



Covid photo courtesy of the Center For Disease Control and Prevention.

Monthly Meeting April 13th at 7:00 PM, at HOME

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

PRESENTATION: Meeting to be held via Webinar, due to current COVID-19 Quarentining Guidelines for our area. Speaker will be David Prosper of the Night Sky Network.

Members, please look for an email how to join us online for this unique experience.

Consider it good practice in case our planet is ever invaded by aliens.

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INTERNATIONAL ASTRONOMY DAY

American Radio Relay League



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

President's Message

Well, it looks like we made it through March in record time (feels like we even skipped an hour in there somewhere) and now we've got a whole new month looking right at us. Most of our in-person group activities for April will have to be skipped ("Probably skipped," according to Ben), but that's not to say that we can't cook up some things for us to do anyway. First off,

The April meeting at HRPO is going to be moved online in some fashion.

We're discussing how to implement this plan during the upcoming business meeting so stay tuned to your e-mail and Ben will let you know how to be a part of it. As it stands, Coy has lined up a great speaker from the Astronomical League, which should be very informative.

I am told that, as of now, **Astronomy Day** is still on schedule for 2 May, which should give us all something to look forward to—any changes in that plan will be passed along to you as soon as possible.

April is prime viewing season in the northern hemisphere, and there's plenty of observing to be done if you have your own kit, especially if you've found yourself a nice piece of dark sky to call your own. But for those of us stuck in the city, there are still some great sights to be seen. Early risers will, of course, have the planetary parade in the early morning, and the rest of us will still have a nice waning Venus to enthrall us in the early evening hours. The Astronomical League also has some great programs to help you wile away the hours, several programs are available even from within the confines of the city. **Double star, Lunar 1 & 2, Solar System, and Urban Observer** are all programs that work very well even from within a heavily light polluted zone—Urban even requires it! And if you dig around through the listings, I'm sure you'll find several more that you should be able to get through from your own back yard. Most of the online astronomy sites have also come up with some great projects for people who can't make it outside of the city. And, of course, don't feel you need to be limited to world-wide reach organizations: we have our own forums at brastro.org where you can grab some local advice on what to see and do.

That's it for April: ya'll have fun, and, hopefully, I'll see ya'll in May.

Submitted by Scott Cadwallader, President 2020

Upcoming BRAS Meetings:

NSN Training Kit Session, Postponed

Monthly Business Meeting: 7:00 p.m., Wednesday, April 8; via Webinar (TBA)

Light Pollution Committee Meeting: 6:15 Wednesday, April 8 (before the business meeting, via Webinar (TBA)

Monthly Member Meeting: 7:00 Monday, April 13; via webinar due to COVID-19 quarantening. (TBA)

Star Party at Chris Desselles' house, postponed

MOON (Members Only Observing Night), TBA

ALCon Planning Meetings: Saturday, TBA.; Coffee Call, 3132 College Dr F, BR, LA 70808, contact Steve

WANT TO ATTEND ALCON 2020?

Albuquerque, New Mexico from 15 to 18 July 2020

Here is the print and Mail-In Registration Form, or register online:

<http://alcon2020.info/info-registration//>

Secretary's Summary of March Meeting

The March meeting was held at HRPO on March 9th. *By March 15th our city was in quarantine.*

The guest speaker, Dr. Manas Gartia, spoke about using natural radiation in space as a means to purify water for long term space travel, how humans take bacteria into space with them; how X-ray based catalyst can produce Reactive Oxygen Species (ROS); about hydrothermal synthesis; and how oxymutant strains of bacteria were tested.

John N. talked about the Light Pollution Petition – members signed it afterwards.

Scott C made the following announcements:

- The third training session on the NSN kits to be on the 22nd at HRPO at 1PM.
- The second annual crawfish boil would be held at John and Michele's house on May 9th.
- Excess equipment sale is still ongoing.
- The big white Dob has a tentative agreement to be purchased, and the big blue Dob will be offered for sale to BRAS members – if no takers, will offer to sell to the public.
- Working on a policy for donated equipment so that donations do not keep taking up space in the BRAS closet.

The new BRAS outreach banner was shown, thanks to Krista R. for its procurement.

Chris K announced that volunteers were needed for Nano Days, and IAD. When HRPO gets its license from the state, it can start doing raffles

Ben T talked about upcoming outreaches, and name tags for BRAS volunteers.

Scott C announced that the upcoming BRAG event at Chris D's has been postponed due to rain and soft ground.

Don W talked about the Mid-South Star Gaze in April.

John N said he would be going to the Texas Star Party in May.

Trey A called for all unpaid dues – if not paid, will purge the membership roll.

Scott C ran a raffle for three books and a 70mm Meade refractor (as is).

Meeting adjourned



Submitted by Thomas Halligan, Secretary

2020 Officers:



GET ZAZZLED!

President: Scott Cadwallader
Vice-President: Coy Wagoner
Secretary: Thomas Halligan
Treasurer: Trey Anding

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

Committees/Coordinators:
 AL Awards
 Merrill Hess
 Light Pollution:
 John Nagle
 Newsletter:
 Michele Fry
 Observing:
 John Nagle
 Outreach:
 Ben Toman
 Public Information
 Krista Reed
 Webmaster:
 Frederick Barnett



Hi Everyone,

Not a whole lot of news on the Outreach front since we are still under stay-at-home orders due to the COVID-19 pandemic, and Baton Rouge being on LOCKDOWN by order of the Governor. All BRAS meetings for April are cancelled and we had to cancel most events from mid-March onward including our 3rd Training Session and Zippity Zoo Fest. (We hope to have reschedule dates for both of those events, though.) We are also cancelling Sidewalk Astronomy at Perkins Rowe that was to take place on Tuesday, March 31st.

March wasn't all doom and gloom, though. We had a fantastic time earlier in March at **St. George School's Star Night**. A lot of families came out and we had some nice clear skies so we were able to show off Venus, the Moon, Orion nebula and several stars and clusters. Their Vice-Principal was on hand and was amazed by the event (it was a 1st time event for St. George School.) I'm sure we'll be working with them in the future.

We also had another great yearly event at **Rockin' At The Swamp**. There were too many people throughout the day to keep track of, really! The weather was very nice and we even got in some solar viewing this year. (Wish there had been some sunspots to make it a bit more interesting!)

Finally, **STEAM Night at Oak Grove Primary** was another successful evening. Again, lots of kids and families throughout the night and we were a popular stop.

We're getting better at utilizing some of our Night Sky Network materials. Couple that with our new stands for displaying banners and our newly acquired BRAS sign and we're starting to have a pretty nice setup for these events. A big thanks to our volunteers: Chris and Annette R., Chris K., Scott C., Scott L., Krista R., Roz R., Susan M., Ben T., John N., and Don W. (Please forgive me if I left anyone out!)

A few of us took advantage of the monthly **Night Sky Network Webinar**. This past month was about the Hubble Space Telescope and was headed by Dr. Frank Summers, an astrophysicist that has worked with the HST for nearly 20 years. It was a lot of fun and I highly encourage you all to check in to future webinars. They are FREE and don't take up much time. You can even post questions to the speaker in real time with a good chance at getting them answered. These FREE webinars are another benefit of being affiliated with the NSN.

Well, the only thing we have on the books right now is our final Sidewalk Astronomy at Perkins Rowe on Tuesday, April 28th. As I am writing this, I am hearing that the stay-at-home order has now been extended to April 30th, so it is likely that we will have to cancel that, as well. We'll see what happens and of course, we'll keep you updated in the event of a cancellation. I hope this will finally come to an end soon so we can get back to our regularly scheduled Outreach events! Stay well, everyone, and keep looking up! (As Jack used to say!!)

Clear Skies,
Ben Toman

Here are some photos from the events mentioned above:



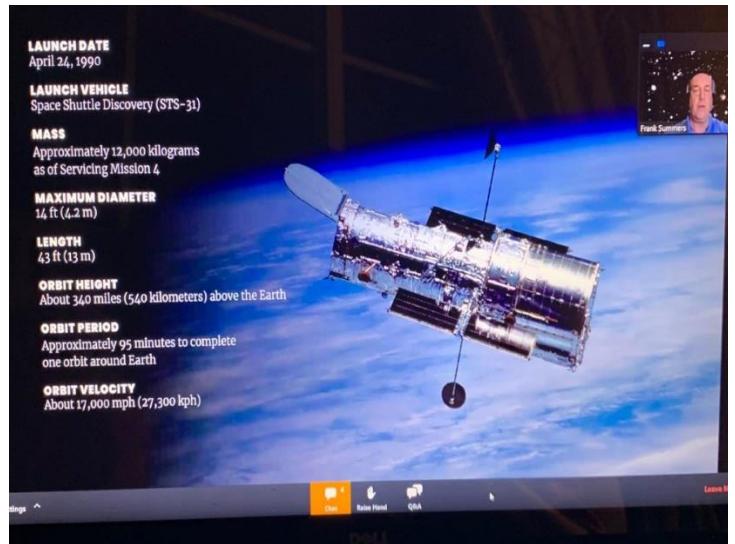
Chris R, Scott C., & Scott L. at St. George School Star Night



Chris and Annette R., John N. & Scott C. at Rockin' at the Swamp



Don W., Roz R. & Scott C. working with folks at the Oak Grove Primary STEAM Night



NSN webinar took place via computer on Tuesday, March 24th

Science

Skywatch: What's happening in the heavens in April

By **Blaine P. Friedlander Jr.**

March 28, 2020 at 11:01 p.m. CDT

While keeping social distance, give yourself a break from binge-watching television or glaring at a smartphone screen. Step outside, breathe and enjoy a dose of natural reality: Look to the heavens. For April, the ultrabright planet **Venus** dazzles you in the western heavens after dusk, while the merry trio of **Jupiter**, **Saturn** and **Mars** plays in the south before sunrise. A few shooting stars will zip by us..... Read the full article here:

https://www.washingtonpost.com/science/skywatch-whats-happening-in-the-heavens-in-april/2020/03/28/faf39c20-7048-11ea-a3ec-70d7479d83fo_story.html?utm_campaign=wp_speaking_of_science&utm_medium=email&utm_source=newsletter&utm_source=nl_science



BRAS Light Pollution Committee Report

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

Meeting called to order by John Nagle
February Minutes published in the March newsletter

Old Business:

1. Discussed format of the Light Pollution Petition sign-up forms. Agreed on final form. Forms to be on display at all outreaches and at HRPO.
2. Draft of letter from BRAS to Utilities approved.
3. Discussed draft of letter to the BREC Environmental Sustainability Program.
4. Discussed ideas about LP to be placed into the BRAS part of the CEA with BREC and LSU.
5. Discussed how to find out which entity controls which street lights.
6. Discussed putting together a list of Home Schoolers so as to possibly enlist them in helping with the Globe at Night Program.

New Business:

1. LSU to be contacted for permission to connect up the SQM (donated to HRPO) to the network at HRPO.
2. Discussed LP training for BRAS members.
3. Two items from Chris Kersey:
 - A. Initiating a survey of local schools for any space or astronomy based clubs/activities.
 - B. Start contacting all municipalities within the HRPO service area and arrange to visit them.

Minutes of this meeting read and approved
Meeting adjourned.

Submitted by John R. Nagle

Globe At Night

The target for this month's Globe at Night program is **Leo from April 14th through the 23rd**.

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

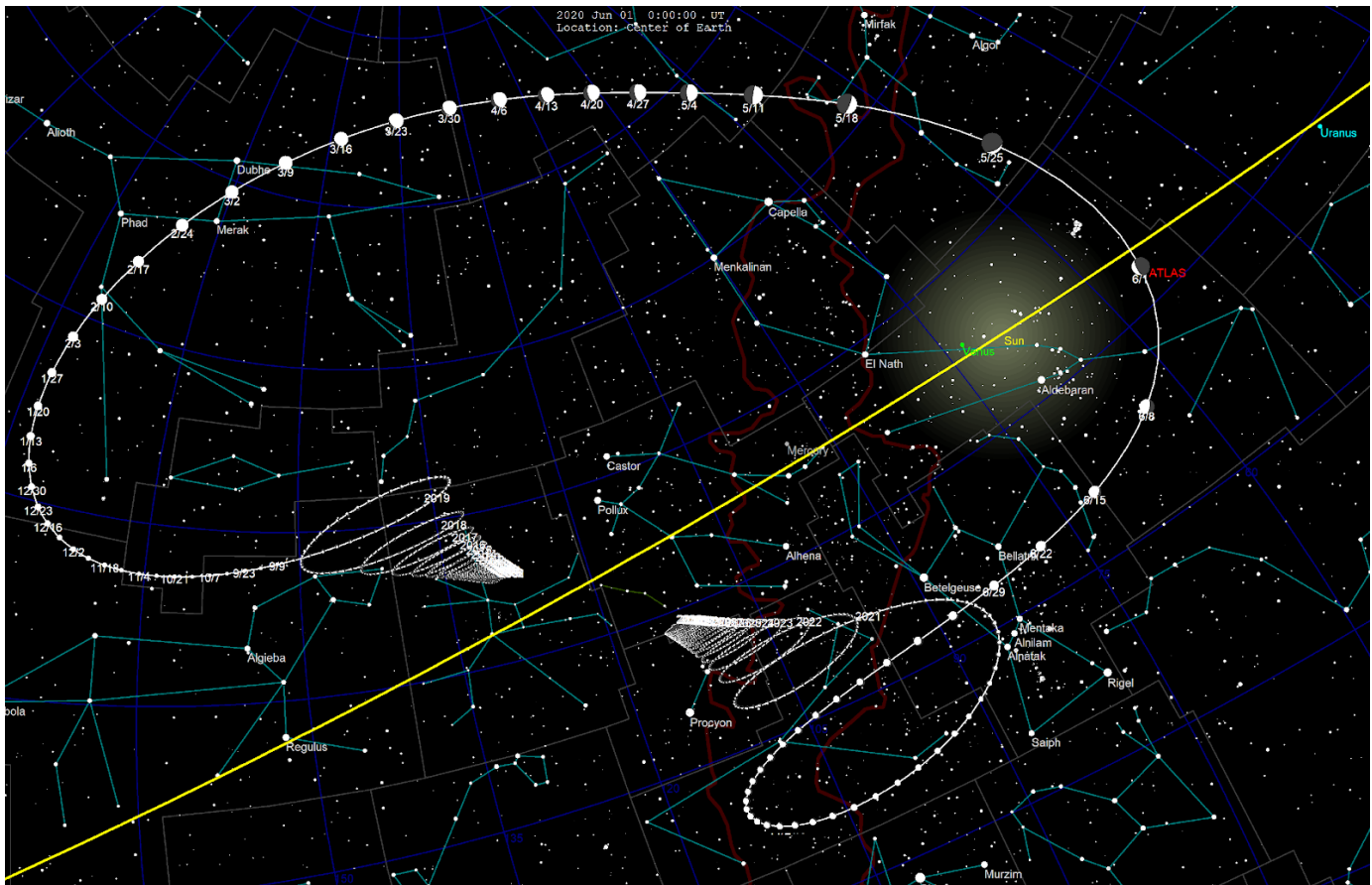
Flying “Rocks” and “Dirty Snowballs”:

Asteroid and Comet News

April 2020

Volume 2, Issue 4.

The Comet ATLAS (C/2019 Y4) may reach naked-eye visibility in May. This comet was discovered on December 28, 2019, and has a similar orbit to that of the Great Comet of 1844 (C/1844 Y1). It is believed the two are fragments of a more massive comet that broke up about 5,000 years ago. Given the brightness of the Great Comet of 1844 and the timing of the closest approach of Comet ATLAS (C/2019 Y4), C/2019 Y4 could brighten to well inside naked-eye visibility. How should we remember how comets are like cats, both have tails and do as they please.



Comet C/2019 Y4 (ATLAS)'s trajectory in the sky with 7-day markers by Tom Ruen
https://commons.wikimedia.org/wiki/File:Comet_2019_Y4_ATLAS-sky.png

See: **Comet ATLAS: Will it Become a Naked-Eye Object?:** Has our bright comet drought ended? Find out when and where to see the brightening Comet ATLAS (C/2019 Y4). By Bob King

<https://skyandtelescope.org/astronomy-news/comet-atlas-will-it-become-a-naked-eye-object/>

[JPL Close Approach Data](#) from Fed 19, 2020 to Mar 31, 2020 Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal LD (au)	H (mag)	Estimated Diameter
(2020 DR4)	2020-Feb-25	0.24 (0.00062)	29.7	3.0 m - 6.8 m
(2020 FD2)	2020-Mar-14	0.85 (0.00219)	25.7	19 m - 43 m
(2020 FD)	2020-Mar-18	0.67 (0.00171)	27.6	7.9 m - 18 m
(2020 FG4)	2020-Mar-19	0.49 (0.00126)	27.1	10 m - 23 m
(2020 FL2)	2020-Mar-22	0.38 (0.00099)	26.1	16 m - 35 m
(2020 FJ4)	2020-Mar-25	0.67 (0.00172)	29.5	3.4 m - 7.6 m

As of 2020-02-26 there is

- 930,678 discovered asteroids (MPC)(<https://www.minorplanetcenter.net/>)
- [545,135 have been numbered](<https://minorplanetcenter.net/iau/lists/NumberedMPs.html>)
- 22,541 discovered Near-Earth Objects (MPC) (<https://www.minorplanetcenter.net/>)
- 4,142 discovered Comets (MPC)(<https://www.minorplanetcenter.net/>)
- 1,003 objects listed on JPL’s Sentry: Earth Impact Monitoring(JPL) (<https://cneos.jpl.nasa.gov/sentry/>)
- 2,451 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/giorgion.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 2020-02-26 to 2020-03-31

Object Designation	Removed (UTC)
2020 FM6	2020-03-31 13:34:58
2020 FD2	2020-03-31 13:30:09
2020 FO5	2020-03-31 13:28:14
2020 FR3	2020-03-28 14:00:07
2020 FE2	2020-03-25 14:18:37
2020 FO1	2020-03-24 14:01:11
2020 ET	2020-03-17 15:31:28
2020 DB5	2020-03-16 13:37:47
2019 WA3	2020-03-16 13:31:56
2020 DR2	2020-03-11 13:49:06
2020 DP4	2020-03-07 13:35:23
2019 ND7	2020-03-05 13:37:59

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>)



Messages from HRPO

Highland Road Park Observatory

COVID 19 ALERT:

There will be no on-site programming on HRPO grounds during the month of April.

[The May HRPO schedule will be posted online before 15 April.]

HRPO will continue to serve the public during this time of quarantine, for while the facility is closed to all but personnel, we can be reached via phone (768-9948) or email (observatory@brec.org) for any observing, equipment, light pollution or program questions.

We encourage regulars and first-time readers of Night Visions to:

- ***regularly check the HRPO front page (hrpo.lsu.edu) for Home Skygazing Opportunities,***
- ***regularly check the BRAS Forum (brastro.org/phpBB3) for straightforward skygazing tips, and astronomy and space travel news, and***
- ***obtain a binocular (if possible) if not already in possession of one.***



STEM Expansion

Saturday 25 April from 3:30pm to 7:30pm.
For ages twelve to sixteen. \$15/\$18 per kid.

Hour One: Medical Benefits of Space Studies

Hour Two: Compton Gamma Ray Observatory (Data, Model Building)

Hour Three: Electronics Learning Lab (Console Sections/Part Insertions)

Hour Four: Unearth and Tech Connect Games

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.



NanoDays

Saturday 4 April from 3pm to 7pm

For ages eight and older. No admission fee.

This event has been canceled due to the COVID-19 virus outbreak and response. Demonstrations and experiments from this event will be incorporated into International Astronomy Day.



INTERNATIONAL ASTRONOMY DAY

Saturday 2 May from 3pm to 11pm

Thirteenth Consecutive Year!

Subject to change due to virus outbreak and response.

RAFFLE TICKETS, \$5 EACH

EXPECTED EXHIBITORS...

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

POTENTIAL RIDES...

18" Dry Slide
Spacewalk
Obstacle Course
Hamster Ball

OTHER...

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

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



American Radio Relay League Field Day

Saturday 27 June from 2pm to 10pm

No admission fee. For ages eight and older.

Subject to change due to virus outbreak and response.

The Baton Rouge Amateur Radio Club will take part in an exciting nationwide emergency exercise. Temporary stations will be set up at HRPO as BRARC joins similar clubs across the continent in an exciting emergency exercise. Some clubs use strictly battery power and solar power. Some clubs use low power outputs (five watts or less) to make contact with other stations all over North America. Field Day is a twenty-four-hour endurance session of skill and suspense.

The Amateur Radio Service, founded decades ago, is the original “social medium!” Ten of thousands of licensed hams—including high schoolers, college kids, parents and grandparents—communicate day after day from coast to coast.

What can people do in the Amateur Radio Service?

- Talk around the world without the Internet or cell phones.
- Send a message to another country using less electricity than a nightlight.
- Transmit your communication in code—Morse code!
- Speak to astronauts on the International Space Station.

What can adults do in the Amateur Radio Service?

- Earn various awards.
- Have more peace of mind knowing that, unlike the internet, federal law mandates sending identifying information during any communication.
- Increase the chances of their families having contact with the outside world during an emergency, simply by connecting radio equipment to a car battery.
- Collect weather and flight data from a launched balloon.

What can kids do in the Amateur Radio Service?

- Work toward specialized merit badges and patches.
- Steer radio-controlled cars and airplanes, or control robots, using ham-only frequencies.
- Keep a hand-held remote transceiver during camping trips.

Come learn more about amateur (or “ham”) radio at this fantastic annual event. Remember, if you like what you see at Field Day, there will be plenty of friendly “hams” around to tell you exactly what you need to do to obtain your own amateur radio license and start transmitting!



AREN'T YOU PROUD OF OUR HRPO!!!

LET OTHERS KNOW IT BY WEARING THE LATEST T-SHIRT.

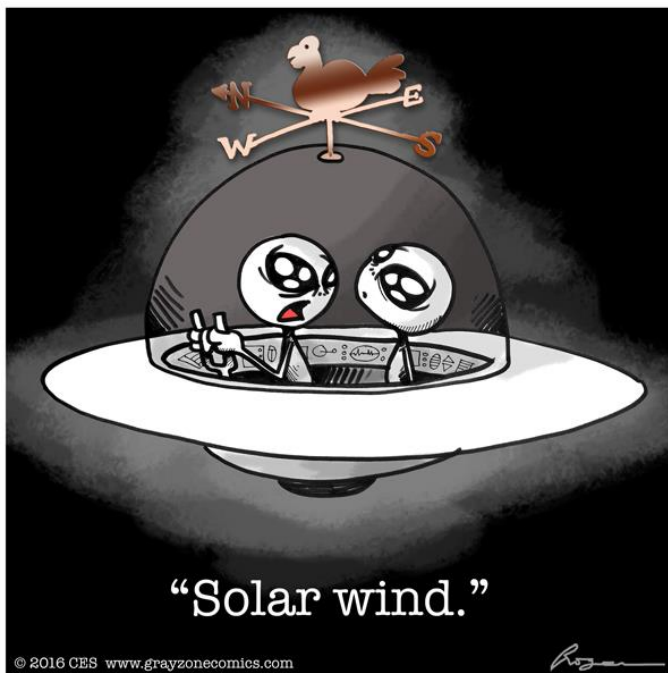
Get your 2019 HRPO T-Shirt, all sizes, \$7.00

Apollo 8 "Earthrise"

Call the Observatory to place your orders.

225-768-9948 or email observatory@brec.org

White and blue on black, the design (created by HRPO Education Curator Amy Brouillette and BREC's Marketing Department) takes its inspiration from the legendary Apollo 8 "Earthrise" photo.





Observing Notes: April

by John Nagle

Ursa Major – The Great Bear

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 recycle and update the constellations, but the Sky Happenings calendar and associated information are new each month.

Named Stars:

Dubhe (Alpha UMa), from the Arabic “Thahr al Dub al Akbar”, “The Back of the Great Bear”, mag. 1.81, 11 03 43.84 +61 45 04.0, is a red giant star and also is a close visible binary star. The companion star (magnitude 2.71) has an orbital period of 44.4 years at a separation of 23 a.u. The companion star is a suspected variable star. There is a second companion (**GC 15179**), at 7th magnitude, at a distance of 6.3’ – it is a spectroscopic binary star with a period of 6.035 days. Also known as **HD 95689**, **HIP 54061**, and **50 Ursae Majoris**.

Merak (Beta UMa), “Mirak”, from the Arabic “Al Marākk”, “The Loin of the Bear”, mag. 2.34, 11 01 50.39 +56 22 56.4, is a suspected variable star. It is a main sequence dwarf star that emits an excess of Infra-red radiation and has a disk of hot gas and dust surrounding it. Located 5.4° south of **Alpha Ursae Majoris**, and about 1.5° to the southeast is **NGC 3556**, and less than 1° further is the large **Owl Nebula (M97)**. Also known as **HD 95418**, **HIP 53910**, and **48 Ursae Majoris**.

Phad (Gamma UMa), “Phecda”, from the Arabic “Al Fahdh ad-dubb”, “The Thigh of the Bear”, mag. 2.41, 11 53 49.74 +53 41 41.0, Located about 0.7° to the southeast is **NGC 3992 (M109)** – a bright, barred spiral galaxy of 11th magnitude. Also known as **HD 103287**, **HIP 58001**, and **64 Ursae Majoris**.

Megrez (Delta UMa), from the Arabic “Al Maghrez”, “The Root of the Tail”, mag. 3.32, 12 15 25.45 +57 01 57.4, is a blue-white dwarf star with companions. The **Hubble Deep Field** is located to the northeast of this star. Also known as **HD 106591**, **HIP 59774**, and **69 Ursae Majoris**.

Alioth (Zeta UMa), or “Allioth”, has an uncertain meaning – possibly from the Arabic “Alyat”, “The Fat Tail” of an animal, mag. 1.76, 12 54 01.63 +55 57 35.4. The star’s spectrum displays abnormally strong lines of chromium and europium. There is a brown dwarf star companion. Also known as **HD 112185**, **HIP 62956**, and **77 Ursae Majoris**.

Mizar A (Zeta¹ UMa), from the Arabic “Mi’zar”, “a girdle or waistband”, mag. 2.23, 13 23 55.54 +54 55 31.3, is a spectroscopic binary and a visual double star with **Mizar B**. This is the first double star discovered, and the first double star to be photographed. Also known as **HD 116656**, **HIP 65378**, **ADS 8891**, and **79 Ursae Majoris**.

Mizar B (Zeta² UMa), mag. 3.88, 13 23 56.33 +54 55 18.6, is a spectroscopic binary star. It has a separation of 14.4’ from **Zeta¹ Ursae Majoris**. This star is the first binary star to be detected spectroscopically. It is a naked eye binary star with **Alcor**. Also known as **HD 116657**, **HIP variant 65376**, **ADS 8891**, and **79 Ursae Majoris**.

Alkaid (Eta UMa), sometimes called “Beretnasch” from the Arabic “Kā'id Ban āt al Na'ash”, “The Leader of the Daughter's of the Bier”, mag. 1.85, 13 47 32.55 +49 18 47.9, is one of the hottest stars that can be seen with the naked eye, at a surface temperature of 20,000° Kelvin. Also known as **HD 120315**, **HIP 67301**, and **85 Ursae Majoris**.

Al Haud (Theta UMa), from the Arabic for “The Pond Into Which the Gazelle Sprang for Safety, at the Lashing of the Lion's Tail”, mag. 3.17, 09 32 52.33 +51 40 43.0. Also known as **HD 82328**, **HIP 46853**, and **25 Ursae Majoris**.

Talitha Borealis (Iota UMa), or “Talita”, from the Arabic “Al Kafzah al Thalithah”, “The Third Spring, or Leap of the Ghazal (Gazelle)”, mag. 3.12, 08 59 12.84 +48 02 32.5, is in a system with two double stars. Component A is a white sub-giant star that is also a spectroscopic binary, and component B is a pair of red dwarf stars at 9th and 10th magnitudes. The two B components have a separation of 11 a.u., and are separated from the A components by 4.5”, with an orbital period of 818 years. Along with Kappa Ursae Majoris (1° away), it marks the front feet of the **Bear**. Also known as **HD 76644**, **HIP 44127**, and **9 Ursae Majoris**.

Talitha Australis (Kappa UMa), from the Arabic “Al Kafzah al Thalithah”, “The Third Leap”, Mag. 3.57, 09 03 37.5 +47 09 24.0, is a binary star with a mean separation of 0.3”, and an orbital period of just under 58 years. Located 1° from **Iota Ursae Majoris**. Also known as **HD 77327**, **HIP 44471**, and **12 Ursae Majoris**.

Tania Borealis (Lambda UMa), from the Arabic “Al Kafzah al Thāniyah”, “The Second Leap of the Gazelle”, mag. 3.45, 10 17 05.93 +42 54 52.1. This star is paired with **Mu Ursae Majoris** (1.5° away), and marks the **Bear's** left hind foot (**Lambda Ursae Majoris** is the northern star). Also known as **HD 89021**, **HIP 50372**, and **33 Ursae Majoris**.

Tania Australis (Mu UMa), from the Arabic “Al Kafzah al Thāniyah”, “The Second Leap of the Gazelle”, mag. 3.06, 10 22 19.80 +41 29 58.0, is a red giant star and a close binary star having an orbital period of 230.089 days. Located 0.7° nearly due west is the face-on spiral galaxy **NGC 3184**. Also known as **HD 89758**, **HIP 50801**, and **34 Ursae Majoris**.

Alula Borealis (Nu UMa), from the Arabic “Al Kafzah al Üla”, “The First Leap of the Gazelle”, Mag. 3.49, 11 18 28.76 +33 05 39.3, is a double star. The secondary star, at magnitude 9.9, has a separation of 7.2” from the primary star. Paired with **Xi Ursae Majoris**, with **Nu Ursae Majoris** being the northern star. Also known as **HD 98262**, **HIP 55219**, **ADS 8123**, and **54 Ursae Majoris**.

Alula Australis (Xi A UMa), from the Arabic “Al Kafzah al Üla”, “The First Leap of the Gazelle”, mag. 3.79, 11 18 11.24 +31 31 50.8, is a binary star composed of two main sequence dwarf stars (the secondary is **Xi Ursae Majoris B**). Each of these stars is a spectroscopic double star with a low mass companion star. Paired with **Nu Ursae Majoris** (1.6° to the north). Also known as **HD 98230**, **HIP 55203**, **ADS 8119**, and **53 Ursae Majoris**.

Alula Australis (Xi B UMa), mag. 4.41, 11 18 11.0 +31 31 45.0, has a separation of 1.9”, and a period of 60 years from **Xi B Ursae Majoris**. Also known as **HD 98231**, **ADS 8119**, and **53 Ursae Majoris**.

Muscida (Omicron UMa), comes from a word used in the Middle Ages for the “muzzle” of an animal, mag. 3.35, 08 30 16.03 +60 43 06.4, has a 15th magnitude dwarf star companion. Has one planet in orbit. Also known as **HD 71369**, **HIP 41704**, and **1 Ursae Majoris**.

Muscida (Pi¹ UMa), “muzzle”, mag. 5.63, 08 39 11.74 +65 01 14.5. Also known as **HD 72905**, **HIP 42438**, and **3 Ursae Majoris**.

Muscida (Pi² UMa), mag. 4.59, 08 40 12.9 +64 19 40.3, has one planet in orbit. Also known as **HD 73108**, **HIP 42527**, and **4 Ursae Majoris**.

Nuy Keae (Tau UMa), from the Chinese “The Inner Steps”, mag. 4.67, 09 10 54.93 +63 30 19.6, is a double star. Secondary star, mag. 4.70, 09 11 00.60 +63 31 29. Primary also known as **HD 78362**, **HIP 45075**, and **14 Ursae Majoris**; Secondary is also known as **HD 78363**, and **14 Ursae Majoris**.

Al Kaphrab (Chi UMa), mag. 3.69, 11 46 03.13 +47 46 45.6, is also known as **HD 10224**, **HIP 57399**, and **63 Ursae Majoris**.

Ta Tsan (Psi UMa), or “Tien Tsan”, from the Chinese for “Extremely Honorable”, mag. 3.0, 11 09 39.86 +44 29 54.8, is also known as **HD 96833**, **HIP 54539**, and **52 Ursae Majoris**.

Tien Laou (Omega UMa), from the Chinese for “Heavenly Prison”, mag. 4.66, 10 53 58.71 +43 11 24.1, is also known as **HD 94334**, **HIP 53295**, and **45 Ursae Majoris**.

Alcor from the Arabic “Al Khawwar”, “The Faint One”, or from “al Jau’n”, a courser, also called “Suhä”, “The Forgotten, Lost, or Neglected One”, mag. 3.99, 13 25 13.54 +54 59 16.7, is a naked eye double star with **Mizar B (Zeta² Ursae Majoris)**. The separation from **Mizar A** is 708.7”. **Alcor** is a spectroscopic binary star. Also known as **HD 116842**, **HIP 65477**, **ADS 8891**, **g Ursae Majoris**, and **80 Ursae Majoris**.

Groombridge 1830, “The Flying Star”, or “Runaway Star”, mag. 6.42, 11 52 55.82 +37 43 58.1, is a nearby yellow sub-dwarf star. Also known as **HD 103095**, **HIP 57939**, and **4010 B.A.C.**

Lalande 21185, mag. 7.49, 11 03 20.19 +5 58 11.5, is the 4th closest star system to **Earth**. Planets are suspected. Also known as **HD 95735**, and **HIP 54035**.

Winnecke 4, mag. 9.0, 12 22 12.54 +58 04 59, is an optical double star. Also known as **M40**.

Deep Sky:

M40 (Winnecke 4 or WNC 4), mag. 9.0, 12 22 12.54 +58 04 59, is two stars at magnitudes 9.0 and 9.3, with a separation of 52”. Located 20’ northeast of **70 Ursae Majoris**.

M81 (NGC 3031), mag. 6.8, 09 55.6 +69 04, 26’x14’ in size, is an extremely large, elongated, and extremely bright galaxy; bright nucleus. It is a radio source. It is called **Bode’s Nebulae**, along with **M82** – only ½° away to the north. Also known as **PGC 028630**; **UGC 05318**; **CGCG 333-007**, **CGCG 0951.4+6918**; **MCG+12-10-010**, and **Bode’s Nebula**.

M82 (NGC 3034), mag. 8.4, 09 55.8 +69 41, 11.2x4.6 in size, is a very bright, large, and very elongated galaxy that is spindle-shaped, emits an infra-red excess, and is the brightest galaxy in the sky when observed in infra-red light. It has several systems of filaments. Also known as the **Cigar Galaxy**, **H4-79**, **Ursa Major A**, and **Bode’s Nebula**.

M97 (NGC 3587), mag. 9.9, 11 14.8 +55 01, 2.5’x2.5’ in size, is a very bright, very large, and round galaxy; resembles the face of an owl with two dark “eyes” when viewed in a large telescope. **M108** is about 50’ to the northwest. Also known as the **Owl Nebula**, **PK 148+57.1**, **PNG 148.4+57.0**, **ARO 25**, and **SDSS J111447.71+550108.5**.

M101 (NGC 5457), mag. 7.7, 14 03.2 +54 21, 27’x26’ in size, is a pretty bright and very large galaxy; face on, faint spiral arms; small, bright nucleus. Within 1° of **M101** you can find galaxies **NGC 5422**, **5473**, **5474**, and **5485**. In the knots on the spiral arms one can find galaxies **NGC 5471** and **5447**. **M101** is located 45’ north and 80’ east of **86 Ursae Majoris**. **NGC 5474** is 45’ to the south-southeast. Also known as **The Pinwheel Galaxy**, **PGC 50063**, **UGC 8981**, **MCG+09-23-028**, and **Arp 26**.

M108 (NGC3556), mag. 10.0, 11 112.5 +55 40, 8.3’x2.5’ in size, is a bright, very large, and extremely elongated galaxy; nearly edge on; no visible nucleus. Located about 1½° southeast of **Beta Ursae Majoris**, with the **Owl Nebula (M97)** about 50’ to the southeast. **M108** contains about 290 globular clusters, and 83 x-ray sources. Also known as the **Surfboard Galaxy**, **UGC 06225**, **CGCG 267-048**, **CGCG 268-001**, **CGCG 408.5+5556**, **H5-46**, and **MCG+09-18-098**.

M109 (NGC 3992), mag. 9.8, 11 57.2 +53 23, 7.6’x4.9’ in size, is a quite bright, very large, and elongated galaxy; spiral arms; diffuse, very bright nucleus. Located 1° southeast of **Gamma Ursae Majoris**, and has three satellite galaxies – **UGC 6923**, **6940**, and **6969**. Also known as **PGC 037617**, **UGC 6937**, **CGCG 269-023**, **CGCG 1155.0+5339**, **H4-61**, and **MCG+09-20-044**.

Latysev 2, mag.3.67, 13 44.4 +53 30, 300’ in size, 7 stars – including **81,83,84**, and **86 Ursae Majoris** – in a line between **Zeta Ursae Majoris** and **M101**.

Arp 26, mag. 7.9, 14 03.2 +54 24.0, 34’x26’ in size, is a very bright, non-stellar core galaxy, with clock-wise spiral arms easily seen. Straight arms, with a bright knot on the east side. It has over 500 HII regions, 70 of which have NGC numbers. Also known as **M101** and **NGC 5457**.

Arp 337, mag. 8.4, 09 55.86 +69 40.8, 11’x8.5’ in size, is a long, cigar shaped galaxy with three dark lanes. It has many dark stripes perpendicular to the plane of the galaxy. Also known as **M82** and **NGC 3034**.

NGC 2841, mag. 9.2, 09 22.0 +50 59, 8.1'x3.8' in size, is a very bright, large, and elongated galaxy; symmetrical, spiraled, knotty arms; bright, large nucleus. Also known as **PGC 026512**, **UGC 04966**, **H1-205**, **CGCG 265-006**, **CGCG 0918.5+5112**, and **MCG+09-16-005**.

NGC 4326, mag. 9.6, 12 16.7 +69 28, 22'x6' in size, is a pretty faint, extremely large, and very elongated galaxy. Paired with galaxy **Holmberg 357b**. Might be part of the **M81** group of galaxies. Also known as **H5-51**.

NGC 3077, mag. 9.8, 10 03.4 +68 44, 4.6'x3.6' in size, is a quite bright, quite large, and round galaxy. In the **M81** galaxy group. **The Garland** object is to the south. Located 45' east-southeast of **M81**. Also known as **UGC 05398**, **CGCG 333-013**, **CGCG 0959.44+6858**, **H1-286**, and **MCG+10-13-065**.

NGC 3184, mag. 9.8, 10 18.3 +41 25, 7'x7' in size, is a pretty bright, very large, and round galaxy; two main knotty arms; small, very bright nucleus. Also known as **H1-168** and **UGC 05557**.

NGC 5462, mag. 9.8, 14 04 38 +54 15 57, is a part of **M101** – a knot on the arm of **NGC 5457**. Also known as **CXOU J140354.0+542157**.

NGC 2768, mag. 9.9, 09 11.6 +60 02, 6.3'x2.8' in size, is a quite bright, quite large, and elongated galaxy; a bright, large nucleus. Also known as **PGC 025915**, **UGC 04821**, **H1-250**, **CGCG 288-026**, **CGCG 0907.1+6015**, and **MCG+10-13-065**.

Objects of interest beyond magnitude 10 are as follows:

IC 2574, mag. 10.4, 10 28.7 +66 28, 13.2'x5.4' in size, is a very large, extremely faint, and elongated galaxy. In the **M81** galaxy group. Also known as **Coddington's Nebula**, **PGC 030819**, **UGC 05666**, **DDO 081**, **VII Zw330**, **CGCG 333-031**, **CGCG 1024.8+6840**, and **MCG+12-10-38**.

NGC 2685, mag. 10.4, 08 57 11 +58 39 29, 4.6'x2.3' in size, is a pretty faint, pretty large, and elongated galaxy; almost edge-on; bar like core. Shaped like a cigar. Also known as **The Helix Galaxy**, **The Pancake Galaxy**, **PGC 025065**, **UGC 04666**, **Arp 336**, **CGCG 288-012**, **CGCG 0851.7+5855**, and **MCG+10-13-039**.

NGC 3310, mag. 10.8, 10 38.8 +53 30, 3'x2' in size, is a quite bright, pretty large, and round galaxy; filamentary arms, very small, very bright nucleus. Also known as the **Bow and Arrow Galaxy**, **UGC 05786**, **Arp 217**, **VV 356**, **VV 406**, **CGCG 267-004**, **CGCG 1035.7+5345**, and **MCG+09-18-008**.

NGC 3353, mag. 12.8, 10 45.4 +55 58, 1.4'x1.0' in size, is also known as **H3-842** and **The Broken Engagement Ring Galaxy**.

NGC 3928, mag. 13.0, 11 51.8 +48 41, is called **The Miniature Spiral Galaxy**. Also known as **UGC 06834**, **Mrk 0190**, **CGCG 243-019**, **CGCG 1149.1+4857**, **H2-740**, and **MCG+08-22-019**.

IC 708, mag. 14.0, 11 33.9 +49 03, 1.2'x0.97' in size, is called **The Papillion Galaxy**. Also known as **UGC 06549**, **CGCG 242-048**, **CGCG 1131.2+4920**, and **MCG+08-21-056**.

Pal 4, mag. 14.2, 11 26 16.8 +28 58 25, 1.3' in size, is also known as the **UMa Dwarf Galaxy**, the **Serpens Dwarf Galaxy**, the **UMa Globular Cluster**, **UGCA 237**, **CGCG 1126+0292**, and **EQ 1126+292**.

UMa II, mag. 14.3, 08 51 30 +63 07 48, is a dwarf galaxy that is over 10 billion years old.

UMa I, 14 40.9 +69 34, is also known as **Cr 286**, the **UMa Moving Cluster**, and **Pal 4**.

Mayall's Object, 11 03 53.95 +40 50 59.9, is also known as **Arp 148**, **VV 032**, and **MCG+07-23-019**.

Arp's Galaxy, 11 19.6 +51 30, is almost a stellar galaxy.

Bode's Galaxies, is composed of **M81 (NGC3031)** and **M82 (NGC3034)**. Most of the time it is used for **M81** only.

Keenan's System, 13 32.2 +62 43, is composed of **NGC 5216**, **5216A**, and **5218**, along with **Arp 104**.

Hubble Deep Field, 12 37 +64 00, is the location where the **Hubble Telescope** took the **Deep Field Picture**.

Objects in Ursa Major are as follows: 442 NGC; 56 IC; 751 UGC; 3 UGCA; 493 MCG; 100+ CGCG; 32 Arp; 7 HCG; 5 Holmberg; 20 Shk; 4 AGC; 1 Frr; 21 Quasars; 9 Radio Galaxies; 18 Mrk; 100 Abell; 1 Abell PN; 50+PGC; 1 P; 10+ PK; 10+ PNG; 1 Sachariassen; 1 Willman; 1 Winnecke; 1 FBS; Mayall's Object; 1 Ton; 1 Pal; 1 Latysev; 2 K; 1 IIZw; 1 Cr; 178 Herschel; 62 VV; 12 Ring Galaxies; 15 galaxy Triplets; 11 Flat galaxies; 5 Variable Galaxies; 2 Rose Galaxies;

and 1 Gravitationally Lensed Quasar. Total of Deep Sky objects in Ursa Major is 2,371.

Other Stars:

47 UMa, mag. 5.03, 10 59 28.22 +40 25 48.4, has 3 planets in orbit. Planet b has an orbital period of 1078 days; planet c has an orbital period of 2391 days; and planet d has an orbital period of between 3907 and 19,097 days. Sometimes called **Chalawan**. Also known as **HD 95128** and **HIP 53721**.

41 Lyn, mag. 5.41, 09 28 39.99 +45 36 06.5, has one planet in orbit. Sometimes called **Intercrus**. Also known as **HD 81688** and **HIP 46471**.

HD 89744, mag. 5.47, 10 22 10.0 +41 13 46, has two planets in orbit. Also known as **HIP 50786**.

HD 101013, mag. 6.14, 11 37 53.05 +50 37 05.8, is a **Barium Star**. Also known as **HIP 56731**.

HD 96127, mag. 7.43, 11 05 46 +44 18 06, has one planet in orbit. Also known as **HIP 54232**.

HD 116798, mag. 7.59, 13 24 52 + 54 53 51. Also known as **Sidus Ludoviciana**.

HD 99706, mag. 7.81, 11 28 30 +43 58 00, has one planet in orbit. Also known as **HIP 55994**.

HD 102956, mag. 8.0, 11 51 23 +57 38 27, has one planet in orbit. Also known as **HIP 57820**.

HD 118203, mag. 8.07, 13 34 02.54 +53 43 42.7, has one planet in orbit. Also known as **HIP 66192**.

HD 95127, mag. 8.15, 10 59 35.0 +43 48 52, has one planet in orbit. Also known as **HIP 53733**.

HD 68988, mag. 8.21, 08 18 22.17 +61 27 38.6, has two planets in orbit. Also known as **HIP 40687**.

HD 80606, mag. 8.93, 09 22 37.57 +50 36 13.4, is a binary star (separation of 1200 a.u.) with a transiting planet. A hot Jupiter was modeled to have evolved in a perpendicular orbit about 5 a.u. from its sun. It is currently in an incredibly eccentric orbit that ranges from approximately 1 a.u. at apogee, and six stellar radii at perigee. Also known as **HIP 45982**.

HIP 57274, mag. 8.96, 11 44 41 +30 57 33, has three planets in orbit.

HAT-P-22, mag. 9.73, 10 22 44 +50 07 42, has one transiting planet. Also known as **HD 233731**.

Stars beyond magnitude 10 that are of interest are as follows:

HD 233604, mag. 10.41, 09 09 49.0 +53 34 05, has one planet in orbit.

Hat-P-13, mag. 10.62, 08 39 31.81 +47 21 07.3, has a transiting brown dwarf star and one unconfirmed planet in orbit.

Past magnitude 11 there are 4 more stars with planets in orbit, and two flare stars.

Stars in Ursa Major include the following: 68 Σ ; 18 O Σ ; 1 O $\Sigma\Sigma$; 9 β ; 3 Ho; 2 Es; 33 A; 4 Hu; 2 S; 1 L; 1 ADS; 1 h; 1 Arg; 1 Cou; and 1 Lalande. Total of 146 stars.

Asterisms:

The Three Leaps of the Gazelle consists of 3 pairs of stars;

1st Leap is composed of Nu UMa and Xi UMa;

2nd Leap is composed of Lambda UMa and Mu UMa;

3rd Leap is composed of Iota UMa and Kappa UMa.

*****The Big Dipper, also known as "The Plough"***, is composed of the seven brightest stars in Ursa Major, and has been recognized as a distinct grouping of stars in many cultures from time immemorial. Within Ursa Major, the stars of the **Big Dipper** have Bayer designations in consecutive Greek alphabetical order from the bowl to the handle; **Dubhe (Alpha UMa)** at magnitude 1.8; **Merak (Beta UMa)** at magnitude 2.4; **Phad or Phecda (Gamma UMa)** at magnitude 2.4; **Megrez (Delta UMa)** at magnitude 3.3; **Alioth (Epsilon UMa)** at magnitude 1.8; **Mizar (Zeta UMa)** at magnitude 3.3; and **Alkaid (Eta UMa)** at magnitude 1.9. The stars of the **Big Dipper** can be used as guides to other stars. **Polaris, the North Star**, is found by imagining a line from **Merak** to **Dubhe**, and then extending it for 5 times the distance between the two pointers. Extending a line from **Megrez** to **Phecda**, on the inside of the bowl, leads to **Regulus (Alpha Leonis)** and **Alphard (Alpha Hydrae)**. Crossing the top of the bowl from **Megrez** to **Dubhe** takes one in the direction of **Capella (Alpha Aurigae)**. Imagine a diagonal line from **Megrez** to **Merak**, and then extending it for approximately 5 times that distance to **Castor (Alpha Geminorum)**. By following the curve of the handle from **Alioth** to **Mizar** to **Alkaid**, one reaches **Arcturus (Alpha Boötes)** and **Spica (Alpha Virginis)**. Projecting a line from **Alkaid** through**

*the pole star will point to the constellation **Cassiopeia**. Crossing the bowl diagonally from **Phecda** to **Dubhe**, and then proceeding onward for a similar stretch leads to the bright galaxy pair **M81** and **M82**. There are two spectacular spiral galaxies that flank **Alkaid**, **The Pinwheel Galaxy (M101)** to the north, and **The Whirlpool Galaxy (M51)** to the southeast in the constellation **Canes Venatici**. The **Hubble Deep Field's** approximate location can be found by following a line from **Phecda** to **Megrez**, and continuing on for the same distance again.*

Sky Happenings: April, 2020

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

- April 1st** - Dawn: **Saturn** and **Mars** are 1° apart, with **Jupiter** just over 6° to their upper right, above the southeast horizon before the **Sun** rises,
First Quarter Moon occurs at 5:21 AM CDT.
- April 2nd** - Asteroid **Juno** is at opposition at 3 PM CDT.
- April 3rd** - The **Moon** is 1.3° north of the **Beehive (M49)** at 2 AM CDT,
Mercury passes 1.4° south of **Neptune** at 10 AM CDT,
Evening: **Venus** is 0.3° south of the **Pleiades (M45)**, southeast of **Alcyone**.
- April 7th** - The **Moon** is at perigee (221,771 miles or 356,907 km from **Earth**) at 1:09 PM CDT,
Full Moon occurs at 9:35 PM CDT.
- April 14th** - Dawn: The last-quarter **Moon**, **Jupiter**, **Saturn**, and **Mars** form a graceful arc that spans some 20° above the south-southeast horizon before sunrise,
Last Quarter Moon occurs at 5:56 PM CDT,
Jupiter is 2° north of the **Moon** at 6 PM CDT.
- April 15th** - The **Moon** passes 2° south of **Saturn** at 4 AM CDT,
Dawn: The thinning **Moon** is 3° below **Saturn**, with **Jupiter** and **Mars** flanking the pair.
- April 16th** - The **Moon** passes 2° south of **Mars** at 12 AM CDT,
Dawn: The thinning **Moon** is 3° to 4° to the lower left of **Mars**.
- April 17th** - **Venus** passes 10° north of **Aldebaran** at 3 PM CDT.
- April 19th** - The **Moon** passes 4° south of **Neptune** at 2 AM CDT.
- April 20th** - The **Moon** is at apogee (252,564 miles or 406,462 km from **Earth**) at 2 PM CDT.
- April 21st** - **Mercury** is 3° north of the **Moon** at 12 noon CDT.
- April 22nd** - The **Lyrid Meteor Shower** peaks in the early morning hours under a waning crescent **Moon**, less than one day from new,
New Moon occurs at 9:26 PM CDT.
- April 25th** - Dusk: The thin waxing crescent **Moon**, nicely illuminated by **Earthshine**, is 3° to 4° from **Aldebaran**.
- April 26th** - **Uranus** is in conjunction with the Sun at 4 AM CDT,
The **Moon** passes 0.1° north of asteroid **Vesta** at 6 AM CDT,
Pluto is stationary at 8 AM CDT,
The **Moon** passes 6° south of **Venus** at 10 AM CDT,
Dusk: The fattening **Moon** is now between the horns of the Bull (**Taurus**), some 4° from **Zeta Tauri**. **Venus**, also in **Taurus**, is about 7° to the right of the lunar crescent.
- April 27th** - The **Moon** is 0.7° south of **M35** at 5 PM CDT,
Venus is at greatest illuminated extent (magnitude -4.7) at 8 PM CDT.
- April 30th** - The **Moon** is 1.6° north of the **Beehive (M44)** at 11 AM CDT,
First Quarter Moon occurs at 3:38 PM CDT.

Planets:

Mercury – **Mercury** shines at magnitude 0.0 on April 1st, 3° high in the eastern sky 30 minutes before sunrise. On April 3rd, the planet will be 1.5° south of **Neptune**. The planet will brighten to magnitude -0.2 by the 10th, but its elevation keeps dropping slightly lower each morning at the same time before sunrise.

Venus – Venus, in **Taurus the Bull**, opens April just 1.7½ below the **Pleiades** star cluster (**M45**), shining at magnitude -4.6. On April 3rd, **Venus** is just 16' from **Alcyone**, the brightest star in **M45**. The planet is the first object to become visible in the western sky as twilight descends after sunset. Sunset will occur near 7:30 PM local daylight time, with the planet standing at almost 45° altitude due west. As nightfall advances, each star of the **Pleiades** pops into view. The **Hyades** star cluster, with the reddish star **Aldebaran**, soon joins the scene. Then **Orion** comes up, with **Gemini** high above. An eight day old gibbous **Moon** will stand 6° below **Pollux** on the 1st. By the 17th, Venus will stand 10° due north of **Aldebaran**. A crescent **Moon**, on the 25th, is 3.5° north of **Aldebaran**, with the planet 10° higher. On the 26th, the planet is 7° to the right of the waxing crescent **Moon** in eastern **Taurus**, with the **Hyades** below it, and **Orion** to its southeast, hugging the horizon. All month the planet will show a crescent, starting on April 1st at 46% lit, and slimming down to 25% lit by the 30th. The planet's disk will grow from 26" to 39" during the month. **Venus** will reach greatest brilliancy on April 27th.

Mars – Mars, on April 1st, is 1° southeast of **Saturn** and will shine at magnitude 0.8. **Mars**, in western **Capricornus**, will quickly move eastward during the month, crossing most of **Capricornus**, and ends the month 2.7° due west of **Deneb Algedi (Delta Capricorni)**, in the northeast of the constellation. By the 30th, **Mars** will brighten to magnitude 0.4, and will be beginning to grow in apparent size, spanning more than 7".

Jupiter – **Jupiter** will rise about 3½ hours before the **Sun** as April begins. **Saturn** and **Mars** will follow ½ hour later. **Jupiter** will lie in eastern **Sagittarius** all month and will brighten from magnitude -2.1 to -2.3 during the month, with its apparent diameter growing from 37" to 41". The planet will reach quadrature (90° west of the **Sun**) on the 15th. On the 6th, **Pluto** (magnitude 14.0) will stand 45' due south of **Jupiter**. Ganymede cast's its shadow into the northern regions of the planet on the 15th, with the event already underway as the planet rises, and ends at 4:52 AM CDT. **Europa** will cross the planet on the 19th, beginning at 4:17 AM CDT, and ending nearly three hours later. On the 20th, Io's shadow transits the planet starting at 3:43 AM CDT, with Io following at 5AM CDT. On the 26th, **Ganymede** will re-appear from behind the planet's southeast limb soon after 4:20 AM CDT, just as **Europa**'s shadow begins its transit at 4:18 AM CDT at the planet's northeast limb. **Ganymede** will take over 6 minutes to fully re-appear, by which time **Europa**'s shadow will be easily visible also.

Saturn – **Saturn** rises with **Mars** on April 1st at 4 AM local daylight time, and nearly two hours earlier on April 30th. Saturn glows at magnitude +0.7 as the month begins, and will brighten slightly to magnitude +0.6 by month's end. On the 15th, the planet is 2° north of the last quarter **Moon**. At mid-month, the planet's ring system spans 37" with the minor axis at 13", and the planet's disk will span 16". **Titan**, at 8th magnitude, is likely the only moon you will see in early April, since the planet is only about 15° high at the beginning of twilight. The fainter moons may have to wait until later in the month when the planet will reach 25° altitude by 5 AM local daylight time.

Uranus – **Uranus** can be glimpsed with binoculars in southern **Aries** at dusk at the very start of the month, but will be lost shortly due to its conjunction with the **Sun** on April 26th.

Neptune – **Neptune** will gradually emerge in the morning twilight late in April.

Moon – The **Moon** will be at it's nearest for 2020 at 12:59 PM CDT on the 7th, just 8.5 hours before it reaches full. When the **Moon** returns to the evening sky as a thin waxing crescent, it passes by the **Hyades**, to the right of **Aldebaran** and very near **Epsilon Tauri** on the 26th.

Favorable Librations: **Kircher Crater** on the 7th; **Malapert Crater** on the 8th; and **Helmholtz Crater** on the 9th.

Greatest northern declination on the 1st (+23.6°) and 29th (23.9°)

Greatest southern declination on the 14th (-23.8°)

Libration in longitude: East limb most exposed on the 14th (+7.5°)

West limb most exposed on the 2nd (-8.0°) and on the 30th (-7.2°)

Libration in latitude: North limb most exposed on the 20th (+6.6°)

Southern limb most exposed on the 7th (-6.5°)

Asteroids – Asteroid **3 Juno**'s positions, according to the *RASC Observers Handbook*, are as follows: On April 1st – 13 02.29 +01 40.7, at magnitude 9.5; **Juno** will reach opposition on April 2nd; **Juno** will be about ½° south of **Delta Virginis** on the 9th and 10th; on the 11th – 12 54.41 +03 00.1, at magnitude 9.7; and on the 21st –

12 47.12 +04 07.3, at magnitude 9.9. **Juno's** positions, *by my estimates*, are as follows: On April 2nd – about 2° southeast of **Delta Virginis**; on the 5th – about 1.8° southeast of **Delta Virginis**; on the 8th – about 0.8° south-southeast of **Delta Virginis**; on the 11th – about ½° south of **Delta Virginis**; on the 14th – about 0.8° due west of **Delta Virginis**, or 0.3° northeast of **37 Virginis**; on the 17th – about 1.5° west-northwest of **Delta Virginis**; on the 20th – about 2° west-northwest of **Delta Virginis**, or about 0.6° east-northeast of **35 Virginis**; on the 23rd – about 2.6° northwest of **Delta Virginis**, or 1° northwest of **35 Virginis**; on the 26th – about 1.7° northwest of **35 Virginis**; on the 29th – about 1.9° northwest of **35 Virginis**; and on May 2nd – about 1.2° northwest of **35 Virginis**.

Asteroid **6 Hebe** – **Hebe's** positions, according to the *RASC Observers Handbook*, are as follows: On April 1st – 13 25.85 +10 53.9, at magnitude 9.9; and on the 11th – 13 17.3 +12 10.0, at magnitude 9.9.

Asteroid **40 Harmonig's** position, according to the *RASC Observer's Handbook*, on April 21st is 14 15.93 -06 43.9, at magnitude 9.8

Asteroid **1 Ceres's** position, according to the *RASC Observer's Handbook*, on April 21st is 22 14.93 -18 49.2, at magnitude 9.2

Asteroid **Pallas's** position, according to the *RASC Observer's Handbook*, on April 10th is about 19 28+14 00

Asteroid **4 Vesta's** positions, according to the *RASC Observers Handbook*, are as follows: On April 7th – 3.7° due north of **Gamma Tauri**, at magnitude 8.4; and from the 12th through the 13th – about 30' north of **Epsilon Tauri**. **Vesta's** positions, by my estimates, are as follows: On April 1st – 3.6° west-northwest of **Delta Tauri**; on the 6th -1.5° south and a little east of **Omega Tauri**; on the 11th - 1° northwest of **Epsilon Tauri**; on the 16th - 3° northeast and a little west of **Aldebaran**; on the 21st –

2.6° due south of **Tau Tauri**; on the 26th – 3.3° southeast of **Tau Tauri**; and on May 1st – 5.7° west-southwest of **Tau Tauri**.

Comets – Comet **PANSTARRS (C/2017 T2)**, at 9th magnitude, will, by my estimates, be at the following positions: On April 1st – just over 4° northwest of **IC 342** in **Camelopardus**; on the 6th – just under 2° south-southeast of **IC 342**, or about 2½° due west and a little north of **Gamma Camelopardalis**; on the 11th – about 1° north and a little west of **Gamma Camelopardalis**; on the 16th – about 3.2° northeast of **Gamma Camelopardalis**; on the 21st – just over 6° northeast of **Gamma Camelopardalis**; on the 26th – about 8.5° northeast of **Gamma Camelopardalis**; and on May 1st – about 11.2° northeast of **Gamma Camelopardalis**.

Comet **C/2019 Y4 (Atlas)** – according to the *Heavens Above* website, comet **Atlas's** positions will be as follows: On April 1st – 07 47.6 +68 28; on the 5th – 07 20.1 +68 01; on the 10th – 06 49.2 +67 03; on the 15th – 06 22.2 +65 44; on the 20th – 05 58.7 +64 08; on the 25th – 05 32.6 +62 16; on the 30th – 05 18.0 +60 06; and on May 1st – 05 14.1 +59 37. Comet **Atlas's** positions, *by my estimates*, are as follows: On April 1st - 1° southeast of **NGC 2366**, or about 3.3° west and a little south of

43 Camelopardalis; on the 5th – about 2° east of **42 Camelopardalis**; on the 10th – about ½° west of **42 Camelopardalis**; on the 15th – about ½° east of **42 Camelopardalis**; on the 20th – about 0.7° southeast of **36 Camelopardalis**; on the 25th – about 0.7° southeast of **17 Camelopardalis**; on the 30th – about 1° north of **Beta Camelopardalis**; and on May 1st – about 0.3° north-northeast of **17 Camelopardalis**, or 0.7° southeast of **Beta Camelopardalis**.

Meteor Showers – There are 5 minor showers and one large shower in April. The minor showers are as follows: The **Zeta Cygnids**, active from April 3rd -10th, peaks on the 6th (less than 2 per hour); the **Delta Aquilids**, active from April 7th – 13th, peaks on the 10th (less than 2 per hour); the **Sigma Leonids**, active from April 8th – 25th, peaks on the 16th (less than 2 per hour); the April **Rho Cygnids**, active from April 11th – May 4th, peaks on the 23rd (less than 2 per hour); and the **Pi Puppids**, active from April 15th-28th, peaks on the 23rd (less than 2 per hour). The one major shower is the **Lyrids**, active from April 14th to the 30th, peaking on the 22nd, with an expected zenithal hourly rate of 15 to 20 per hour. This shower comes from the debris trail of bits of dust or rock shed by comet **Thatcher (C/1861 G1)**, which orbits the **Sun** every 415 years. As **Earth** plows through the comet's debris trail, the shards slam into our atmosphere at more than 165,000 km per hour (about

265,485 mph). Note: The ISS is traveling at 17,500 mph.

When to View the Planets:

Evening Sky

Venus (west)

Uranus (west)

Midnight

Morning Sky

Mercury (east)

Mars (southeast)

Jupiter (southeast)

Saturn (southeast)

Neptune (east)

DARK SKY VIEWING - PRIMARY ON APRIL 25TH, SECONDARY ON APRIL 18TH

mythology

Ursa Major – the Great Bear,

*a part of which is easily identifiable as “The Big Dipper” (see italicised *** above)*

The Great Bear is identified with two separate characters: Callisto, a paramour of Zeus; andAdrasteia, one of the Ash tree nymphs who nursed the infant Zeus. To complicate matters, there are several different versions of each story, particularly the one involving Callisto. Callisto is usually said to have been the daughter of Lycaon, King of Arcadia in the central Peloponnese. Callisto joined the retinue of Artemis, goddess of hunting. She dressed in the same way as Artemis, tying her hair with a white ribbon and pinning together her tunic with a brooch, and she soon became the favorite hunting partner to Artemis, to whom she swore a vow of chastity.

One afternoon, as Callisto laid down her bow and rested in a shady forest grove, Zeus caught sight of her and was entranced. Cunningly assuming the appearance of Artemis, Zeus entered the grove to be greeted warmly by the unsuspecting Callisto. He lay beside her and embraced her. Before the startled girl could react, Zeus revealed his true self and, despite Callisto’s struggles, had his way with her. Zeus returned to Olympus, leaving the shame-filled Callisto scarcely able to face Artemis and the other Nymphs. On a hot afternoon some months later, the hunting party came to a cool river and decided to bathe. Artemis stripped off and led them on, but Callisto hung back. As she reluctantly undressed, her advanced pregnancy was finally revealed. She had broken her vow of chastity! Artemis, scandalized, banished Callisto from her sight.

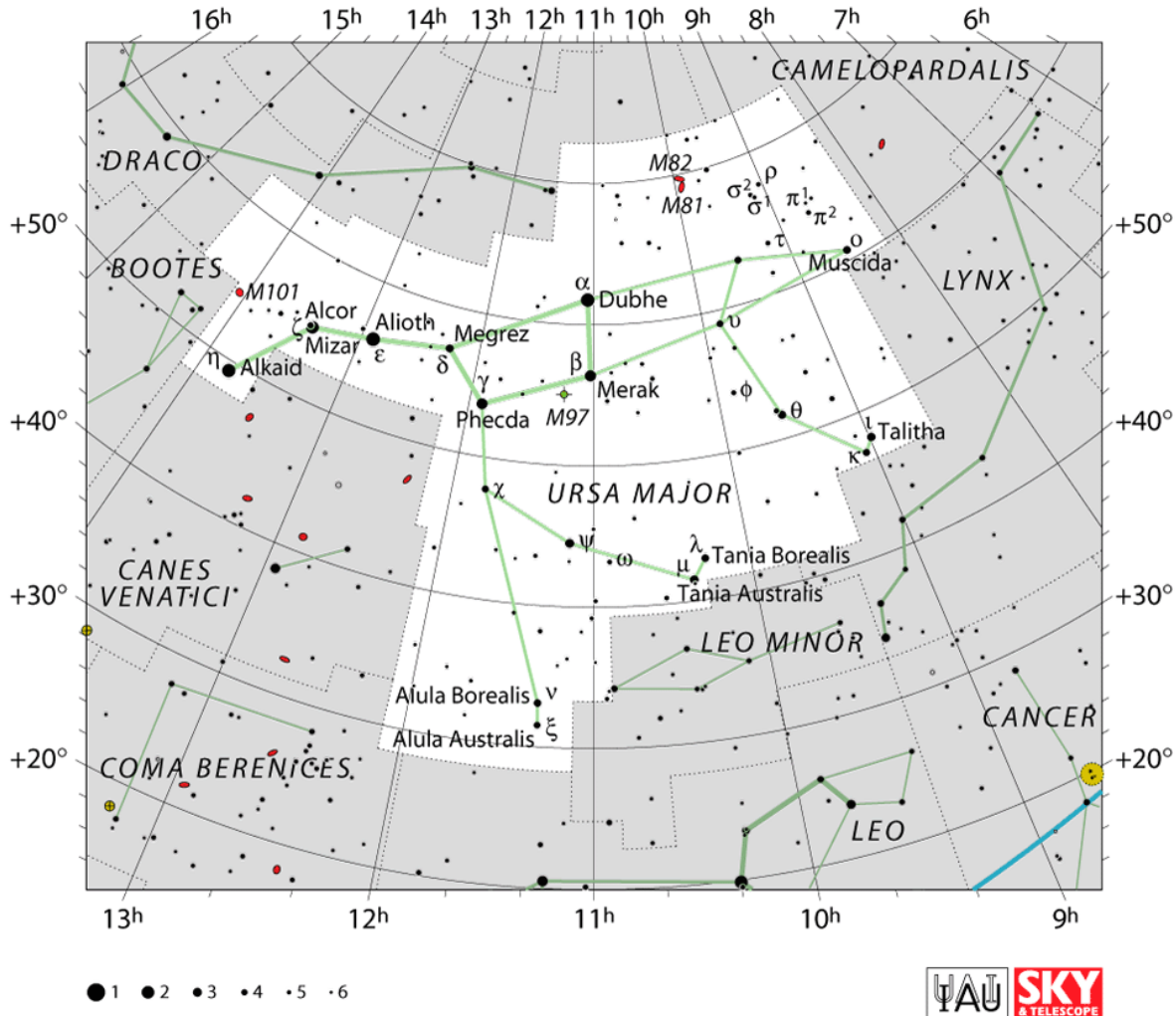
Worse was to come when Callisto gave birth to a son, Arcas. Hera, the wife of Zeus, had not been slow to realize her husband’s infidelity, and was now determined to take her revenge on her rival. Hurling insults, Hera grabbed Callisto by her hair and pulled her to the ground. As Callisto lay spread-eagled, dark hairs began to sprout from her arms and legs, her hands and feet turned into claws and her beautiful mouth, which Zeus had kissed, turned into gaping jaws that uttered growls. For 15 years Callisto roamed the woods in the shape of a bear, but still with a human mind. Once a huntress herself, she was now pursued by hunters. One day she came face to face with her son Arcas. Callisto recognized Arcas and tried to approach him, but he backed off in fear. He would have speared the bear, not knowing it was really his mother, had not Zeus intervened by sending a whirlwind that carried them up into heaven, where Zeus transformed Callisto into the constellation Ursa Major and Arcas into the constellation Boötes.

The storyteller Eratosthenes says that Callisto was changed into a bear not by Hera but by Artemis as a punishment for breaking her vow of chastity. Later, Callisto, the bear, and her son Arcas were captured in the woods by shepherds who took them as a gift to King Lycaon. Callisto and Arcas sought refuge in the temple of Zeus, unaware that Arcadian law laid down the death penalty for trespassers (yet another variant of the story

says that Arcas chased the bear into the temple while hunting, see the Boötes legend). To save them, Zeus snatched them up and placed them in the sky.

Aratus makes a completely different identification of Ursa Major. He says that the bear represents one of the nymphs who raised Zeus in the cave of Diote in Crete. That cave, incidentally, is a real place where local people still proudly point out the supposed place of Zeus’s birth. Rhea, his mother, had smuggled Zeus to Crete to escape Chronus, his father. Chronus had swallowed all his previous children at birth for fear that one day they would overthrow him – as Zeus eventually did. Apollodorus names the nurses of Zeus as Adrasteia and Ida, although other sources give different names. Ida is represented by the neighboring constellation of Ursa Minor, “The Little Bear”. These nymphs looked after Zeus for a year, while armed Cretan warriors, called the Curetes, guarded the cave, clashing their spears against their shields to drown out the baby’s cries from the ears of Chronus. Adrasteia laid the infant Zeus in a cradle of gold and made for him a golden ball that left a fiery trail like a meteor when thrown into the air. Zeus drank the milk of the she-goat Amaltheia with his foster brother Pan. Zeus later placed Amaltheia in the sky as the star Capella, while Adrasteia became “The Great Bear” – although why Zeus turned her into a bear is not explained.

One puzzle, never explained by any mythologist, is why the celestial bears have long tails, which real bears do not. Thomas Hood, an English astronomical writer of the late 16th century, offered the tongue-in-cheek suggestion that the tails had become stretched when Zeus pulled the bears up into heaven. ‘Other reason know I none’, he added apologetically.



The End