenices – Berenices Hair

Position: RA 12.76, Dec. +21.83°

Note: For six years I have been writing these Observing Notes, featuring the 60 constellations we can see before midnight from Baton Rouge, that contain objects above magnitude 10. Beginning with the February 2019 newsletter, I began to update the constellations with new and expanded material, but the Sky Happenings calendar and associated information are new each month.

Named Stars

Diadem (Alpha Com), mag. 4.8, 13 09 59.2 +17 31 46, is a close binary star (secondary at magnitude 5.5), with a separation of 0.4". It is composed of two yellow-white dwarf stars. Also known as **HD 114378**, **HIP 64241**, **Σ 1728**, and **42 Comae Berenices**.
Al-Dafira (Beta Com), from the Arabic for "The Coarse Hair, or Tuft" (on the tail of the Lion), also called Al Halbah, mag. 4.2, 13 11 52.4 +27 52 41.0, is a hydrogen fusing dwarf star. Also known as **HD 114710**, **HIP 674394**, and **43 Comae Berenices**.
Kissin (21 Com), named for a species of Ivy, mag. 5.44, 12 31 00.57 +24 34 01.9, is a close binary star with nearly equal components, and an orbital period of 26 years. Also known as **HD 108945**, **HIP 61071**, **UU Comae Berenices**, and **21 Comae Berenices**.
Feige 66, mag. 10.59, 12 37 23.52 +25 03 59.9, is a sub-dwarf star.

Deep Sky:

M53 (NGC 5024), mag. 7.7, 13 12 55.2 +18 10 05, 14.4' in size, is a globular cluster; medium concentration of stars; a large, bright cluster. A brilliant mass of minute stars, blazing in the center. Paired with **NGC 5053**, 57.5' to the southeast. **M53** is 12.7 billion years old, and the most metal poor of the outer halo galactic globular clusters. It is abundant in blue straggler stars – nearly 200 of them. There is a tidal bridge-like structure stretching between **M53** and **NGC 5053**. Within 6' of the optical center of **M53** there is a 33-millisecond pulsar, **B1310+18**. **M53** is located 56.4' northeast of **Alpha Comae Berenices**. Also known as **Mel 111**, **CGCG 1310+184**, and **GCL 22**.
M64 (NGC 4826), "The Black Eye Galaxy", mag. 8.5, 12 56 43.7 +21 40 57.0, 10'x5.4' in size, is a very bright, very large, and very elongated galaxy; extremely bright nucleus. It has a prominent lidded dust lane just north-northeast of the galaxy's center. It has two counter-rotating gas discs (ionized gas and neutral hydrogen). It is located 5º northwest of **Alpha Comae Berenices**, or just over 1º northeast of **35 Comae Berenices**, or 3º north and 3º west of **M53**. Also known as **UGC 8062**, **CGCG 130-001**, **CGCG 1254.2+2157**, **MCG +4-31-001**, **IRAS 12542+2157**, **KUG 1254+1219**, "**The Evil Eye Galaxy**", and "**The Sleeping Beauty Galaxy**".
M85 (NGC 4382), mag. 9.1, 12 25 24.1 +18 11 28.0, 7.1'x5.5' in size, is a very bright, round, and pretty large galaxy; extremely bright, diffuse nucleus. Paired with **NGC 4934**, 8' to the east-northeast, and interacting with **MCG +3-32-038**. **M85** is a northern outlier of the **Virgo Galaxy Cluster**. The **SDSS** turned up an "ultra-compact dwarf (**UCD**) galaxy, **M85-HCC1**, only 0.6' south-southwest of

M85. Also known as **UGC 7508**, **CGCG 099-045**, **CGCG 1222.9+1828**, **MCG +3-32-029**, **KUG 334A**, and **VCC 798**.

M88 (NGC 4501), mag. 9.6, 12 31 59.0 +14 25 11.0, 6.7'x3.7' in size, is a bright, very large, and quite elongated galaxy; bright, very small nucleus. It has multiple spiral arms, and has a supermassive black hole (estimated mass of nearly 80 million suns) at its center. The central region of **M88** has a high degree of gas condensation for a galaxy without an apparent visual bar. It is one of the brightest galaxies in the **Virgo Galaxy Cluster**. Also known as **UGC 7675**, **VCC 1401**, **CGCG 099-076**, **CGCG 1229.4+1442**, **MCG +3-32-059**, and **IRAS 12294+1441**.

M91 (NGC 4548), mag. 10.2, 12 35 26.4 +14 29 47.0, 5.2'x4.2' in size, is a bright, large, and slightly elongated galaxy; bright, diffuse nucleus, with a central bar dimly visible. Paired with **NGC 4571**, and is a member of the **Virgo Galaxy Cluster**. Located 50' east-northeast of **M88**, and **M90** is about 0.25º to the south-southeast. Also known as **UGC 7753**, **VCC 1615**, **CGCG 099-096**, **CGCG 1232.9+1446**, **MCG +3-32-075**, **H2-20**, and **IRAS 12328+1446**.

M98 (NGC 4192), mag. 10.1, 12 13 48.3 +14 54 01.0, 9.8'x2.8' in size, is a bright, large, and slightly elongated galaxy; very small, extremely bright nucleus. The star **6 Comae Berenices** is 32' to the east, and **M99** is 1.3º to the east-southeast. **M98** is 6º east of **Denebola** (**Beta Leonis**), with **NGC 4237** about 1º to the northeast. Also known as **UGC 7231**, **VCC 092**, **CGCG 098-108**, **CGCG 1211.2+1510**,
MCG +3-31-079, **SDSS J121348.28+145401.6**, and **IRAS 12112+1510**.

M99 (NGC 4254), "Virgo Cluster Pinwheel", mag. 9.9, 12 18 49.6 +14 24 59.0, 5.4'x4.7' in size, has one heavy arm. It has no close neighbors, but a clumpy tail of neutral hydrogen (H I) is trailing to the north-northwest that links the galaxy with a massive H I source – **VIRGOHI2I** (with a mass of about 100 million suns), a suspected "dark galaxy" – it has a shortage of baryons compared to visible galaxies. Also known as **UGC 7345**, **VCC 307**, **CGCG 098-144**, **CGCG 099-011**,
CGCG 1216.3+1442, **MCG +3-31-099**, **SDSS J121849.60+142459.4**, **IRAS 12162+1441**,
"**St. Katherine's Wheel**", and "**The Pinwheel Nebula**".

M100 (NGC 4321), mag. 9.4, 12 22 54.9 +15 49 20.0, 7.4'x6.3' in size, is a pretty faint, very large, round, face on galaxy; very bright nucleus. Paired with **NGC 4312**, 18' to the south-southwest. It has two prominent spiral arms springing from an oval central whorl, which forms a weak bar. It has a tenuous extension toward **NGC 4323** (often identified as **NGC 4322**) that is 5.3' to the north-northeast. **NGC 4328** is 18' to the south-southwest. **IC 7831** is about 19' to the west-southwest. There are some 57 **H II** regions that have been resolved within the circum-nuclear ring. Also known as **UGC 7450**, **KUG 1220+160**, **VCC 596**, **CGCG 099-030**, **CGCG 1220.4+1606**, **MCG +3-32-015**, and **IRAS 12204+1605**.

Mel 111, "Coma Star Cloud", "The Flying Witch Cluster", mag. 1.8, 12 25 06 +26 07 00, 300' in size, 273+ stars. Near its center is the star **12 Comae Berenices**, a magnitude 4.8 spectroscopic binary and a visual triple star system (the **B** star is magnitude 12.0, 37" to the west-northwest, and the **C** star is magnitude 9.0 , 7' to the south and a little west). **M111** is located just south of **Gamma Comae Berenices**. Also known as **Cr 256**, **Lund 613**, **OCL 558**, **OCL 558.0**, **CGCG 1222+265**,
"**The Coma Star Cluster**", " **The Coma Berenices Cluster**", "**The Coarse Hair Cluster**", and "**The Tuft Cluster**".

NGC 5053, mag. 9.0, 13 16 27.0 +17 41 52.0, 8'x8' in size, 3400 + stars, is a globular cluster with a low concentration of stars; pretty large, very faint, irregularly round. A minimum age of 10 billion years. Located 1.5º east of **Alpha Comae Berenices**, and just 57.5' to the northwest is **M53**. Also known as **Cr 267**, **OCL 970**, **EQ 1313+179**, **CGCG 1313+179**, **GCL 23**, and **H6-07**.

NGC 4725, "The Fighter", mag. 9.4, 12 50 26.5 +25 30 02.0, 10.7'x7.7' in size, is a very large and elongated galaxy; has an internal ring; very small, extremely bright nucleus. Paired with the emission line galaxy **NGC 4712**, 12' to the west. Interacting with **NGC 4247**. Located 5.3º west-southwest of **Beta Comae Berenices**. Also known as **UGC 7989**, **PGC 43451**, **Best 31**, **KUG 1247+257B**, **CGCG 129-027**, **CGCG 1248.0+2546**, **MCG +4-30-022**, **Holm 468A**, **LEDA 43451**, **H1-84**, and **H3-611**.

NGC 4565, "The Needle Galaxy", mag. 9.6, 12 36 20.8 +25 59 14.0, 15.8'x2.1' in size, is a bright, extremely large, and extremely elongated galaxy; edge on. It has an old stellar population (about 8 billion years old). Located 3º southeast of **Gamma Comae Berenices**, on the eastern fringes of **Melotte 111**. **NGC 4562** is 13' to the southwest, while **IC 3571** is 6' to the north. Also known as **UGC 7772**, **H5-24**, **KUG 1233+262**, **CGCG 129-010**, **CGCG 1233.8+2615**, **MCG +4-30-006**, **FGC 1471**, **RFGC 12338**, and **IRAS 12338+2615**.

NGC 4494, mag. 9.7, 12 31 24.1 +25 46 31.0, 4.8'x3.5' in size, has a supermassive black hole in its center, and has a nuclear dust ring. Also known as **UGC 7662**, **H1-83**, **IC 7662**, **MCG +4-30-002**, and **PGC 41441**.

NGC 4559, "The Koi Fish Galaxy", mag. 9.9, 12 35 57.7 +27 57 35, 10.5'x4.9' in size. Also known as **C 36**, **UGC 7766**, **H1-92**, and **PGC 42002**.

Objects beyond magnitude 10 that are of interest:

NGC 4651, "The Umbrella Galaxy", mag. 10.8, 12 43 47.6 +16 23 36, 4.0'x2.6' in size, is a galaxy rich in neutral hydrogen. Also known as **UGC 7901**, **H2-12**, **ARP 189**, and **PGC 42833**.

NGC 4889, mag. 11.5, 13 00 08.1 +27 58 37, 2.9'x1.9' in size, is a small, bright, slightly elongated galaxy, and the brightest galaxy in the **Coma Cluster** (**Abell 1656**). Has over 1580 globular clusters, and has one of the largest known black holes – 21 billion solar masses. **NGC 4874** is 7.2' to the west. Also known as **UGC 8110**, **LEDA 44715**, **ZwG 160.241**, **C 35**, **NGC 4884**, **MCG +5-31-077**, **PGC 44715**, and **Abell 1656-BCG.**

The Coma Cluster, Abell 1656, mag. 11.0, 12 59 48.7 +27 58 50, 224' in size, is a cluster that contains at least 1,000 galaxies. Its brightest members are **NGC 4874** and **NGC 4889**. Contains the X-ray source **Coma X1**. About 90% of its mass is believed to be dark matter. Also called **Coma I**.

NGC 4615, "The Integral Sign Spiral Galaxy", mag. 13.1, 12 41 37.3 +26 04 22.1, 1.6'x0.7' in size. Also known as **UGC 7852**, **ARP 34**, **PGC 42584**, and **GC 5667**.

NGC 4676A/B, "The Mice", mag. 13.1/13.8, 12 46 10.1/12 46 11.2 +30 43 55/30 43 22, 2.3'x0.7'/2.2'x0.8' in size, are interacting galaxies with remarkable tidal tails. The tail of the northern galaxy, **NGC 4676A**, is narrow, nearly straight, and punctuated with knots of star formation, while the southern galaxy, **NGC 4676B**, is more diffuse. Also known as **IC 819/820**, **UGC 7938/7939**, **ARP 242**, and **PGC 43062/43065**.

Coma Berenices Dwarf Galaxy, "Coma Dwarf", mag. 14.5, 12 26 59 +23 55 09, 11.8' in size, is most probably dominated by dark matter. Also known as **PGC 4713557**.

Dragonfly 44, mag. 19.4, 13 00 58.0 +26 58 35, 20"x15" in size, is a large "**Ultra Diffuse Galaxy**" (**UDG**) in the **Coma Cluster**, located 50' south-southeast of the **NGC 4874/4889** pair. Most of its mass (about 1 trillion solar masses), with only one hundredth of one percent is in normal matter – the rest is dark matter. Also known as **SDSS J130057.99+265839.7**.

Coma Super Cluster is a part of the **Coma Filament**, containing the **Coma Cluster** (**Abell 1656**) and **Leo Cluster** (**Abell 1367**) of galaxies. Also known as **SCI 117**.

The Coma-Virgo Cluster is the northern portion of the **Virgo Cluster**, and includes six **Messier** galaxies – **M85** (**NGC 4382**), **M88** (**NGC 4501**), **M91** (**NGC 4548**), **M98** (**NGC 4192**), **M99** (**NGC 4254**), and **M100** (**NGC 4321**).

Asterisms:

The Box, Rose 10, HCG 61, is composed of four galaxies in a box shape:

NGC 4169, mag. 12.16, 12 12 18.8 +29 10 46, 1.8'x0.9' in size. Also known as **UGC 7202**, **PGC 38892**, **MCG +5-29-032**, **CGCG 158+041**, **H3-358**, **HCG 61A**, **KTG 42A**, and **SDSS 121218.7+291045.8**.

NGC 4173, mag. 13.0, 12 12 21.4 +29 12 25, 5'x1.7' in size. Also known as **UGC 7204**, **HCG 61B**, **KTG 42B**, **Holm 346a**, **NGC 4171**, **MCG +5-29-033**, **CGCG 158-043**, **PGC 38897**, and **FGC 1382**.

NGC 4174, mag. 13.3, 12 12 26.9 +29 08 57, 0.9'x0.35' in size. Also known as **UGC 7206**, **HCG 61D**, **MCG +5-29-034**, **CGCG 158-044, Mrk 761**, and **PGC 38906**.

NGC 4175, mag. 13.2, 12 12 31.0 +29 10 06, 1.8'x0.4' in size. Also known as **UGC 7211**,

HCG 61C, KTG 42C, Holm 346b, MCG +5-29-036, CGCG 158-045, PGC 38912.

I have listed the following objects in Coma Berenices:

342 NGC; 159 IC; 267 UGC; 1 UGCA; 142 MCG; 17 CGCG; 5 Radio Galaxies; 12 Quasars; 166 Herschel; 15 Arp; 2 Mel; 2 Cr; 3 Caldwell; 1 Abell; 1 HCG; 7 Messier; 26 VV; 3 Galaxy Trios; 3 MAC; 9 Flat Galaxies; 5 Variable Galaxies; 4 Small Compact Galaxy Groups; 4 Rose; 8 ZwG; 10 Ho; 1 IIZw; 1 IIIZw; 1 GCL; 1 NPM1G; 5 PGC; 1 LoTr; 1 Malin; and 1 Dwarf Galaxy, for a total of 1326 objects.

Other Stars:

41 Com, mag. 4.80, 13 07 10.7 +27 37 29.7, has one planet in orbit. Also known as **HD 113996**, and **HIP 64022**.
29 Com (36 Virginis), mag. 5.71, 12 48 54.2 +14 07 21.5. Also known as **HD 111397**, and **HIP 62541**.
HD 111591, mag. 6.43, 12 50 17.23 +22 51 48.8, has one planet in orbit. Also known as **HIP 62653**.
HD 112127, mag. 6.88, 12 53 55.75 +26 46 48.0, is a carbon star. Also known as **HIP 62944**.
HD 107146, mag. 7.07, 12 19 06.5 +16 32 53.9, has a debris disk. Also known as **HIP 60074**.
HD 114762, mag. 7.3, 13 12 19.74 +1731 01.6, has one planet in orbit. Also known as **HIP 64426**.
HD 108863, mag. 7.89, 12 30 20 +21 56 54, has one planet in orbit. Also known as **HIP 61020**.
HD 116029, mag. 8.04, 13 20 40 +24 38 55, has one planet in orbit. Also known as **HIP 65117**.
IN Com, mag. 8.70, 12 55 33.75 +25 53 30.6, is the central star of the planetary nebulae **LoTr5**. Also known as **HD 112313**, and **HIP 63087**.
HD 108874, mag. 8.76, 12 30 26.88 +25 52 47.4, has two planets in orbit. Also known as **HIP 61028**.

Stars beyond magnitude 10 that are of interest:

HZ 43, mag. 12.66, 13 16 21.85 +29 05 55.4, is part of a white dwarf/red dwarf binary system. Also known as **HIP 64776**.
GD 153, mag. 13.35, 12 57 02.34 +22 01 52.7, is a white dwarf star.
Hz 21, mag. 14.69, 12 13 56.25 +32 56 31.4, is a white dwarf star.
GP Com, mag. 15.69, 13 05 42.43 +18 01 04.0, is an interacting binary white dwarf star.
LM Com, mag. 16.15, 12 26 30.9 +30 38 52.7, is a re-radiating binary system.
RBS 1223, mag. 28.6, 13 08 48.7 +21 27 08, is a neutron star.
PSR B1237+25, 12 39 40.39 +24 53 49.9, is a pulsar star.

Asterisms:

Lang Wei, from the Chinese for "Official Rank", is composed of the stars a, b, c, d, e, and f.

I have listed the following stars in Coma Berenices:

19 Σ; 3 OΣ; 2 ΣI; 5 β; 3 h; 3 Ho; 4 A; 1 Cou; 48 Variable; 46 Numbered; 4 Greek; 1 BD; 1 Feige; 2 Hz; 1 GD; 1 RBS; 1 PSR; 1 WASP; and 6 Supernovae, for a total of 152.

Sky Happenings:June, 2021

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

June 1st - The **Moon** passes 5º south of **Jupiter** at 4 AM CDT.
June 2nd - **Last Quarter Moon** occurs at 2:24 AM CDT,
Dawn: The last quarter **Moon**, **Jupiter**, and **Saturn** form a shallow arc,
Mars passes 5º south of **Pollux** at 9 AM CDT,
The **Moon** passes 4º south of **Neptune** at 8 PM CDT.
June 4th - Double shadow transit of **Jupiter**, starting at 7:39 PM CDT.
June 6th - Asteroid **Juno** is at opposition at 5 PM CDT.
June 7th - The **Moon** passes 2º south of **Uranus** at 1 AM CDT,
The **Moon** is at apogee (252,418 miles or 406,228 km from **Earth**) at 9:27 PM CDT.
June 10th - **New Moon** occurs at 5:53 AM CDT (lunation 1218). Annular solar eclipse. Partial solar eclipse visible in the **US**, from **Charleston**, **South Carolina**, going north through **North**

Dakota into **Canada**,
Mercury is in inferior conjunction at 8 PM CDT.

June 11th - Double shadow transit on **Jupiter**, starting at 8:16 PM CDT.

June 12th - The **Moon** passes 1.5º north of **Venus** at 2 AM CDT.

June 13th - The Moon passes 3º north of Mars at 3 PM CDT,
Dusk: The thin lunar crescent is in **Cancer**, with **Mars** 3º from it, and the **Beehive Cluster** (**M44**) is a bit more than 4º to the left of the **Moon**.

June 15th - Dusk: In **Leo**, the waxing lunar crescent and **Regulus** are some 4º apart.

June 17th - **First Quarter Moon** occurs at 10:54 PM CDT.

June 19th - Evening: In **Virgo**, the first quarter **Moon** gleams about 5º from **Spica**.

June 20th - The **Summer Solstice**, the longest day of the year in the **Northern Hemisphere**, and the official start of **Summer**, occurs at 10:32 PM CDT.

June 21st - **Jupiter** is stationary at 12 AM (Midnight) CDT,
Dusk: Very low on the west-northwest horizon in **Gemini**, **Venus** is 5º from **Pollux**.

June 22nd - **Venus** passes 5º south of **Pollux** at 10 AM CDT,
Mercury is stationary at 6 PM CDT,
Evening: The **Moon**, two days short of full, is in **Scorpius**, with about 3.5º separating it from **Antares**.

June 23rd - The **Moon** is at perigee (223,666 miles or 359,956 km from **Earth**) at 4:55 AM CDT,
Evening: **Mars** is in the **Beehive Cluster** (**M44**), starting at 90 minutes after sunset, just 7º above the west-northwest horizon.

June 24th - **Full Moon** occurs at 1:40 PM CDT.

June 25th - Double shadow transit on **Jupiter**, starting at 10:35 PM CDT.

June 26th - **Neptune** is stationary at 5 AM CDT.

June 27th - The **Moon** passes 4º south of **Saturn** at 4 AM CDT,
Dawn: The waning gibbous **Moon** hangs above the southern horizon, with **Saturn** a bit less than 5º above it, with **Jupiter** to the left of the pair.

June 28th - Dawn: The **Moon** is between **Jupiter** and **Saturn**, forming a triangle before the **Sun** rises,
The **Moon** passes 4º south of **Jupiter** at 2 PM CDT.

June 30th - The **Moon** passes 4º south of **Neptune** at 4 AM CDT,
The **Tungusta Impact** occurred on this day in **Siberia** in 1908.

Planets:

Mercury – **Mercury** will reach inferior conjunction with the **Sun** on June 10th, and will move west of the **Sun** in late June. It is too faint to spot in the bright twilight until the last week of the month. On the 30th, it will shine at magnitude 1, and will be just 8º east of **Aldebaran**. Look east at 4:30 AM local time to find **Aldebaran** 5º high. See if you can spot **Mercury** over the next half hour as it rises.

Venus – **Venus** is the first planet to appear after sunset, low in the western sky, at 6º elevation 45 minutes after sunset on June 1st. At magnitude -3.9, it will remain visible until nearly 10 PM local time. On the 3rd, the planet will be roughly 30' from **M35** in **Gemini**, as the sky darkens. On the 11th, the planet and the slender crescent **Moon** (1.6 days old, 2.3% illuminated) to the lower right, are less than 3º apart. The planet reaches perihelion on the 12th, so its visibility stays good throughout the month. On the 21st, the planet and **Pollux**, in **Gemini**, will be about 5º apart. On the evenings of the 24th and 25th, **Castor**, **Pollux**, and **Venus** will form a line spanning 12º parallel to the west-northwest horizon. By the end of the month, the planet is 2.7º shy of the **Beehive Cluster** (**M44**). Through a telescope, the planet changes very little this month. On the 1st, it is 10" in diameter with a 95% lit disk, and will grow to 11" with a 90% illuminated disc by the 30th.

Mars – **Mars** begins the month in **Gemini**, 5.5º due south of **Pollux**, and sets just before midnight in early June. It will shine at a bright magnitude 1.7. On the 13th, a three-day-old crescent **Moon**, **Mars**, and the **Beehive Cluster** (**M44**) combine, with **M44** being 4.5º southeast of the **Moon**, and **Mars** being 3º southwest of the **Moon**. The planet crosses the 1.5º wide **Beehive Cluster** on the 22nd and 23rd, shining at magnitude 1.8. The planet will set before 11 PM local time. On the 30th, the planet lies 4.5º east of **M44**,

and will set around 10:30 PM local time.

Jupiter – Jupiter rises (at about 1 AM local time) about an hour after Saturn, and is about 30º high in the southeast on June 1st, at 4:30 AM local time, just as the first signs of twilight paint the sky. The planet shines in **Aquarius** at magnitude -2.4. The planet moves eastward slowly until it reaches a stationary point on the 21st, having brightened to magnitude -2.6, and will stand 8.5º northeast of the waning gibbous **Moon** on the morning of the 28th. By the 30th, the planet rises shortly before midnight, and stands 40º high at 4:30 AM local time. The planet's disk spans 41" as the month begins, and grows to 45" wide by month's end. There are three double shadow transits of **Jupiter** this month. The first, on June 4th, starts at 5:39 PM CDT when **Ganymede's** shadow starts ingress, followed by **Io's** shadow's ingress at 6:22 PM CDT. **Io** starts transit at 7:41 PM CDT, with its shadow's egress at 8:39 PM CDT. **Ganymede's** shadow egresses at 9:17 PM CDT, with **Io** starting egress at 9:58 PM CDT. The second event, on June 11th, starts with **Io's** shadow's ingress at 8:16 PM CDT, followed by **Io** starting transit at 9:32 PM CDT. **Ganymede's** shadow will start ingress at 9:39 PM CDT, followed by **Io's** shadow's egress at 10:33 PM CDT. **Io** will egress transit at 11:49 PM CDT, with **Ganymede's** shadow's egress at 1:17 AM CDT on the 12th. The third event, on the 24th, starts with **Callisto's** shadow's ingress at 10:35 PM CDT, with **Io's** shadow starting ingress at 12:03 AM CDT on the 25th. **Io** starts transit at 1:12 AMCDT, and **Io's** shadow will egress at 2:21 AM CDT. **Callisto's** shadow will egress at 3:12 AM CDT, with **Io** starting egress at 3:29 AM CDT. There are five **Jupiter** mutual satellite events (moons eclipsing moons) this month. On June 1st, **Io** eclipses **Ganymede** at 6:06 AM CDT to 6:13 AM CDT. On June 10th, **Callisto** eclipses **Europa** at 2:50 AM CDT to 3:05 AM CDT. On the 18th, **Europa** eclipses **Callisto** at 12:26 AM CDT to 12:55 AM CDT. On the 21st, **Io** eclipses **Europa** from 1:13 AM CDT to 1:21 AM CDT. Finally, on the 28th, **Io** eclipses **Europa** from 3:33 AM CDT to 3:36 AM CDT.

Saturn – Saturn appears above the eastern horizon soon after midnight local time on June 1st, and about two hours earlier on the 30th. The planet starts the month at magnitude 0.4, ending the month slightly brighter at magnitude 0.0. The planet is located in the mid-northern part of **Capricornus** on the 1st, at 0.7º west of **Theta Capricorni**. By mid-month the planet will span 18", and the rings will span 42" wide by the 30th. The best time to view the planet is in the hour before dawn, around 4 AM local time. On the 27th, the waning gibbous **Moon** is less than 5º below the +0.4 magnitude planet. The planet's brightest moon, **Titan** (magnitude 8.6) will lie south of the planet on the 8th and 24th, and north of the planet on the 16th. Fainter moons **Tethys**, **Dione**, and **Rhea** are near the planet shining at 10th magnitude. **Enceladus**, near magnitude 12, hugs the outer regions of **Ring A**. **Iapetus** starts the month at nearly 12th magnitude, but will progressively brighten to 11th magnitude as it moves toward its June 13 inferior conjunction. By the 30th, it is near 10th magnitude and is 8.8' due west of **Saturn**.

Uranus – Uranus emerges in the pre-dawn sky at magnitude 5.9, and is best found using binoculars in late June, when it stands about 20º high as twilight breaks. The planet lies in Aries**,** nearly 12º southeast of **Hamal** (**Alpha Arietis**). During the last days of the month, the planet will come close to **Omicron Arietis**. On the 30th, the bluish planet will stand 11' due north of the star.

Neptune – Neptune is located in northeast **Aquarius**, and reaches a stationary point on June 26th. On the 1st, the planet rises just after 2 AM local time, and two hours earlier by the 30th. On the 1st, the planet is 5.6º east of **Phi Aquarii**, and due south of the **Circlet** in **Pisces**. At magnitude 7.8, the planet is visible in binoculars an hour or two before dawn, The planet will remain within 7' of a magnitude 7.2 field star all month, appearing as a double star.

Moon – On June 10th, there will be a **New Moon** with an **Annular Solar Eclipse** – unfortunately, not visible to most of **North America** (only the north and northeast will see all or part of the eclipse).

Favorable Librations: **Boss Crater** on June 24th; and **Zeno Crater** on the 25th.

Greatest North declination on the 12th (+25.6º)

Greatest South declination on the 25th (-25.6º)

Libration in Longitude, East Limb most exposed on the 1st (+7.4º), and on the 29th (+7.0º)

West Limb most exposed on the 17th (-6.9º)

Libration in Latitude, North Limb most exposed on the 2nd (+6.8º), and the 30th (+6.7º)

South Limb most exposed on the 17th (-6.8º)

Asteroids / Minor Planets – Asteroid **4 Vesta** – **Vesta's** positions, according to the ***RASC Observers Handbook, 2021 USA Edition***, are as follows: On June 5th – 11 12.19 +13 45.4, at magnitude 7.5 in **Leo**; on the 15th – 11 23.0 +12 10.2, at magnitude 7.6 in **Leo**; and on the 25th – 11 35.15 +10 27.2, at magnitude 7.7 in **Virgo**. **Vesta's** positions, ***by my estimates***, are as follows: On June 1st – 1.7º south-southwest of **Chertan** (**Theta Leonis**); on the 5th – 1.9º south and a little west of **Chertan**, or 0.6º west and a little north of **73 Leonis**; on the 10th – 0.7º southwest of **73 Leonis**, or on the southern edge of **M65**; on the 15th – 1.5º north of **Iota Leonis**; on the 20th – 1.6º east-northeast of **Iota Leonis**; on the 25th – just over 2º north and a little west of **Omega Virginis**; and on the 30th – 1.6º northeast of **Omega Virginis**, or just over 1º north-northwest of **Xi Virginis**. On the evening of the 17th, **Vesta** will shine at magnitude 7.6, and will be only 1.3º north-northeast of **Iota Leonis** – **Vesta** will be the middle dot in a three-in-a-row configuration.

Asteroid **6 Hebe** – **Hebe's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On June 5th – 20 04.51 -06 59.0, at magnitude 9.4 in **Aquila**; on the 15th – 20 02.42 -07 12.1, at magnitude 9.2 in **Aquila**; and on the 25th – 19 57.60 -07 46.6, at magnitude 8.9 in **Aquila**.

Asteroid **12 Victoria** – **Victoria's** position, according to the ***RASC Observer's Handbook, 2021 USA Edition***, on June 10th will be 20 40 00 -06 35 00, in **Aquila**.

Asteroid **63 Ausonia** – **Ausonia's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On June 5th – 16 36.53 -33 12.8, at magnitude 9.8 in **Scorpius**; and on the 15th – 16 26.19 -32 40.8, at magnitude 9.9 in **Scorpius**.

Pluto – **Pluto's** positions in **Sagittarius,** at 15th magnitude and an angular size of 0.1", are as follows: On June 10th – 19 53 30 -22 22 30; and on the 15th – 19 53 12 -22 26 00.

Comets **–** Comet **7P/Pons-Winnecke** – **7P's** positions, according to *ALPO*, are as follows: On June 10th – 22 07 30 -17 37, at magnitude 11.4 in **Aquarius**; on the 20th – 22 43 54 -24 38, at magnitude 11.3 in **Aquarius**; and on the 30th – 23 15 30 -31 16, at magnitude 11.2 in **Sculptor**. **7P's** positions, ***by my estimates***, are as follows: On the 1st – about 5º north-northwest of **Gamma Capricorni**, or about 3.5º northwest of **42 Capricorni**; on the 5th – less than 0.5º north and a little east of **Delta Capricorni**; on the 10th – about 4º south and a little east of **Iota Aquarii**; on the 15th – about 1.5º west-southwest of **Upsilon Aquarii**, or about 1º northeast of the **Helix Nebulae** (**NGC 7293**); on the 20th – about 2º north and a little east of **Epsilon Piscis Austrini**; on the 25th – about 1.5º northeast of **Fomalhaut** (**Alpha Piscis Austrini**); and on the 30th – just over 4º east and a little north of **Delta Piscis Austrini** (this position is in **Sculptor**), or about 1º north-northwest of **Gamma Sculptoris**.

Comet **15P/Finlay** – **Finlay's** positions, according to ***ALPO***, are as follows: On the 10th – 01 08 12 +01 20, at magnitude 12.6 in **Cetus**; on the 20th – 01 54 06 +07 02, at magnitude 11.7 in **Pisces**; and on the 30th – 02 40 06 +12 21, at magnitude 11.0 in **Aries**.

Comet **C/2020 R4** (**Atlas**) – **R4's** positions, according to ***ALPO***, are as follows: On June 10th – 10 57 24 +19 52, at magnitude 13.5 in **Leo**; on the 20th – 10 54 18 +18 06, at magnitude 14.1 in **Leo**; and on the 30th – 10 54 18 +16 38, at magnitude 14.7 in **Leo**.

Comet **C/2021 A1** (**Leonard**) **A1's** positions, according to ***ALPO***, are as follows: On June 10th – 10 34 18 +55 31, at magnitude 16.9 in **Ursa Major**; on the 20th – 10 29 48 +53 39, at magnitude 16.8 in **Ursa Major**; and on the 30th – 10 28 06 +51 46, at magnitude 16.7 in **Ursa Major**.

Meteor Showers **–** There are no Major Meteor Showers (Class I) in June. There are no Minor Meteor Showers (Class II) in June. There are two Variable Meteor Showers (Class III) active in June: The **Tau Herculids**, active from May 19th through June 14th, peaking on June 2nd; and the **June Bootids**, active from June 23rd through June 25th, peaking on June 23rd. There are seven Weak Meteor Showers (Class IV) active in June; the **Daytime Arietids**, active from May 22nd through June 24th, peaking on June 7th, with a maximum zenith hourly rate (mzhr) of <2; the **June Mu Cassiopeiids**, active from May 18th through June 15th, peaking on

June 8th, with a mzhr of <2; the **Beta Equulids**, active from June 7th through June 30th, peaking on June 14th, with a mzhr <2; the **Phi Piscids**, active from June 8th through August 2nd, peaking on July 4th, with a mzhr <2; the **Southern June Aquilids**, active from June 9th through July 17th, peaking on July 5th, with a mzhr <2; and the **c-Andromedids**, active from June 26th through July 27th, peaking on July 9th, with a mzhr <2.

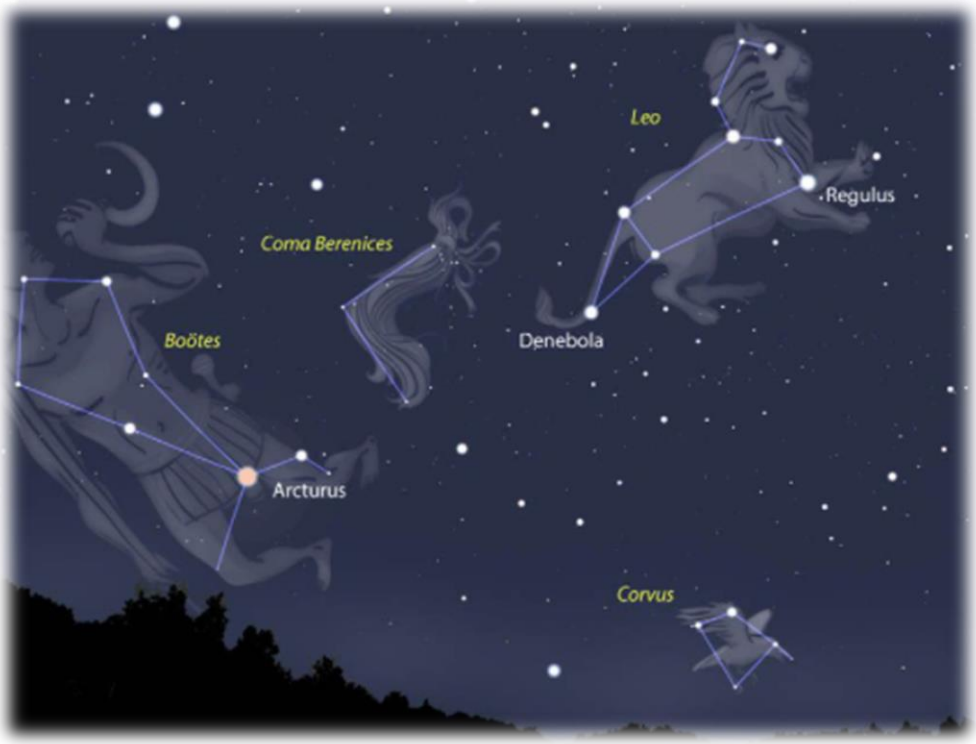
When to View the Planets:

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

Mythology:

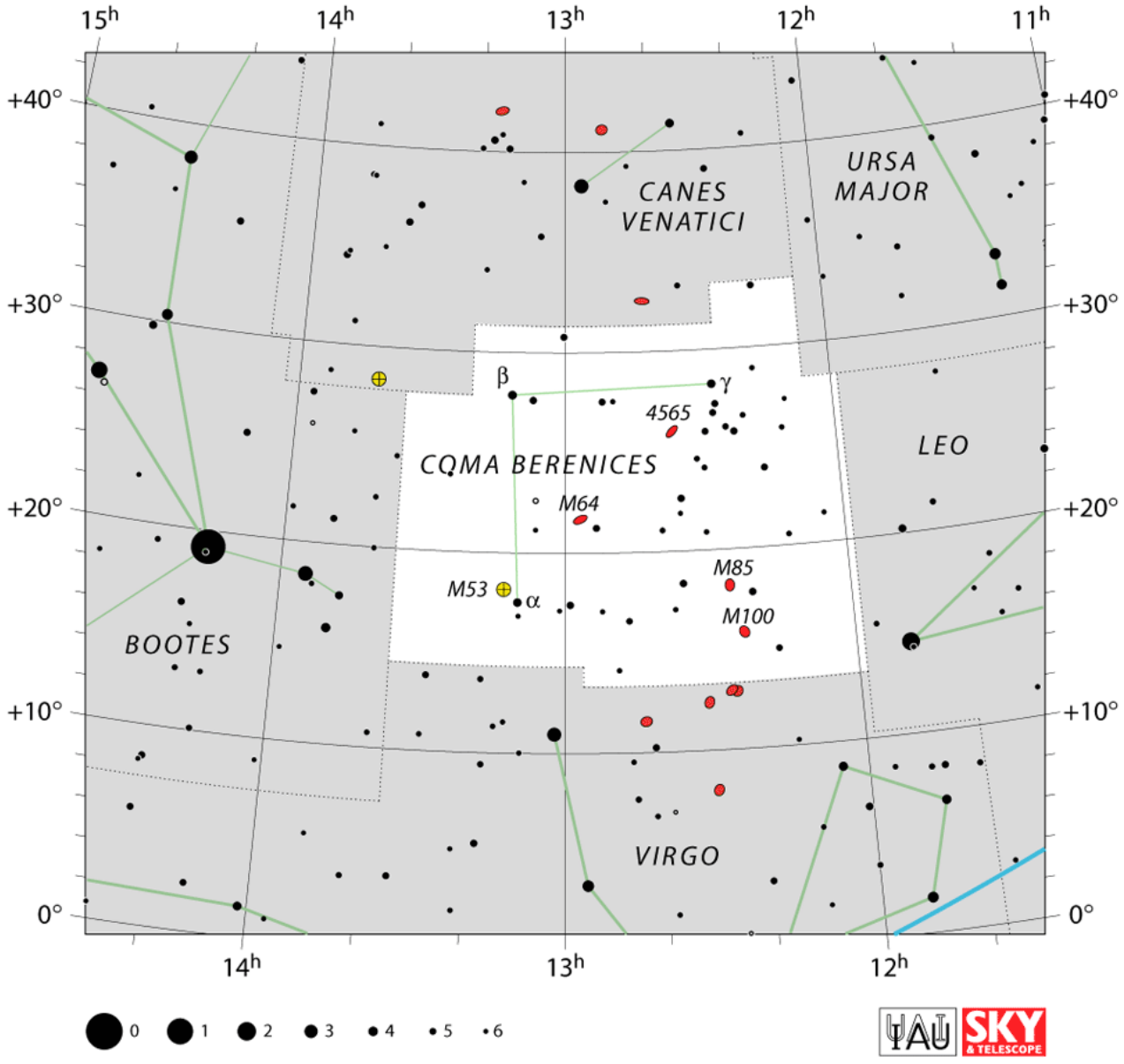
Coma Berenices – Berenice's Hair

Between Boötes and Leo lies an attractive little swarm of stars that was known to the Greeks, but was not classed by them as a separate constellation, being considered part of Leo. Eratosthenes referred to it as the hair of Ariadne under his entry on the Northern Crown (Corona Borealis), but under Leo he said it was the hair of Queen Berenice of Egypt, as we know it today. Ptolemy referred to these stars as "a nebulous mass, called the lock" (i.e. of hair) in his Almagest circa AD 150, but the group was officially made into a separate constellation in 1551 by the Dutch cartographer Gerardus Mercater, and in 1602 Tycho Brahe included in his influential star catalogue.



Berenice was a real person who, in the third century BC, married her brother, Ptolemy III Euergetes, as was the tradition of the Egyptian royal family. Berenice was reputedly a great horsewoman who had already distinguished herself in battle. Hyginus, who deals with the star group under Leo in his Poetic Astronomy, tells the

following story. It seems that a few days after their marriage, Ptolemy set out to attack Asia. Berenice vowed that if he returned victorious, she would cut off her hair in gratitude to the gods. On Ptolemy's safe return, the relieved Berenice carried out her promise and placed her hair in the temple dedicated to her mother Arsinoe (identified after her death with Aphrodite) at Zephyrium near the modern Aswan. But the following day the tresses were missing. What really happened to them is not recorded, but Conon of Samos, a mathematician and astronomer who worked at Alexandria, pointed out the group of stars near the tail of the lion, telling the King that the hair of Berenice had gone to join the constellations.



The End