

Newsletter of the Baton Rouge Astronomical Society



**April, 2014**

**Next Meeting April 14<sup>th</sup> 7PM at the HRPO**



**Total Lunar Eclipse from 2010 by Dr. Charles Genovese**

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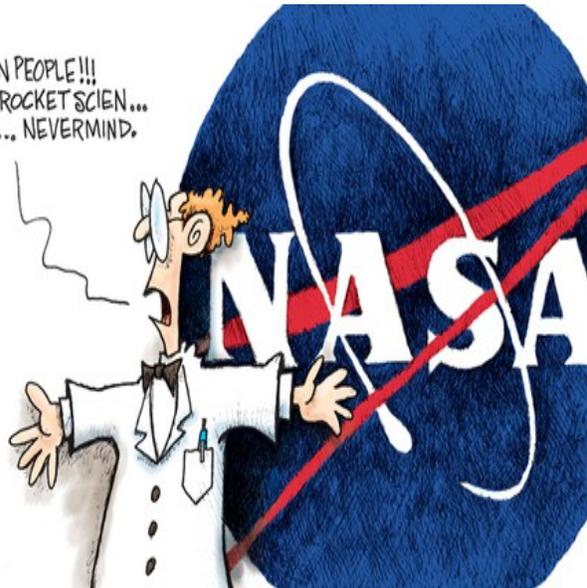
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Wally

Some clichés should be avoided when working in the aerospace industry.

@2014@regwallaceink

C'MON PEOPLE!!!  
THIS ISN'T ROCKET SCIEN...  
... OH WAIT... NEVERMIND.



# President's Message

The April 14th BRAS meeting should be an exciting one. It coincides with the closest approach of Mars for the year. Also, there will be a total lunar eclipse in the morning hours of April 15<sup>th</sup>! All in the same night!

To observe this occasion, the Highland Road Park Observatory will be open to the public the entire night, beginning at 8 PM.

The BRAS meeting will be a bit different that night, to coordinate with the HRPO events. Instead of our normal start time, we will begin our meeting at 7:30 PM. We will spend that time to quickly cover any announcements or business, so the guest speaker will be able to begin his presentation at 8 PM. If we have time, anyone who goes to the Hodges Garden Star Party can share their stories, pictures, what have you. (OK, people, make those who didn't go regret their decision.)

Notice the HRPO activities and our guest speaker both begin at 8 PM? That was done so our meeting would not conflict with that night's public activities and to allow the public to hear the speaker. Our meeting will officially be complete when the speaker begins.

Our guest speaker will be Suniti Karunatilake, who conducts planetary science through the LSU Geology department. Since that will be the night of Mars' closest approach, his presentation will naturally focus upon his research on the Red Planet.

After the talk, we will be able to join (and volunteer) with the evening's activities. We need at least several volunteers who will be willing to stay the entire night. (I will.)

Beside the Moon, Jupiter will be almost overhead as darkness falls. Saturn and Mars will both rise later that night and will be well placed high in the sky sunrise approaches. Mars is already exceptionally bright, so it should be a good night for observing.

Clear skies,

Merrill Hess- President

## Vice-President's Message

Last month's meeting turned out real well. Brad's talk was very interesting. He had some interesting relationship charts that I would not have thought about.

This month's event has 2 speakers, since it coincides with the HRPO event Mars's closest approach. The first talk is by **Dr. Suniti Karunatillake** from the Geology and Geophysics department at LSU. His talk topic is going to be on the nature of water on the Martian surface as multi-institutional project by scientists across LSU, GeorgiaTech, and several other universities. He is going to focus on the promise this search holds for habitability and the insight it may offer on the nature of Martian soil. I think this is a very interesting topic that coincides with the event. This talk is probably going to be open to public as well.

The second talk is going to be later that night (maybe close to 10PM) by our very own **Dr. Brad Schaefer**. The title of his talk is going to be "Lunar Eclipses That Changed The World". Here is a little description on it - "Lunar eclipses have inspired universal fear and dread in all cultures worldwide in olden times. With this, they are often events that change history. For example, it was a lunar eclipse that demoralized the defenders of Constantinople in 1453, thus allowing one of the major turning points in history. And Nicias' lunar eclipse caused the freaking out of the Greek leader during the siege of Syracuse, and this was the direct cause of Athens losing the Peloponnese War. Both Lawrence of Arabia and General "Chinese" Gordan (Gordan of Khartoum) used lunar eclipses as part of their war winning assaults. In the year 528 AD, Hank Morgan (a Connecticut Yankee) first made use of the trick of an eclipse to 'scare the natives' into freeing himself from captivity. This trick was later copied by Christopher Columbus (in Jamaica in 1504), Allan Quatermain (in Zululand in 1884), and Tintin (in Peru in 1962)."

I look forward to seeing you all there.

Regards,  
Murali Chakravarthi  
BRAS VP

# Outreach Report

There are several upcoming events that we will need some volunteers for:

**Zippity Zoo Fest is April 5<sup>th</sup> and 6<sup>th</sup>**, but we will only be present on the 6<sup>th</sup>. We will be operating a solar telescope and also stamping “Expedition BREC” booklets. The event is 9:30AM to 6PM, but if I recall correctly, the trees will greatly restrict our ending time. Regardless, it would be nice to have a companion for that event, even if you can only stay for a short time during the day. I do not yet know where we will be set up within the zoo.

**Louisiana Earth Day is April 27<sup>th</sup>**, and we will be operating from noon to 5pm. We will be set up in front of the old governor's mansion downtown. As with last year, we will have a solar telescope or two, and a shaded table with a light pollution display set up. I will be there for the duration operating my scope, but it would be nice to have two people for the table, and possibly another person to man my scope from time to time, or bring their own scope.

We also have an ambiguous request from someone that simply asks if we would be interested in doing 'an event' in Washington Parish. Mention is made to reimbursement for mileage, but I'm not sure how that fits in with our status.

Finally, **International Astronomy Day is May 10<sup>th</sup>**, but Chris will be helming the volunteer wrangling on that one.



# Secretary's Summary

- Don Weinell got up to speak first about the Hodges Gardens Star Party coming up on March 26<sup>th</sup> – March 30<sup>th</sup>. There is a \$10 fee for the star party (please see and pay Don) and a \$2 daily use fee for the park. There are plenty of non-astronomy things to do in and around the park; participants are encouraged to bring their bicycles. Saturday night (the 29<sup>th</sup>) will be public viewing night (roughly about 200 people from the surrounding area) with hayride transit between parking and the viewing field. He also reminded everyone with vehicles to park off the observing field as the ground is soft out there. There is information about this on the website at [www.braastro.org](http://www.braastro.org).
- The next BRAS meeting on the 14<sup>th</sup> of April will feature a speaker from out of town. Since this is the same night as the public event for Mars' closest approach and the lunar eclipse, the meeting will start at 7:30 so that the lecture on Mars can occur at 8:00 for BRAS and the general public. Brad Schaefer is also scheduled to give a presentation at 11:00 pm that evening. They are looking for volunteers for this event if anyone is available and wants to help.
- They are also looking for volunteers for International Astronomy Day on May 10<sup>th</sup>. This will run from 3:00 pm to 11:00 pm with approximately 800 – 900 people expected to show up. There may be a telescope as the main raffle prize this year. Several groups are expected to man booths again this year including the Civil Air Patrol, the Gem and Mineral Society, and the EBR Library. Craig has a sign-up sheet circulating to man an information table for BRAS; he should have badges for all participating club members.
- Ben got up on behalf of Trey who could not attend to remind everyone who hadn't paid dues yet for this year that they needed to pay if they wanted to keep getting the newsletter. Dues not only help the club, they also are used to pay the Astronomical League for our membership in that organization.
- Chris recognized and awarded certificates in the Observatory's Apprenticeship program. Rory Bentley received two certificates and Matthew Dreher received one certificate commemorating recent achievements of work and research done at the observatory. Jacob DesRoches was also recognized for his high attendance at Science Academy on Saturday mornings.
- Trevor spoke about the outreach email and mentioned that the annual WHAM event at Westdale Middle was coming up on the 20<sup>th</sup> of this month as well as Earthday (12:00 pm to 4:00 pm, April 27<sup>th</sup>) and Zoofest. Please let him know if you can help out for any of these.
- The raffle prizes for the evening were displayed as well as the new sound system on the front table.
- Brad Schaefer gave an interesting talk on Nova Discovery Efficiency: A tale of amateurs with big impact.
- A raffle was held, and the meeting adjourned.

# HRPO

## FRIDAY NIGHT LECTURE SERIES

*all start at 7:30pm*

4 April: “Wonders of the Spring Sky”

11 April: “Medical Physics”

18 April: “Dating the Crucifixion”

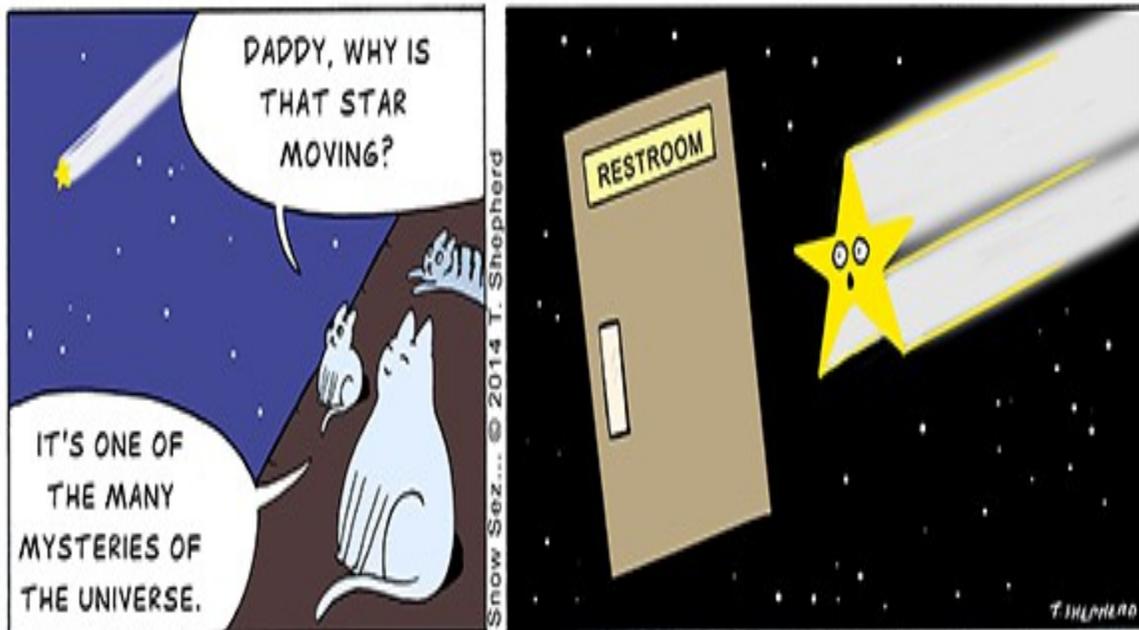
25 April: “Mercury and Venus”

## CALL FOR VOLUNTEERS

\*Saturday, 12 March from 6pm to 10pm. *Two volunteers in addition to regular BRAS compliment.* **Evening Sky Viewing Plus.** Marshmallow roast, demonstration tables; small telescope; setup and takedown. Easy; training provided.

\*8pm on Monday, 14 April to 4am on Tuesday, 15 April. *Six volunteers needed for two- to three-hour shifts.* **Mars’ Closest Approach/Total Lunar Eclipse.** That’s right—HRPO will be open all night long! We need BRAS to assist not only with a couple of telescopes, but also with enforcing the on-site policies to keep all patrons safe.

\*Saturday, 10 May from 3pm to 11pm. *Eleven to fourteen volunteers; two- to four-hour shifts.* **International Astronomy Day.** Staffing of front desk, children’s rides, raffle ticket “booth”; operating telescopes. All needed training given.



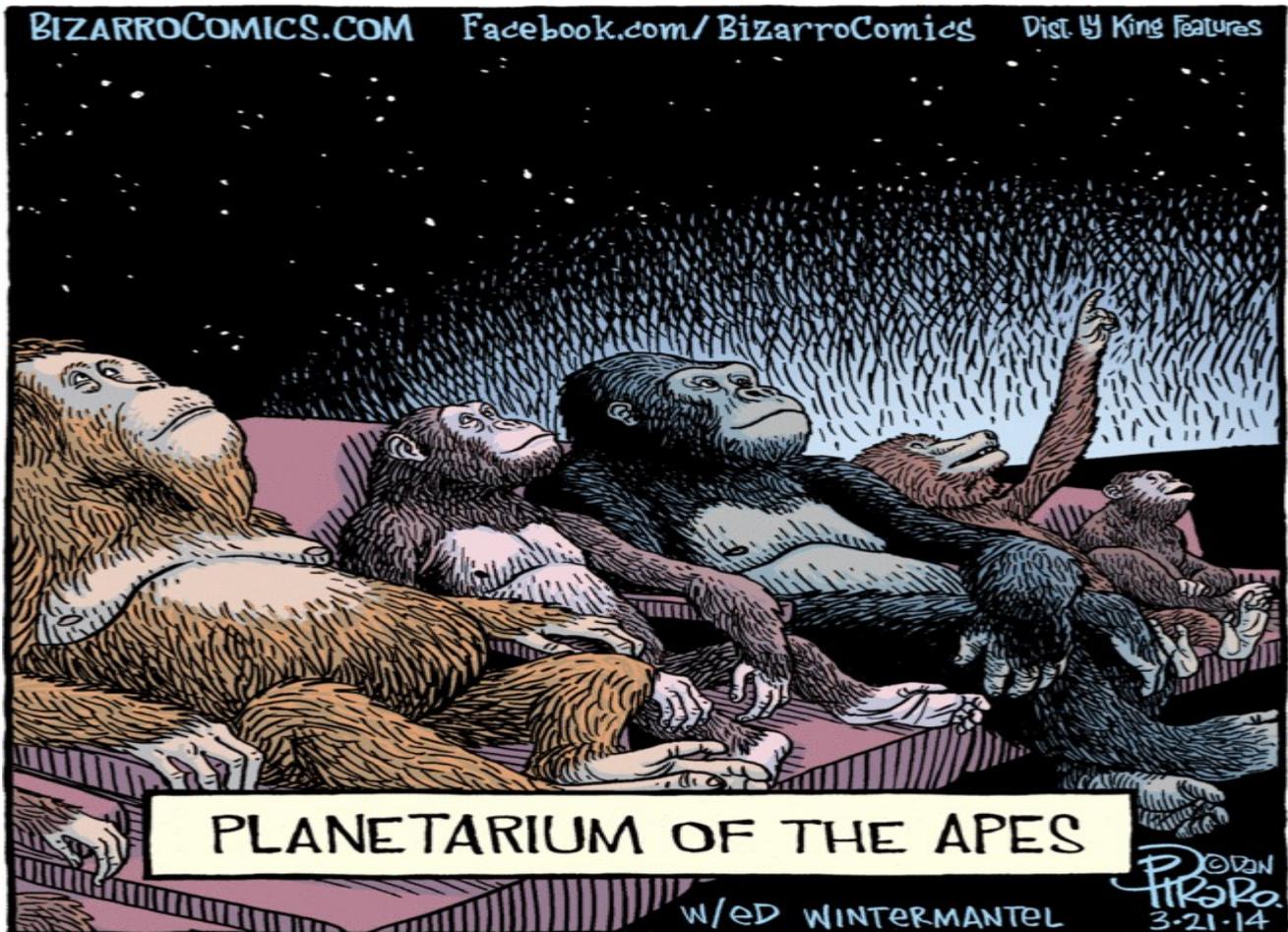
## GLOBE At Night

*19April to 20April*

Everyone's favorite winter light pollution exercise is back...except it's no longer just for winter. During 2014 the GLOBE at Night staff will collect observations during *all twelve* New Moon periods!

This is an excellent time to start compiling a good historical record of sky glow in Baton Rouge. Each BRAS member should take at least one measurement per season during 2014. The GLOBE at Night website makes it as easy as possible, with step-by-step instructions and an downloadable instruction manual. (In March, participants use the constellation Orion. In April and May, the constellation is [Leo](#).)

The heading on this page hyperlinks to the BRAS Forum thread devoted to GLOBE at Night. Visit there regularly for updates and answered questions.



## Imagine Your Parks 2: Better Parks, Better Living

As we all know, an astronomical observatory needs a certain type of environment to function properly. One of the most pressing concerns at this time is the re-darkening of the sky above HRPO's domes. This would be incredible and thrilling to accomplish step-by-step over the next few years, especially since both large professional telescope have new motors, new computers and new operating programs. Capping/shielding of lights in the local area would also contribute to the re-darkening of skies above most BRAS members' residences.

Thanks so much to Wally, Craig, Thomas, Susan and Roslyn. These are the BRAS members known to have each attended at least one meeting to show support for dark skies over HRPO.

Anyone else interested in the most successful future for HRPO (and the darkest skies for local amateur astronomers and schoolkids) should attend the parish-wide meeting mentioned below. If one's residence is too far away to show up for that in-person gathering, by all means call BREC directly at (225) 272-9200, email [planning@brec.org](mailto:planning@brec.org) or use the powerful [Mind Mixer](#) interactive tool.

The parish-wide meeting is on Thursday, 1 May from 6pm to 8:30pm at the [Independence Park Theatre](#).



# Monthly Observing Notes

## Ursa Major – The Great Bear

RA 10.67 Hours, Dec. +55.38

Named Stars:

Dubhe (Alpha UMa), also called Dubh or Dubb, from “Thahr al Dubb al Akbar”, “The Back of the Great Bear”, mag. 1.81, 11 03 43.84 +61 45 04.4. A red giant star that is a close, visible binary with the companion’s orbit being 44.4 years at 23 AU distance – the companion is a suspected variable star. Alpha UMa also has a 7<sup>th</sup> magnitude companion at a distance of 6.3’ (GC15179). The companion is a spectroscopic binary with a period of 6.035 days.

Merak (Beta UMa), also called Mirak, from “Al Marakk”, “The Loin of the Bear”, mag. 2.34, 11 01 50.39 +56 22 56.4. A suspected variable star, it is a main sequence dwarf that emits excess Infra-red radiation, and has a disc of hot gas and dust surrounding it.

Located 5.4° south of Alpha UMa, and about 1.5° to the southeast is the bright, edge-on galaxy NGC 3556, and less than 1° further on is the large “Owl Nebula”, M97.

Phad (Gamma UMa), also called Phecda, from “Al Fahdh ad-dubb”, “The Thigh of the Bear”, mag. 2.41, 11 53 49.74 +53 41 41.0. About 0.7° to the southeast is NGC 3992, M109 - a bright, barred spiral galaxy of the 11<sup>th</sup> magnitude.

Megrez (Delta UMa), from “Al Maghrez”, “The Root of the Tail”, mag. 3.32, 12 15 25.45 +57 01 57.4, is blue-white dwarf with two companion stars. The Hubble Deep Field is located to the northeast of Delta UMa.

Alioth (Epsilon UMa), or Allioth, an uncertain meaning – possibly from “Alyat”, “The Fat Tail” of an animal, mag. 1.76, 12 54 01.63 +55 57 35.4, and it has a brown dwarf companion, and its spectrum displays abnormally strong lines of chromium and europium.

Mizar (Zeta UMa), from “Mi’Zar”, a girdle or waistband, mag. 2.23, 13 23 55.42 +54 55 31.5, it is the first double star discovered, and the first double star to be photographed. Mizar B is at mag. 3.95, 13 23 56.40 +54 55 18.0, and is the first binary star to be detected spectroscopically, and in itself is also a spectroscopic double star, with a third component indicated. Mizar A’s companion star is mag. 4.0, and is separated from Mizar A by 14.4”, and has an optical companion “Alcor” (80 UMa) – see end of named stars.

Alkaid (Eta UMa), sometimes called “Benetnasch”, from “Ka’id Banat al Na’ash”, “The Leader of the Daughters of the Bier”, mag. 1.85, 13 47 32.55 + 49 18 47.9. Eta UMa is one of the hottest stars that can be seen without binoculars, with a surface temperature of 20,000 Kelvin.

Talitha Borealis (Iota UMa), or “Talita”, from “Al Kafzah al Thalithah”, “The Third Leap” or “The Third Vertebrae”, mag. 3.12, 08 59 12.84 + 48 02 32.5 -the system has two double stars – a white sub-giant that is a spectroscopic binary (component A), and another pair of red dwarfs of 9<sup>th</sup> and 10<sup>th</sup> magnitudes (component B). The two “B” components are separated by 11 AU, and are separated from the “A” components by 4.5 arc seconds, with an orbital period of 818 years. Along with Kappa UMa (1° away), it marks the front feet of Ursa Major.

Talitha Australis (Kappa UMa), “The Third Leap”, mag. 3.57, 09 03 37.56 [+47 09 24.0](#), it is a binary star, mag. 4.3 and 4.5, with an orbital period of just under 58 years and a mean separation of 0.3”, and is located 1° from Iota UMa.

Tania Borealis (Lambda UMa), from “Kafzah al Thaniyah”, “The Second Leap”, mag. 3.45, 10 17 05.93 +42 54 52.1, it is paired with Mu UMa, 1.5° away, and marks the Bear’s left hind foot (Lambda UMa is the northern star).

Tania Australis (Mu UMa), “The Second Leap”, mag. 3.06, 10 22 19.80 +41 29 58.0, paired with Lambda UMa 1.5° away, it is a red giant and a close binary with a period of 230.089 days. Located 0.7° nearly due west is the face on spiral galaxy NGC 3184.

NGC 3319 lies 2.8° distant in a nearly due east direction. Mu UMa is the southern star on the Bear’s left hind foot.

Alula Borealis (Nu UMa), from “al-ûlã”, “The First Leap”, mag.3.49, 11 18 28.76 +33 05 39.3, and it is a double

star with only one visible to the naked eye. Paired with Xi UMa, Nu UMa is the northern star.

Alula Australis (Xi UMa), “The First Leap”, mag. 3.79, 11 18 11.24 +31 31 50.8, and it is a binary star composed of two main sequence dwarf stars, Xi-A mag. 4.32 and Xi-B mag. 4.84, 11 18 11.0 +31 31 45.0. Each of these stars is a spectroscopic double star and has a low mass companion. Paired with Nu UMa (1.6° to the north), Xi UMa is the southern star.

Muscida (Omicron UMa), “The Muzzle”, mag. 3.35, 08 30 16.03 +60 43 06.4, and it has a 15<sup>th</sup> magnitude dwarf star companion, and one planet.

Museida (Pi UMa), “The Muzzle”, a binary star, Pi UMa 1 mag. 5.63, 08 39 11.74 +65 01 14.5, Pi UMa 2 mag. 4.59, 08 40 12.90 +64 19 40.3 – has 1 planet.

Alcor (UMa 80), also called “Saidak” (The Test), and “Suha (neglected or forgotten), mag. 3.99, 13 25 13.42 +54 59 16.8. Alcor and Mizor (Zeta UMa) are sometimes known as “The Horse and Rider”, and Alcor is a spectroscopic binary.

## Deep Sky

M40 (Winnecke 4, or WNC 4), mag. 9.0, 12 22 12.5 +58 04 59, this is one of the few mistakes in the Messier catalog. M40 is actually a binary star, with a separation of 49', and is located about 1.5° northeast from Delta UMa, and 16' northeast from 70 UMa.

M81 (NGC 3031), “Bode’s Galaxy”, mag. 6.8, 09 55.6 +69 04, size is 26' x 14'. An extremely large, elongated, and bright face on spiral galaxy with M82 being 37" to the north. M81 is located 10° NW of Alpha UMa, and interacts with M82 and NGC 3077.

M82(NGC 3034), “The Cigar Galaxy”, mag.8.4, 09 55.8 +69 41, 11.2' x 4.6' in size, along with M81 it forms “Bode’s Nebula”, and is a very bright, large, and very elongated, spindle shaped galaxy that emits an infra-red excess and is the brightest galaxy in the sky when observed in infra-red light. Type 1A supernova SN2014j was discovered in M82 on Jan. 21, 2014. M 97 (NGC 3587), “The Owl Nebula”, mag. 9.9, 11 14.8 +55 01, 2.8' in size, also designated as PK 148+57.1, is a very bright, very large, and round planetary nebula that resembles the face of an owl with two dark “eyes”. Located about 2.4° SE from Beta UMa, and 48' to the NW is M 108 (NGC 3556). M 101 (NGC 5457), sometimes called the “Pinwheel Galaxy” as M33 is called, mag. 7.7, 14 03.2 +54 21, 27' x 26' in size. It is a pretty bright, and very large, face on galaxy with faint spiral arms and a small, bright nucleus. Within 1° of M 101 you can find NGC 5422, NGC 5473, NGC 5474, and NGC 5485. M 101 is located about 5.5° east of Zeta UMa and is about the same distance NNE from Eta UMa. M 108 (NGC 3556), mag. 10.0, 11 11.5 +55 40, 8.3' x 2.5' in size, is a bright, very large, and very elongated nearly edge on galaxy. The Owl Nebula (M 97) is located about 50' to the SE. M 108 contains about 290 globular clusters and 83 x-ray sources, and is located about 1.5° SE of Beta UMa. M 109 (NGC 3992), mag. 9.8, 11 57.6 +53 23, 7.6 x 4.9 in size, is a quite bright, very large, and elongated galaxy with spiral arms and a diffuse, very bright nucleus. It is located 1° SE of Gamma UMa, and has three satellite galaxies, UGC 6923, UGC 6940, and UGC 6969. NGC 2841, mag. 9.2, 09 22.0 +50 59, 8.1' x 3.8' in size, and is very bright, large, and elongated galaxy with symmetrical, spiral, knotty arms and a bright, large nucleus. NGC 3077, mag. 9.8, 10 03.4 +68 44, 4.6' x 3.6' in size, and is a quite bright, quite large, and round galaxy located about 45' ESE of M 81. NGC 3184, mag. 9.8, 10 18.3 +41 25, 7' x 7' in size, and is a pretty bright, very large, and round galaxy having two main knotty arms with a small, very bright nucleus. NGC 2768, mag. 9.9, 09 11.6 +60 02, 6.3' x 2.8' in size, is a quite bright, quite large, and elongated galaxy with a bright, large nucleus. NGC 3953, mag. 10.1, 11 53.8 +52 20, 6.6' x 3.6' in size, and is a quite bright, large, and elongated galaxy with many arms and a small very bright nucleus. It has a peculiar appearance with there being a coarse double star to the north, and a vertical line of 5 equidistant stars to the east. NGC 2976, mag. 10.2, 09 47.3 +67 55, 4.9' x 2.5' in size, and is a bright, very large, and slightly elongated galaxy with a small bright nucleus, located about 1.4° SSW of M 81. NGC n3675, mag. 10.2, 11 26.1 +43 25, 5.9' x 3.2' in size, and it is a very bright, quite large, and elongated galaxy with two main arms and a small, bright nucleus. NGC 4051, mag. 10.2, 12 03.2 +44 32, 5.0' x 4.5' in size, and is a bright, and very large Seyfert galaxy with two thick spiral arms, with a small and extremely bright nucleus. NGC 5322, mag. 10.2, 13 49.3 +60 11, 6.0' x 4.1' in size, and is a very bright and pretty large galaxy with a bright and diffuse nucleus. NGC 2681, mag.10.3, 08 53.6 +51 19, and is a very bright and very large galaxy with an extremely bright nucleus. NGC b3198, mag. 10.3, 10 19.9 +45 33, 8.3' x

3.7' in size, and is a pretty bright, very large, and very elongated galaxy with several arms and a small, very bright nucleus. NGC 3941, mag. 10.3, 11 52.9 +36 59, 3.5' x 2.5' in size, and is a very bright, pretty large, and round galaxy with a small, bright nucleus. NGC 4605, mag. 10.3, 12 40.0 +61 37, 6.0' x 2.5' in size, and is a bright, large, and very elongated galaxy. IC 2574, mag. 10.4, 10 28.4 +68 25, 13' x 6' in size, also called "Coddington's Nebula" (but really a galaxy) - it is a very large, extremely faint, elongated galaxy located about 3' east and 0.8° south of M 81. NGC 2985, mag. 10.4, 09 50.3 +72 17, 4.7' x 3.5' in size, and is a very bright, quite large, and round galaxy with a small, very bright diffuse nucleus, paired with NGC 3027. NGC 3631, mag. 10.4, 11 21.0 +53 10, 4.6' x 4.1' in size, and it is a pretty bright, large, and round galaxy with two straight, large arms - an absorption lane crosses one arm - and a small, bright nucleus. NGC 3726, mag. 10.4, 11 33.3 +47 02, 6.0' x 4.1' in size. It is a pretty bright, very large, and slightly elongated Seyfert galaxy with several large arms and a small, very bright nucleus. NGC 3938, mag. 10.4, 11 52.8 +44 07, 5.4' in size, and it is a bright, very large face on spiral galaxy with several bright arms and a diffuse, small, bright nucleus. NGC 3893, mag. 10.5, 11 48.7 +48 43, 4.5' x 2.5' in size, and it is a bright, pretty large, and round galaxy with two main arms and a small, bright nucleus - paired with galaxy NGC 3896. NGC 3359, mag. 10.6, 10 46.6 +63 13, 6.8' x 4.3' in size, and it is a pretty bright, large, and elongated galaxy with a very small and faint nucleus. NGC 4088, mag. 10.6, 12 05.6 +50 33, 5.8' x 2.5' in size, and it is bright, quite large, and elongated galaxy with large, knotty arms and a very small, bright nucleus - paired with fainter galaxy NGC 4085. NGC 3898, mag. 10.7, 11 49.3 +56 05, 3.7' x 2.5' in size, and it is a bright, pretty large, and slightly elongated galaxy with very faint arms and a bright, large nucleus - paired with fainter galaxy NGC 3888. NGC 3998, mag. 10.7, 11 57.9 +55 27, 2.9' x 2.3' in size, and it is a quite bright, pretty small, and round galaxy with a very bright nucleus, and in a group with galaxies NGC 3972 and NGC 3982. NGC 4036, mag. 10.7, 12 01.5 +61 54, 4.0' x 1.8' in size, and it is a very bright, very large, and elongated galaxy in a spindle shape having a very bright nucleus - paired with galaxy NGC 4041. NGC 5585, mag. 10.7, 14 19.8 +56 44, 5.5' x 3.7' in size, and it is a pretty faint, large, and irregularly round galaxy with a very faint nucleus, located in the M 101 galaxy group. UGC 4305, mag. 10.7, 08 19.1 +70 43, 7.6' x 6.2' in size, and it is a large and irregular galaxy with a compact core and many knots, also listed as Holmberg II. NGC 2787, mag. 10.8, 09 19.3 +69 12, 3.3' x 2.1' in size, and is a bright, pretty large, and slightly elongated lenticular galaxy with a bar at its center, and with a small, very bright nucleus. It also has a halo of globular clusters. NGC 3310, Mag. 10.8, 10 38.8 +53 30, 2.8' in size, and is a quite bright, pretty large, and round starburst spiral galaxy with filamentary arms and a small, very bright nucleus. NGC 3610, mag. 10.8, 11 18.4 +58 47, 2.7' x 2.6' in size, and is a very bright, pretty small, and slightly elongated galaxy with a very small, very bright nucleus. NGC 3665, mag. 10.8, 11 24.7 +38 46, 3.9' x 3.2' in size, and is a quite bright, quite large, irregularly round galaxy with a very bright, diffuse nucleus - paired with galaxy NGC 3658.

### Asterisms

"The three leaps of the gazelle" is composed of three pairs of stars. The first leap has Nu UMa and Xi UMa. The second leap has Lambda UMa and Mu UMa. The third leap has 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 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 mag. 1.8; Merak (Beta UMa) at mag. 2.4; Phad or Phecda (Gamma UMa) at mag. 2.4; Megrez (Delta UMa) at mag. 3.3; Alioth (Epsilon UMa) at mag. 1.8; Mizar (Zeta UMa) at mag. 3.3; and Alkaid (Eta UMa) at mag. 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 (Beta UMa) to Dubhe (Alpha UMa) and then extending it for five times the distance between the two pointers. Extending a line from Megrez (Delta UMa) to Phecda (Gamma UMa) on the inside of the bowl, it leads to Regulus (Alpha Leonis) and Alphard (Alpha Hydrae). Crossing the top of the bowl from Megrez (Delta UMa) to Dubhe (Alpha UMa) takes one in the direction of Capella (Alpha Aurigae). Imagine a diagonal line from Megrez (Delta UMa) to Merak (Beta UMa) and then extending it for approximately five times that distance to Castor (Alpha Geminorum). By following the curve of the handle from Alioth (Epsilon

UMa) to Mizar (Zeta UMa) to Alkaid (Eta UMa), one reaches Arcturus (Alpha Bootis) and Spica (Alpha Virginis). Projecting a line from Alkaid (Eta UMa) through the pole star will point to the constellation Cassiopeia. Crossing the bowl diagonally from Phecda (Gamma UMa) to Dubhe (Alpha UMa) and proceeding onward for a similar stretch leads to the bright galaxy pair M 81 and M82. There are two spectacular spiral galaxies that flank Alkaid (Eta UMa), “The Pinwheel” (M101) to the north, and “The Whirlpool” (M51) to the southeast in Canes Venatici. The Hubble Deep Fields approximate location can be found by following a line from Phecda (Gamma UMa) to Megrez (Delta UMa) and continuing on for the same distance again.

**In mythology**, 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 of 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 advancing 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 Bootes.

The story teller 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 Bootes 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 on 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 16<sup>th</sup> 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.

## Sky Happenings

April 2<sup>nd</sup> Uranus is in conjunction with the Sun, 2 AM CDT

April 3<sup>rd</sup> North America – The waxing crescent Moon passes through the Hyades star cluster (in Taurus), occulting several medium bright stars. The Moon will be 2° north of Alderbaran.

April 6<sup>th</sup> Waxing Moon passes 5° south of Jupiter at 6 PM CDT.

April 7<sup>th</sup> First Quarter Moon occurs at 3:31 AM CDT.

April 8<sup>th</sup> The Moon is at apogee (251,344 miles from Earth) at 9:52 AM CDT. Mars is at opposition at 4 PM CDT, rising at sunset at maximum brightness (mag. -1.5), and appearing 15’ across through a telescope.

April 10<sup>th</sup> Moon shines below Regulus.

April 11<sup>th</sup> Asteroid Juno is in conjunction with the Sun at 2 AM CDT.

April 12<sup>th</sup> Venus passes 0.7° north of Neptune at 3 AM CDT, in the dawn sky.

April 13<sup>th</sup> Asteroid 4 Vesta is at opposition in Virgo, and 2.5° from Ceres at 7 AM CDT.

April 14<sup>th</sup>/15<sup>th</sup> All night – Mars will be closest to Earth with a disc 15.16 arc seconds across. Full Moon shines about 9° east of Mars, and Spica shines only 1° or 2° from the Moon. There will be a total eclipse of the Moon for most of North America.

Penumbra will be first visible at 12:20 AM CDT, partial eclipse begins at 12:58 AM CDT, total eclipse begins at 2:07 AM CDT, mid-eclipse occurs at 2:46 AM CDT, total eclipse ends at 3:25 AM CDT, partial eclipse ends at 4:33 AM CDT, and penumbra is last visible at 5:10 AM CDT. Full Moon occurs at 2:42 AM CDT, during the eclipse. Pluto is stationary at 8 PM CDT.

April 15<sup>th</sup> Ceres at opposition in Virgo, and will be 2.5° from asteroid 4 Vesta.

April 16<sup>th</sup> Waning gibbous Moon will be 1° below Saturn in the late night sky.

April 17<sup>th</sup> Moon passes 0.4° south of Saturn at 2 AM CDT.

April 22<sup>nd</sup> Last Quarter Moon occurs at 2:52 AM CDT. A weak Lyrid meteor shower peaks in the pre-dawn. Moon is at perigee (229,761 miles from Earth) at 7:24 PM CDT.

April 24<sup>th</sup> The Moon passes 5° north of Neptune at 5 PM CDT. April 25<sup>th</sup> the moon passes 4° north of Venus at 6 PM CDT. Mercury is in superior conjunction at 10 PM CDT.

April 26<sup>th</sup> The Moon shines to the lower left of Venus.

April 27<sup>th</sup> The Moon passes 2° north of Uranus at 6 AM CDT.

April 29<sup>th</sup> New Moon occurs at 1:14 AM CDT.

Mercury – Lies deep in the morning twilight, appearing just above the horizon a half hour before sunrise, and passes through a superior conjunction with the Sun on April 26<sup>th</sup>.

Venus – Rises about 2 hours before the Sun in early April, and 20 minutes later by month’s end. Venus shines at about mag. -4.3 in mid-April. On April 1, Venus’ disc spans 22” and the Sun illuminates just

over half of it. By April 30<sup>th</sup>, Venus appears 17" across and 2/3 lit. On April 2<sup>nd</sup>, Venus passes just 0.7° north of Neptune (mag. 7.9). On April 25<sup>th</sup>, the waning crescent Moon passes 4° north of Venus at about 6 PM CDT.

Mars – Rises in the east in Virgo in retrograde, nearing Gamma Virginis (Porrima) by the end of the month. Mars reaches opposition on April 8<sup>th</sup>, with maximum magnitude of -1.5, matching Sirius. Mars comes closest to the Earth on April 14<sup>th</sup>, with an apparent diameter of 15.16", though it does not drop below 14.6" all month. Mars' North Pole currently tips about 23° in our direction, and because it is currently early summer in Mars's northern hemisphere, you should be able to see the north polar cap visibly shrink during April.

Jupiter – Riding high at dusk in Gemini (more than 60° high), it does not set until after 2 AM LDT. Jupiter's magnitude dims during April from -2.2 to -2.0, and it's equatorial diameter shrinks from 38' to 35'. During April, Jupiter moves away from Epsilon Geminorum, and ends up between Omega Gem and Zeta Gem. On April 21<sup>st</sup>, Io, Europa, and Callisto form a perfectly straight line just west of Jupiter – nearly perpendicular to the equator. Watch a few minutes before 10 PM CDT and you will see Io move directly between Europa and Callisto, with the alignment only lasting about 15 minutes, centered on 10:15 PM CDT.

Saturn – the planet rises around 10:30 PM LDT in early April and 2 hours earlier by month's end. Saturn is in the constellation Libra, brightening from mag. 0.3 to 0.1 during April, with the rings remaining near 22° from edge on. In mid-April, Saturn's disc measures 18" across while the rings span 42". Titan shines at 8<sup>th</sup> magnitude, while Tethys, Dione, and Rhea glow at 10<sup>th</sup> magnitude. Iapetus appears similarly bright in mid-April, when it is 9' away from Saturn.

Uranus – is in Pisces and in conjunction with the Sun on April 2<sup>nd</sup>, and probably impossible to view all month, with it reappearing in mid-May.

Neptune – Glowing at mag. 7.9, it will still be difficult to see on April 12<sup>th</sup> when Venus passes just 0.7° north of Neptune.

Pluto – in Sagittarius, and is findable before dawn.

Moon – The Moon is a waxing crescent near Alderbaran on April 3<sup>rd</sup>, passing through the Hyades cluster that evening, occulting several medium-bright stars. The half Moon is fairly near Jupiter on April 6<sup>th</sup>. The Full Moon is near Mars and very near Spica on the night of April 14<sup>th</sup>/15<sup>th</sup>, experiencing a total eclipse. The waning gibbous Moon is very near Saturn at dawn on April 17<sup>th</sup>, and a waning crescent passes Venus in the dawns of April 25<sup>th</sup> and 26<sup>th</sup>.

Comet PANSTARRS (C/2012K1) lies in Corona Borealis not far from M13 in Hercules as April begins. By month's end, the comet skims between Eta UMa and M51 in Canes Venatici (it will be closer to Eta UMa).

Asteroid Pallas rides high in Hydra to the south on April 1<sup>st</sup>, glowing at mag. 8. As April closes, Pallas passes near R Leonis (about April 26<sup>th</sup>). In early May, Pallas passes near Regulus (in Leo).

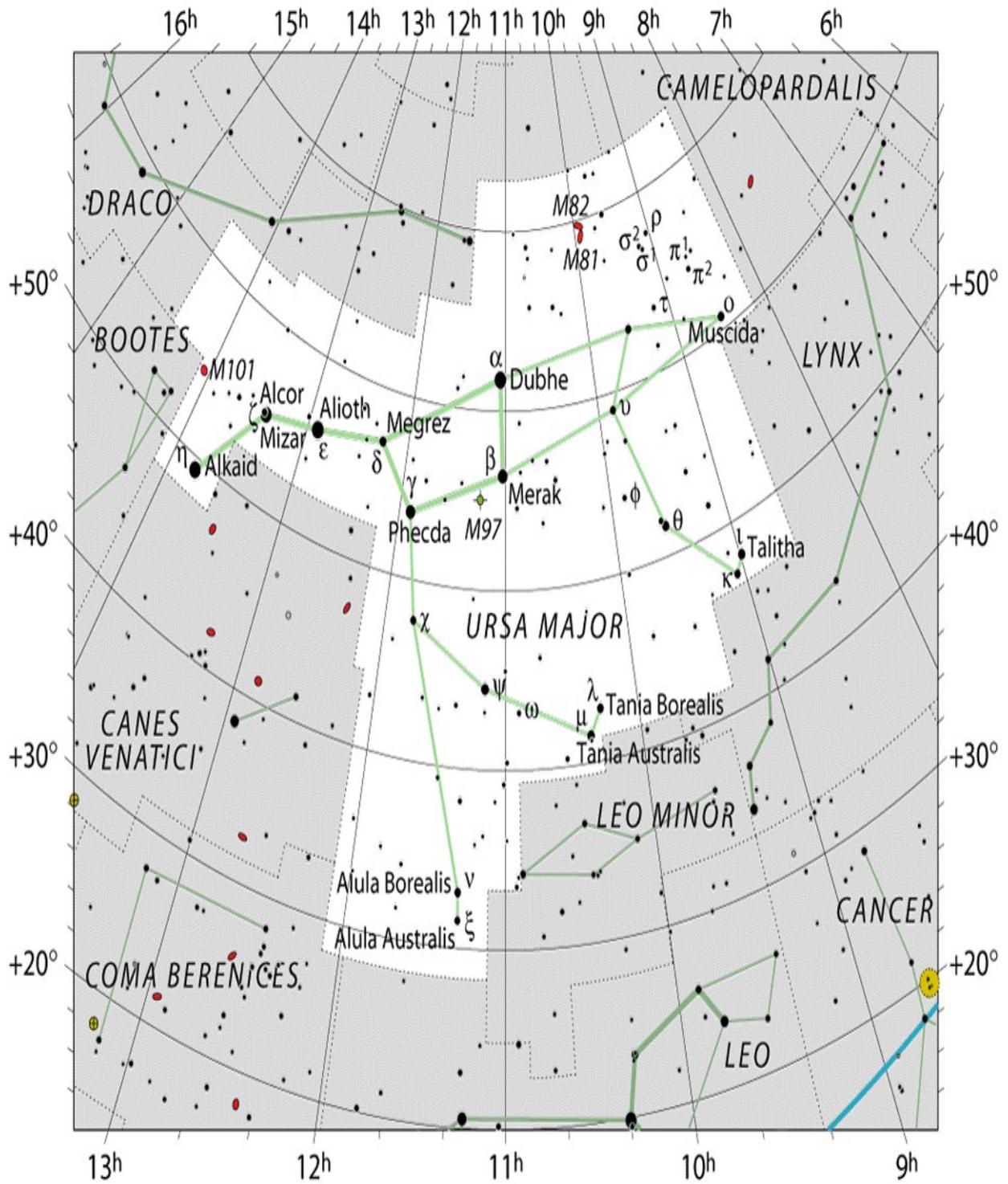
Lyrid Meteor Shower peaks on the morning of April 22<sup>nd</sup>, but the last quarter Moon will impair the viewing. Meteor Showers associated with Ursa Major: The Alpha Ursa Majorids; the Leonids – Ursids; and the newly discovered Kappa Ursae meteor shower peaking between November 1<sup>st</sup> and November 10<sup>th</sup>.

When to view the planets:

Evening – Mars (southeast) and Jupiter (west)

Midnight – Mars (south), Jupiter (west), Saturn (southeast)

Morning – Mercury (east), Venus (east), Mars (west), Saturn (southwest), Uranus (east), and Neptune (east).



● 1 ● 2 ● 3 ● 4 ● 5 ● 6

