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

July 11th at 4:00 PM, a family barbeque at HRPO!!!
This is in lieu of our regular monthly meeting.)

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

This is a pot-luck. Club will provide briskett and beverages, others will contribute as the spirit moves.

What's In This Issue?

Observing Notes: Canes Venatici – The Hunting Dogs

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

BRAS YouTube Channel

President's Message

Hey everybody, happy fourth of July. I hope ya'll've remembered your favorite coping mechanism for dealing with the long hot summers we have down here in the bayou state, or, at the very least, are making peace with the short nights that keep us from enjoying both a good night's sleep and a productive observing/imaging session (as if we ever could get a long enough break from the rain for that to happen anyway). At any rate, we figured now would be as good a time as any to get the gang back together for a good old fashioned potluck style barbecue: to that end, **we've moved the July meeting to the Sunday, 11 July at 4PM at HRPO**. After some brief discussion, we've decided this will give the most folk a chance to get out there, have a good time, and still make it home in time to tuck the kids in (or engage in your normal Sunday ritual). We've also decided to make this a family affair, by suggesting not only that everyone bring their families out with them (well, maybe not you John: we all heard about how many kids, grandkids, and great grandkids you're expecting, and I'm not sure there's enough room, frankly). We've also extended the invite to our observatory family, inviting the BREC and LSU folks that run the place with us out there, to say hey to everyone as well. The club will be providing barbecue brisket from one of the local eateries and we'll have some soda and water out there to wash it all down with. If you've got any side dishes you feel like having with it and sharing, bring that along too. We won't really have much of a program out there aside from the food, maybe some games if we're feeling extra festive. The main goal is just to hang out in person with some of our fellow astronomy enthusiasts.

The summer always is kind of the light time of year for amateur astronomy (yes, suffer my puns!) but we do have some things to keep us occupied. Already, we've spun up the old war machine and have started answering requests to do public outreaches around town and we'll be expecting to get on a regular rotation in the fall, including a return to our favorite sidewalk astronomy locale. To help with that, sometime in the next month or so expect to be hearing the call to restart our training sessions out at HRPO on how to utilize our Night Sky Network kits. Also, we thought it might be a good time to start doing some basic astronomy sessions for members too: this will just cover stuff like how to operate our loaners scopes (or your own dusty scopes), stary party etiquette, how to star hop or read a star chart, you know, intro level stuff for people that want to make the leap from passive to active stargazers. So, keep an eye on your email for future invites regarding those sessions.

Also, in keeping with the tradition of doing at least one **member's stargaze at HRPO per quarter, we've set a date for 30 July at HRPO**. It'll be a Friday night this time with a waning moon, so we should be able to get in a good weekend viewing session—well, as good as you can expect from the summertime in the city at any rate. Timing here will be from probably an hour before sundown until everyone's tuckered out. And with the big 20" scope operational at HRPO again, we may even open up for sky viewing that night if we can get an operator out there to drive us around.

Two more things to consider: **Steven is still looking for active volunteers to work on the planning committee for our attempt to pull in the AL convention in a couple of years**. We expect to hear more of what the committee has been up to at the July meeting, but if you do have an interest in helping out, please let him know.

And speaking of helping out, a quick reminder that now that the moon is out of the way, you should try to sneak out on some mythical clear night and try to do some observations for the Globe at Night program to help us keep some data on the changing light pollution in the city. It usually takes like five minutes: just go out, observe the constellation of the month, and report what you saw via the web app—easy as pie.

And that's all I have for now, despite the heat and the long days, we seem to have a lot planned for July and I hope to see you out there for some of it.

Scott Cadwallader, President 2021

Member Meeting Minutes –June 14th, 2021

in person at HRPO, and remotely via Jitsi

- Tonight's program, by Scott Cadwallader, is on how to remove and clean the lens on a Schmidt-Cassegrain telescope.
- Outreach – Maker's Market, at Circa 1851, on June 18th, will have both solar and lunar viewing.
- There are multiple Kids Camps coming up.
- BRAS 40 year anniversary is coming up. Would like articles about the early years of BRAS, and would like early members to talk about their memories of the early years.
- Asteroid Day on July 3rd, from 7 to 10 PM.
- ALCon Committee – preparing a presentation for the submission of a bid to host ALCon in Baton Rouge. No ALCon has been held in Louisiana. We would need assistance from other persons and organizations for it. If there are any profits from it, BRAS would get a part of it. The next meeting will be at Coffee Call this Saturday at 1:30 PM.
- Chris K said that upcoming events are Field Day, and Asteroid Day.
- Chris is still working on a solution for the hydraulic cylinders for the dome. He is looking for a solution for the problems with the outside dome – Scott C said we might need to find a Mechanical Engineer in the BRAS membership to help find a solution. Chris said if no solution can be found, the dome might have to be replaced.
- Scott C says the July meeting will be held on Sunday the 11th at HRPO. It will be a B-B-Q, starting at 6 PM (changed to 4 PM).
- Scott C says the next big expenditure for BRAS will be the BRAS computer.
- Meeting adjourned at 8:47 PM.

Submitted by Thomas Halligan, Secretary; typed up by John

Sunday, July 4th

2021 Officers:

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

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

Committees/Coordinators:
AL Awards
Merrill Hess
Lightpollution@brastro.org
John Nagle
Newsletter@brastro.org
Michele Fry
Observing@brastro.org
John Nagle
Outreach@brastro.org
Ben Toman
Webmaster@brastro.org
Frederick Barnett

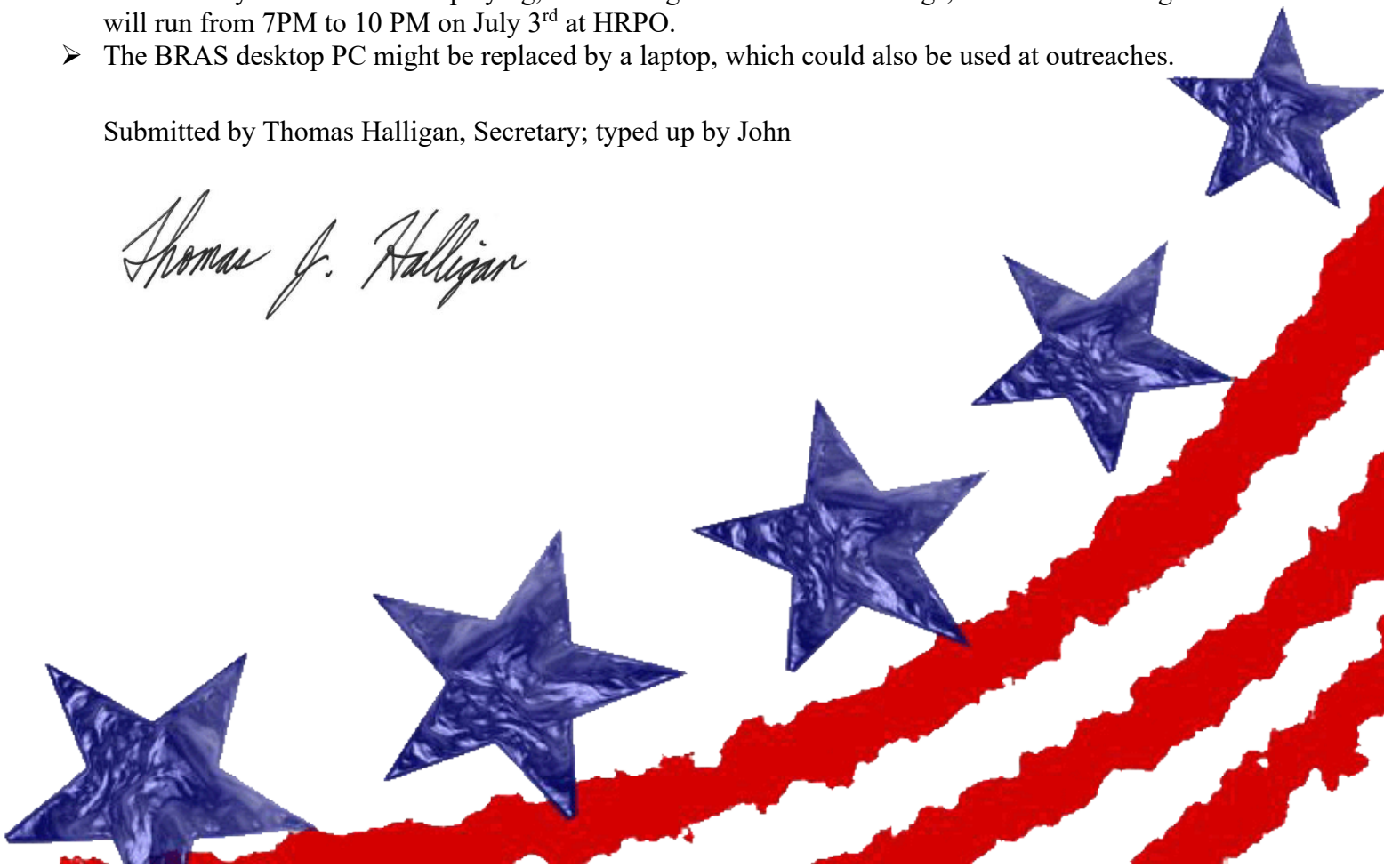
Business Meeting Minutes –June 30th, 2021
in person at HRPO, and remotely via Jitsi

The following items were discussed:

- Scott C – The July membership meeting will be on Sunday, July 11th, at HRPO, starting at 4 PM. It will be a B-B-Q. BRAS will provide the B-B-Q, drink, and ice), with pot luck from the members. All BRAS members and their family members, LSU professors associated with HRPO and their family, and BREC personnel associated with HRPO and their family are invited. If it is raining, Melanie Templett has volunteered to give a talk.
- The August meeting will be about the making and handling of the mirror blank for the SDSS project.
- The next MOON night will be July 30th (Friday).
- The 9.25 inch SC scope has been cleaned and re-assembled. It has been tested and collimated, and is now ready for use. BRAS now have 3 loaner scopes, and any new member will be given a short training session on how to use a digital scope (go to).
- LSU has informed HRPO that due to a large class, LSU will be using HRPO most nights in the fall.
- BRAS web domain can receive e-mails, but cannot send e-mails. The problem is being worked on.
- BRAS 40th Anniversary – John N and Coy W are working on it, and need more people on the committee to help plan it. Scott C discussed possible raffle subjects.
- John N went to the LSU Lakes project meeting and discussed the BRAS stance on Light Pollution.
- Outreach – The National Guard Youth Camps are coming up at the Feliciana Retreat Center. BRAS volunteers will be provide food and drink, and can tent camp overnight if they wish to stay.
- ALCon Committee is preparing a short video for submission to AL along with a bid. A "Special Events" bank account (an account is required for a bid) has been established via a donation.
- Field Day at HRPO had 133 attendees –not counting participants and HRPO associated people.
- Asteroid day will have videos playing, Meteor Rights and Meteor Wrongs, and Crater making events. It will run from 7PM to 10 PM on July 3rd at HRPO.
- The BRAS desktop PC might be replaced by a laptop, which could also be used at outreaches.

Submitted by Thomas Halligan, Secretary; typed up by John

Thomas J. Halligan



Upcoming BRAS Meetings:

Monthly Member Meeting – Pot Luck:

4 pm Sunday, July 11th at the Observatory, Family is invited.

Light Pollution Committee (meets the last Wednesday of the month): 6 pm Wednesday, July 28th, via Jitsi. (Open to the public), followed by…….

Monthly Business Meeting:

7 pm Wednesday, July 28th, (via Jitsi (Members Only)

MOON (Members Only Observing Night),

An hour before sunset til everyone is done, Sunday, July 30th

BRAS Outreach Report

Hi Everyone,

Well, we had a pretty wet month or so and that ended up curtailing our planned outreach for the June Mid-City Makers Market. At this point, we're hoping that things continue to dry out and that we can get some good weather for the couple of events at the end of this month and the beginning of August.

We did have a couple of volunteers respond to our call for help with the Baton Rouge KidCam events. (Thanks to Scott C., James E. and Ben T.) We had outreaches at two different locations Monday, June 28th and we'll have two more locations to visit on Wednesday, June 30th. The outreaches were fun and we showcased the Moon using our Night Sky Network Moon banner. We also got the kids (and ourselves!) pretty messy showing them how craters are formed on the Moon with our crater making demonstration. James had a pretty enthusiastic audience, as well, as he showed off some of his astrophotos he's been getting using his new Stellina telescope. The kids really enjoyed it!

Ben T. and Scott C.'s setup for one of the KidCam events on June 21st.

July and August are usually pretty slow for us outreach-wise. Very hot. Very humid. Gets dark very late. The list of reasons goes on. Just a reminder, though, that we DO have a couple of special events coming up in the last week of July and first week of August with the National Guard Youth Camps.

Regarding the event in July, we HAVE been given permission to tent camp on the observing field at the Feliciana Retreat Center. Unfortunately, though, they said the cabins in the back have sustained damage and are not being used at this time so they would be unavailable unlike last time. They are still hoping to have us do some activities during the day and a bit of observing in the evening, if possible. We'll have to see how we are looking as far as volunteers and whether or not we'll have overnight campers before we tell them for sure what we can provide. The kids will be there for two nights. We can plan to go up on either day and stay either (or both) nights.

The second camp, in the first week of August, has yet to be clarified as far as whether we'd be allowed to camp/stay overnight. As soon as they find out and let me know, I'll get the information out.

Please take a look at the following events and let me know as soon as possible if you'd like to help out. If you would like to plan on camping, please let me know, too. Even though it would be tent camping, they said we could have access to showers/bathrooms and we'd also be provided with meals like last time. It was a really fun

event for us last time and with the smaller group size this year, it will probably be even more fun and give us opportunities to do more.

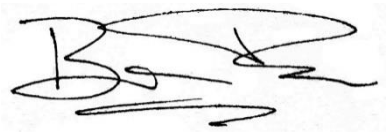
Upcoming Outreach Events:

July 27th-28th
Louisiana National Guard Youth Camp
Feliciana Retreat Center
(Tent camping allowed if you'd like to stay overnight)
Time: TBD by our availability
4 or more people needed for various activities

August 3rd-4th
Louisiana National Guard Youth Camp
Loranger, LA
Details similar to the above, but camping TBD
4 or more people needed for various activities

Again, please let me know as soon as you can if you are interested in helping out. We can work out the details as we get a team together.

Clear Skies,



Ben Toman

Message from Steven Tilley: If you'd like to be on the ALCon 2023 Baton Rouge, La - Astronomical Gombo Planning Committee (working theme) — send an e-mail to stevearenо225@gmail.com

BRAS Light Pollution Committee Report

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

Meeting called to order by Chairperson John Nagle, 4 members present, 0 new members
June minutes were published in June newsletter

Old Business:

1. Discussed Light Pollution Petition and sending out updates, if they want, to the people who have signed the petition.
2. The Multi-Year Natural Sky Reclamation Plan is on hiatus.
3. Investigating the possibility of forming an IDA Chapter in Baton Rouge – the closest chapter is in Houston. Will contact other astronomy groups in Louisiana about this.
4. Will start the process for applying for HRPO to be designated as a Dark Sky Park by IDA.
5. Will have hybrid meetings until the end of the year.
6. Merrill codifying BRAS Light Pollution stand into the LSU-BREC-BRAS UCA.
7. Will contact home school groups about participating in the Globe at Night program.
8. Will start contacting Civic Associations about Light Pollution.

New Business:

1. Need to talk to BREC about their Environmental Sustainability Program and Light Pollution. Will call BREC and set up an appointment.
2. Will contact the LSU School of Architecture and the AIA about Light Pollution.

Minutes of this meeting read and approved. Meeting adjourned.

John R. Nagle

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

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

Image Credit: Marko Langbroek via SatTrackBlog

Globe At Night

The target for the Globe at Night program is Hercules from June 30th through July 9th
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.

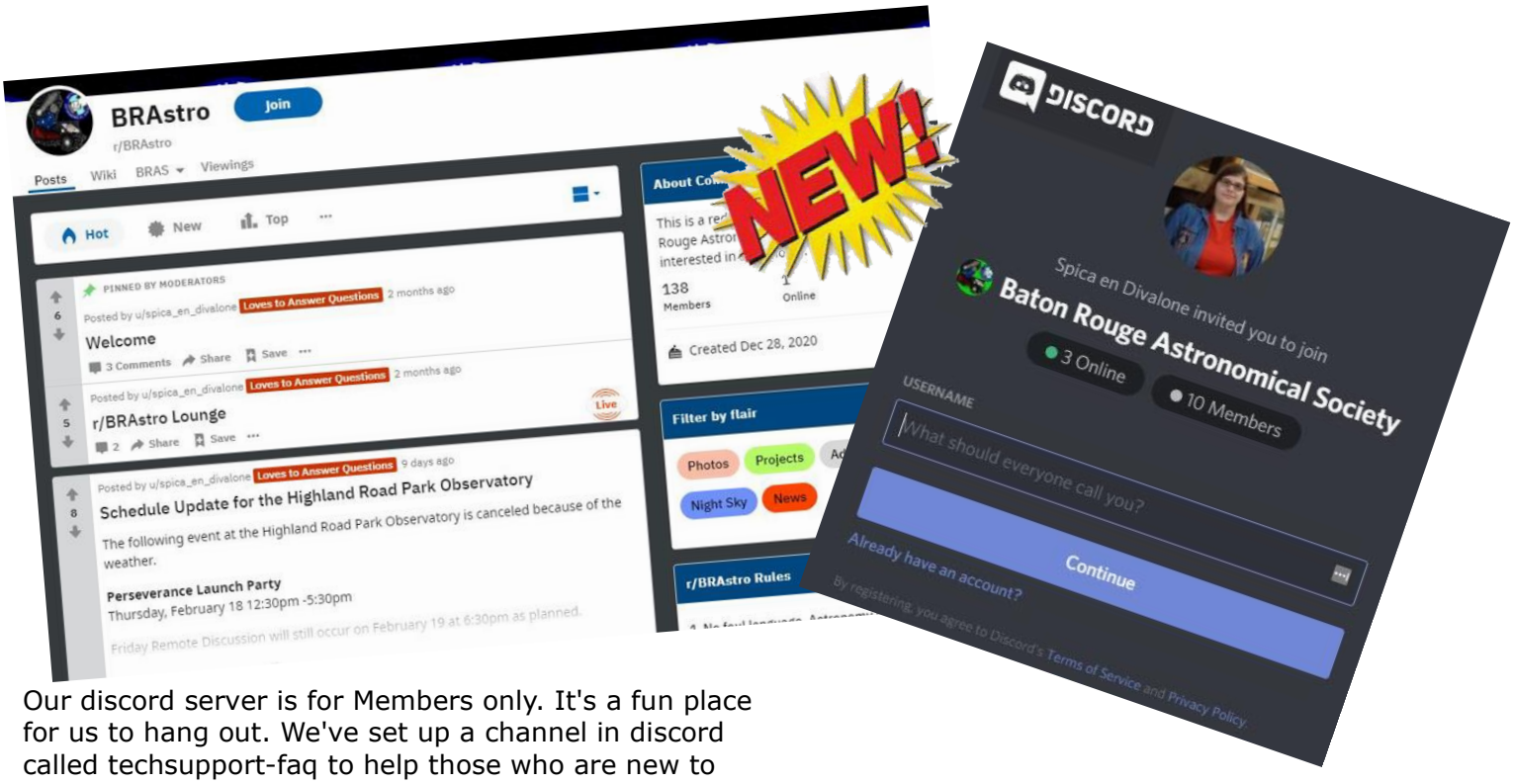
****

BRAS subreddit and a Discord server.

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

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

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



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

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

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

Sincerely,
Amy & Justin Northrop

****

Flying "Rocks" and "Dirty Snowballs":

Asteroid and Comet News

July 2021
Volume 3, Issue 6. you

JPL Close Approach Data from May 14, 2021 to Jun 17, 2021, Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal (LD)	Diameter
(2021 JU6)	2021-May-14	0.17	8.9 m - 20 m
(2021 LV)	2021-May-27	0.73	7.0 m - 16 m
(2021 KO2)	2021-May-30	0.96	6.7 m - 15 m
(2021 KN2)	2021-May-31	0.38	5.0 m - 11 m
(2021 KQ2)	2021-May-31	0.46	2.8 m - 6.2 m
(2021 KT2)	2021-Jun-01	0.76	5.6 m - 13 m
(2021 LX1)	2021-Jun-04	0.42	10 m - 23 m
(2021 LG5)	2021-Jun-12	0.41	4.8 m - 11 m
(2021 LO2)	2021-Jun-13	0.58	6.7 m - 15 m
(2021 MU)	2021-Jun-15	0.43	9.6 m - 22 m
(2021 ME)	2021-Jun-17	0.82	4.2 m - 9.3 m

As of 2021-07-01 there is

1,225 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL) (https://cneos.jpl.nasa.gov/sentry/)
2,684 objects have been removed from Sentry(JPL) (https://cneos.jpl.nasa.gov/sentry/removed.html)

For more information read Jon Giorgini's "Understanding Risk Pages"
(http://www.hohmanntransfer.com/by/giorgjon.htm) (i.e. "A risk-page listing is not a *prediction* of impact")

The following objects were removed from NASA JPL's Sentry: Earth Impact Monitoring list from 2021-05-27 to 2021-06-30

Object Designation	Removed (UTC)
2021 MS1	2021-06-30 14:33:28
2021 LF6	2021-06-27 14:32:35
2021 LH6	2021-06-17 14:03:55
2021 LN	2021-06-04 13:32:14
2021 LB	2021-06-03 13:31:45
2021 AS3	2021-05-27 13:32:11

Useful Links:

Guide to Minor Body Astrometry (https://www.minorplanetcenter.net/iau/info/Astrometry.html)

How Are Minor Planets Named? (https://www.minorplanetcenter.net/iau/info/HowNamed.html)

New- And Old-Style Minor Planet Designations (https://www.minorplanetcenter.net/iau/info/OldDesDoc.html)

The Tracking News
(http://www.hohmanntransfer.com/news.htm)

Accessible NEAs
(https://cneos.jpl.nasa.gov/nhats/intro.html)

BRAS Member AstroPhotos

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

Please read the article below. Then, take smartphone moon shots this summer and send your best one in for inclusion in the August and September newsletters.

Here's how . . . (next page)

Astrophotography With Your Smartphone

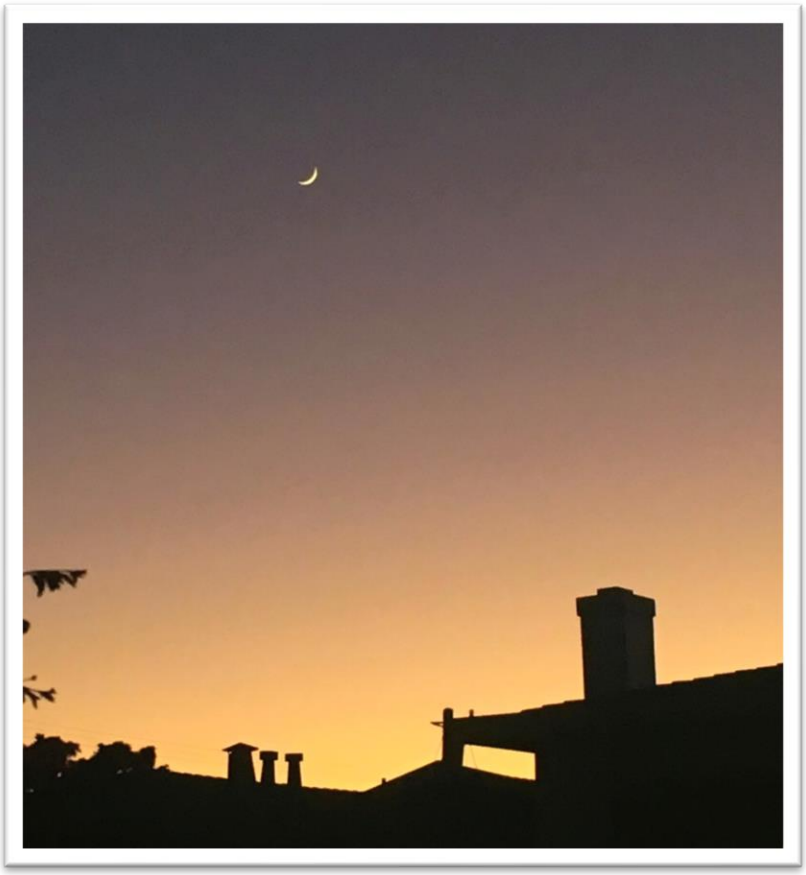
David Prosper

This article is distributed to NSN Partners by NASA Night Sky Network

Have you ever wanted to take night time photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, **anyone with a camera can take astrophotos; even if you have a just smartphone, you can do astrophotography**. Seriously!

A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!

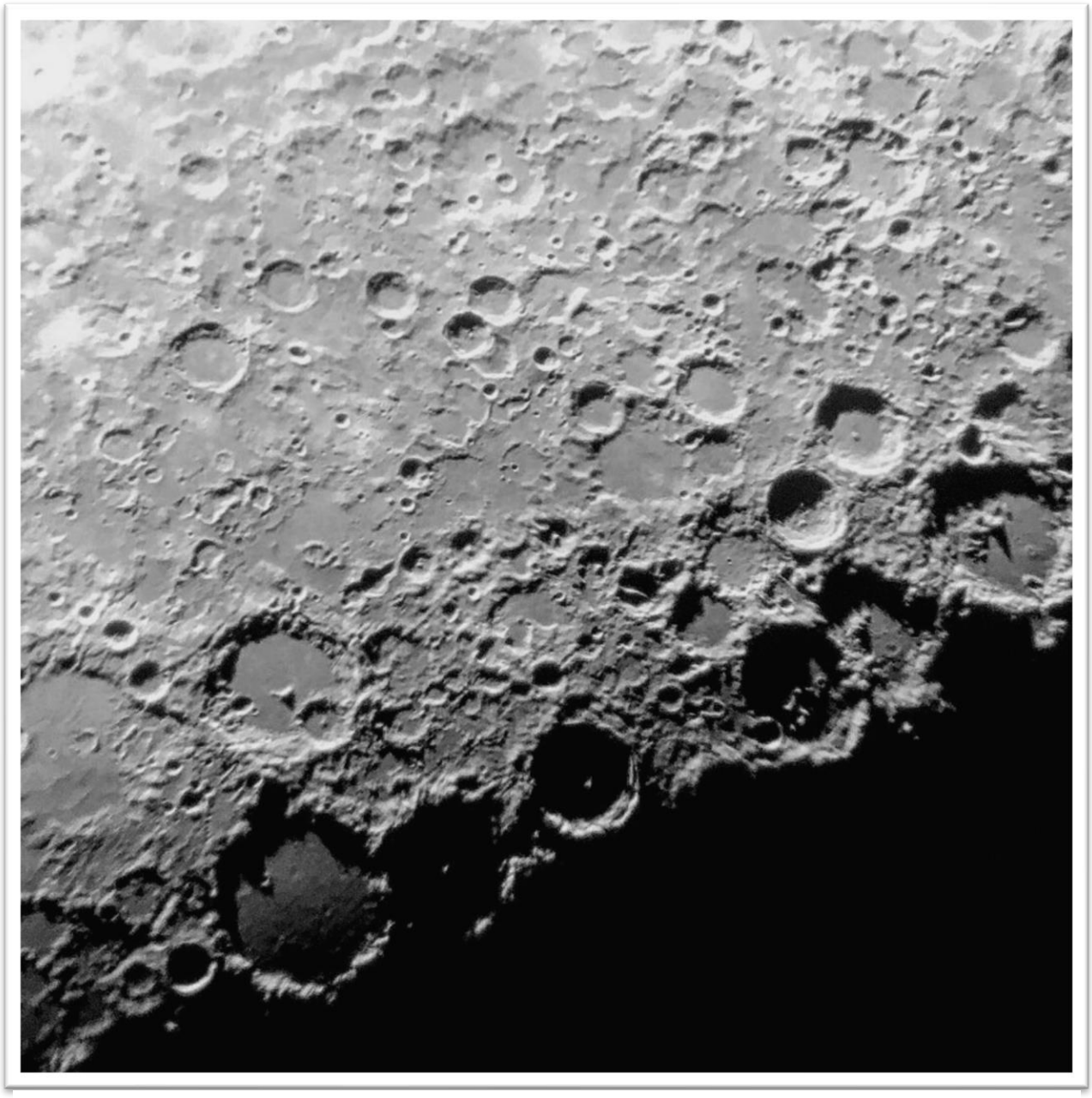
Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch.



Most camera apps offer timer options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using

an app on your phone or computer to bring out additional detail! **Post-processing is the secret of all astrophotography.**

You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. **NASA has a free eBook with extensive tips for smartphone astrophotography** at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at nightsky.jpl.nasa.gov. May you have clear skies!



The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters

OBSERVING NOTES APRIL

Canes Venatici – The Hunting Dogs

Position: RA 19, Dec. -25°

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

Named Stars

Cor Caroli (Alpha² CVn), "Charles's Heart", or "Al Kabdal al Asad", "The Liver of the Lion", and "Chang Chen", "a seat", mag. 2.89, 12 56 01.84 +38 19 05.7, is a wide double star, with each component being a spectroscopic binary star. The primary, **Alpha² Canum Venaticorum**, is a blue dwarf star showing an overabundance of certain metals, and has an unusually strong and variable magnetic field. Its atmosphere has overabundances of the elements europium, mercury, silicon, strontium, and chromium. The secondary star, **Alpha¹ Canum Venaticorum**, at magnitude 5.61, 12 56 00.60 +38 18 52.9, is a yellow dwarf star. This binary star marks the position of the collar on the southern dog, named **Chara**. The separation between the primary and secondary stars is 19.4", or about 640 a.u. The primary, **Alpha²**, is also known as **HD 112413**, **HIP 63125**, **ADS 8706**, **SAO 63257**, **HR 4915**, **Σ 1692**, and **12 Canum Venaticorum**. The secondary, **Alpha¹**, is also known as **HD 112412**, **HIP 63121**, **HR 4914**, **Σ 1692**, and **12 Canum Venaticorum**.

Chara (Beta CVn), "Joy", and Asterion", "Little Star", mag. 4.24, 12 33 45.09 +41 21 24.4. "**Chara**" was originally used for the southern dog along with "**Cor Coroli**", but is now used for the northern dog, named **Asterion**. Also known as **HD 109358**, **HIP 61317**, **SAO 44230**, **HR 4785**, and **8 Canum Venaticorum**.

Xiäng (5 CVn), mag. 4.77, 12 24 01.48 +51 33 44.0, is a suspected eclipsing binary star. Also known as **HD 107950**, **HIP 60485**, **HR 4716**, and **5 Canum Venaticorum**.

La Superba (Y CVn), mag. 5.42, 12 45 07.83 +45 26 24.8, is one of the reddest stars in the sky, and believed to be in the last stages of fusing helium into carbon. It is losing mass in a relatively fast rate, and is surrounded by a circumstellar dust shell. It is a semi-regular variable star (magnitude 4.86 to 5.88 in 267.8 days), and is the brightest J-star (J-stars are the rare carbon stars containing an abundance of the Carbon^{13} isotope). The star is located 7º north and 2.5º west of **Alpha Canum Venaticorum**. Also known as **HD 110914**, **HIP 62223**, **152 Schjellerup**, **HR 4846**, and **Y Canum Venaticorum**.

Tuiren (HAT-P-36), mag. 12.26, 12 33 03 +44 54 55, has one transiting planet named **Bran**, with an orbital period of 1.3 days. Also known as **2MASS J12330390+4454552**.

Deep Sky:

M3 (NGC 5272), mag. 6.8, 13 42 11.6 +45 26 24.9, 18' in size, is a globular cluster; medium concentration of stars; extremely bright and very large. It contains over 450,000 stars; over 274 variable stars – more than any other globular cluster; has 133 **RR Lyrae** type stars; and has 5 blue straggler stars. The stars at its center are rotating around a common axis. The cluster, over 11.4 billion years old, extends 220 light years. To find the cluster, start at **Beta Comae Berenices** (4th magnitude), and then move 0.5º north and then 6º east. There is a 5.5 magnitude star about 30' to its southwest. The

whole cluster has a bluish glow, and is one of the three brightest globular clusters in the northern sky. **NGC 5263** is 29' to the west. Also known as **Mel 119**, and **CGCG 1339+286**.

M51 (NGC 5194), "The Whirlpool Galaxy", mag. 8.1, 13 29 52.7 +47 11 43.9, 11.2'x6.9' in size, is a spiral galaxy with four concentric coils (arms). The galaxy contains many super-giant stars, and has two principle dust lanes. An irregular companion, **NGC 5195** (**M51 B**), is connected to the main galaxy by an extension of one of the spiral arms, indicating some kind of tidal action between the two. Some of the features of the galaxy are a southern tidal tail, a plume extending 20' from the center to the northwest, and a tenuous three-pronged structure of gas known as the "crown". To find, start at **Eta Ursae Majoris** (**Alkad**) – the eastern most star in the "**Big Dipper**" asterism and the tip of the tail of **Ursa Major** – and move 3.5º to the southwest. **NGC 5198** is 32' to the south. Also known as **Arp 85**, **Lord Rosse's Nebulae**, and the **Question Mark Galaxy**.

M51B (NGC 5195), mag. 9.5, 13 29 59.6 +47 15 58, 5.8'x4.6' in size, is a satellite galaxy of **M51** (**NGC 5194**), and is interacting with it. It has about 50 huge red stellar conglomerations referred to as "faint, fuzzy star clusters". Also known as **UGC 8494**, **PGC 47413**, **Arp 85**, and **H1-186**.

M63 (NGC 5055), "The Sunflower Galaxy", mag. 8.6, 13 15 49.3 +42 01 45.4, 12.6'x7.2' in size, is a very bright and large galaxy; very small, bright nucleus. This galaxy has a very tightly wound spiral pattern; the two best spiral arms can be traced for about ¼ a turn, and dust clouds can be seen lying across the spiral arms themselves. To find the galaxy, move 2º north and 3.5º east of **Alpha Canum Venaticorum**, to a little group of three stars containing 20 **Canum Venaticorum**. The galaxy is a little less than 2º north of this star. The galaxy has a dwarf companion, **UGCA 342** (**PGC 46093**). Also known as **PGC 46153**.

M94 (NGC 4736), "The Cat's Eye Galaxy", "The Croc's Eye Galaxy", mag. 8.1, 12 50 53.1 +41 07 12.6, 14.4'x12.1' in size, is a large, very bright, irregularly round galaxy; extremely bright nucleus; no spiral arms; very faint outer ring (about 15' in size). The galaxy forms an isosceles triangle with the stars **Alpha** and **Beta Canum Venaticorum**. It is suspected that this galaxy contains little, if any, dark matter. To find, move 2.75ºnorth and 1º west of **Alpha Canum Venaticorum**. This galaxy is in the **M94 Galaxy Group**, and is part of the **CVn I** cluster of galaxies. Also known as **UGC 7996**.

M106 (NGC 4258), mag. 8.3, 12 18 58.1 +47 18 13.4, 18.6'x7.2' in size, is a very bright, very large, and very elongated galaxy; small, bright nucleus in a bright bulge. Its anomalous arms are strong, non-thermal radio emitters in which the emissions cover an area about twice as large as its visual extent. It is classified as a Seyfert II galaxy, one that has unusual emission lines and emits X-rays, which is why it is suspected of having a super massive black hole at its center. There is a ring of water masers surrounding the nucleus, rotating at about 1000 km/second, causing two bi-polar jets. **M106** was added to the Messier list in 1947 by Helen Sawyer Hogs. To find the galaxy, move 1.4º south of the 5th magnitude star **3 Canum Venaticorum**. There is a companion galaxy, **NGC 4248**, 13' to the west-northwest. **NGC 4217** is 34' to the west-southwest, **NGC 4220** is 45' to the northwest, **NGC 4346** is 49' to the east-southeast, **NGC 4144** is 1.4º to the southwest, and **NGC 4096** is 2.1º to the west. **M106** is part of the **CVn II Cluster** of galaxies. Also known as **UGC 7353**, **PGC 39600**, and **H5-43**.

NGC 4530, mag. 4.3, 12 33 48 +48 41 21, is one star.

NGC 4631, "The Whale Galaxy", "The Herring Galaxy", mag. 9.2, 12 42 12 +32 33, 12.5'x1.2' in size, is a very bright, very large, and extremely elongated galaxy; edge on; star attached. **NGC 4627**, 2.5' to the north-northwest, is a dwarf companion, and is interacting with **NGC 4631**. There is a giant, diffuse corona of X-ray emitting gas surrounding the entire galaxy. Located 5.2º north-northeast of **Gamma Comae Berenices**. **NGC 4656** is 32' to the southeast. Also known as **C 32**, **UGC 7865**, **Arp 281**, and **Best 38**.

NGC 4449, "The Rectangle", mag. 9.6, 12 28 12 +44 05, 6.2'x4.4' in size, is a very bright and quite large galaxy; faint nucleus. Contains more than 60 star clusters, with over 80 more objects considered cluster candidates. It is a member of the **CVn I** galaxy group. Located almost 3º north-northwest of **Beta Canum Venaticorum** (**Charta**). **UGC 7577** is 36' to the south. Also known as **C 21**, **UGC 7592**, **PGC 40973**, **MCG +7-26-009**, **H1-213**, and **Best 36**.

NGC 4490, mag. 9.6, 12 30 35.8 +41 38 26, 6.4'x3.3' in size, is a very bright, very large, and very

elongated galaxy. Along with **NGC 4485** (the southern of the pair), it forms the interacting system Arp 269. An X-ray source is a rare X-ray binary system consisting of a black hole primary and a Wolf-Rayet companion in a 6.4 hour orbital period. There have been several supernovas – one in 1982 and one in 2008. Located 42' northwest of **Beta Canum Venaticorum**. Also known as **UGC 7651**, and **PGC 41333**.

NGC 4214, mag. 9.8, 12 56 36 +36 19, 7.0'x4.5' in size, is a quite bright, quite large, and slightly elongated face on starburst galaxy. In 1954, at the southern edge of the outer disk, a supernova was discovered, and it ranks as the fourth brightest supernova of the 20th century. There are seven candidates for supernova remnants in this galaxy. The galaxy has absorption features – star knots, a ragged central dust lane, and two irregular H II regions. It contains "super" clusters of stars. The north end is an H II galaxy, **WR 145**, and the southern end is an emission line galaxy, **HS 1214+3801**. Located 6.8º southwest of **Beta Canum Venaticorum**, and is a member of the **CVn I** galaxy group. **NGC 4244** is 1.3º to the north-northwest, **UGCA 276** (**PGC 39145**) is 10' to the southwest, and **NGC 4190** is 29' to the northwest. Also known as **UGC 7832**, **MCG +1-32-128**, **H1-95**, and **Best 34**.

Objects beyond magnitude 10 that are of interest:

NGC 4244, "The Silver Needle Galaxy", mag. 10.4, 12 17 29.7 +37 48 25.6, 19.3'x2.1' in size, is a pretty bright, very large, and extremely elongated galaxy; edge on; very small, bright nucleus. It is a long, thin, bright spindle. Located 4.4º southwest of **Chara** (**Beta Canum Venaticorum**). **NGC 4214** is 1.3º to the south-southeast. Also known as **C26**, **UGC 7322**, **H5-41**, and **Best 35**.

NGC 4656, "The Hockey Stick Galaxy", "The Crowbar Galaxy", "The Fishhook Galaxy", mag.10.5, 12 43 57.6 +32 10 13.0, 15.3'x2.4' in size, is a pretty bright, large, and extremely elongated galaxy. On the northeast end is a companion galaxy, **NGC 4657**, magnitude 10.6, 12 44 12 +32 12. Some consider the two to be a single galaxy, misshapen after a close encounter with **NGC 4631**. It is a bright UV source (**NGC 4656UV**). **NGC 4657** is the "hook". Also known as **UGC 7905**, **H1-176**, and **MCG +5-30-066**.

NGC 4151, "The Eye of Sauron", mag. 10.8, 12 10 32.6 +39 24 20.9, 6.3'x4.5' in size, is a very bright, small, and round galaxy; extremely bright, small nucleus (it has X-ray flares in the nucleus). It is a Seyfert galaxy. Located 4.5º west-southwest of **Beta Canum Venaticorum** (**Chara**). **NGC 4156** is 5' to the northeast, **IC 3022** is 40' to the southwest, **NGC 4145** is 29' to the north-northwest, and **NGC 4244** is 2º to the southeast. Also known as **UGC 7166**, **CGCG 215-045**, **MCG +7-25-044**, and **KUG 1208+396A**.

NGC 5395, "The Heron Galaxy", mag. 11.4, 13 58 24 +37 26, 2.6'x1.3' in size, is a quite faint, quite large, and elongated galaxy; single arm; small, bright nucleus. It is in contact with **NGC 5394** (mag. 13.0, 13 58 36 +37 27, 0.5'x0.5' in size, also known as **UGC 8898**, and **H1-191**) that is 1.9' to the north-northwest. Also known as **UGC 8900**, **H1-190**, and **Arp 84(2)**, **VV 048a**, **CGCG 191-026**, **MCG +6-31-034.**

NGC 4485, "The Cocoon Galaxy", mag. 11.9, 12 30 31.1 +41 42 04.2, 2.5'x1.8' in size, is a bright, pretty small, irregularly round galaxy. It is paired with **NGC4490** (the southern galaxy), and the two form an interacting system **Arp 269**. Located 3.3' north-northwest of **NGC 4490**. Also known as **UGC 7648**, **H1-197**, **VV 030b**, **CGCG 216-007**, **MCG +7-26-013**, and **KPG 341A**.

NGC 4627, "The Club", mag. 12.4, 12 42 00 +32 34, 2.2'x1.7' in size, is a faint, small, and roundish galaxy; has a diffuse counter-tail. It is a dwarf companion galaxy to **NGC 4631** (**The Whale Galaxy**) that is 2.5' to the south-southeast, and the two are interacting. Also known as **UGC 7860**, **Arp 281**, **PGC 42620**, **CGCG 188-015**, **MCG +6-28-019**, Holm 442B, and **KUG 1239+328A**.

CVn I, "CVn Dwarf Galaxy", mag. 13.9, 13 28 03.5 +33 33 21, 17.8' in size, is a part of the **CVn I Galaxy Group** (about 40 members of this group). Also known as **PGC 4689223**.

NGC 4774, "The Kidney Bean Galaxy", mag. 14.3, 12 53 06 +36 49, 0.6'x0.4' in size. Also known as **H3-618**, and **MCG +6-28-037**.

CVn II, mag. 15.1, 12 57 10 +34 19 15, 3.2' in size. Also known as **PGC 4713558**.

KKR 03, mag. 15.68, 14 07 10.7 +35 03 37, is a dwarf irregular galaxy, 980 light years in diameter. Also known as **LEDA 166185**, and **PGC 166185**.

TON 618, mag. 15.9, 12 28 24.9 +31 28 38, is a hyper-luminous galaxy and a blazer. It contains a black hole of 66 million solar masses. Also known as **BZ 1225+317**, and **7C 1225+3145**.
Twin Quasar, mag. 17.2 and 19.0, 12 18 41.1 +50 15 34, is a gravitational lensed quasar.
Upgren 1, 12 35 +36 22, 15' in size, is the remnant of an open cluster.
CVn Supervoid, is the 2nd largest (largest in the **Northern Galactic Hemisphere**) confirmed void (1 to 1.3 billion light years in diameter). It has 17 galaxy clusters in it. Also known as **AR-Lp 36**.

Here is a list of the objects in Canes Venatici: 247 NGC; 80 IC; 309 UGC; 2 UGCA; 252 MGC; 14 Arp; 4 Caldwell; 1 Mel; 14 PGC; 147 Herschel; 11 Quasar; 7 Radio galaxies; 7 Abell; 6 CGCG; 2 HCG; 1 Holmberg; 1 Upgren; CVn I and II; 1 Mrk, 1 1Zw; 1 TON; 1 KKR; 1 SDSS; 35 VV; 7 Ring Galaxies; 7 Galaxy Trios; 1 Gravitational Lensed galaxy; 7 Flat Galaxies; 2 Variable Galaxies; and 1 Rose Galaxy for a total of 1179 objects.

Other Stars:

7 CVn, mag. 6.21, 12 30 03.1 +51 32 08.1, is a binocular triple star (magnitudes 6.2, 10.4, and 9.0); with the AB separation being 109", and the AC separation is 229". Also known as **HD 108845**, **HIP 60988**, and **HR 4761**.
HD 109995, mag. 7.64, 12 38 47.6 +39 18 31.6, is a horizontal branch star. Also known as **HIP 61696**.
HD 115781, mag. 8.13, 13 18 51.94 +33 26 19.3, is a rotating ellipsoidal variable star with a period of 18.692 days. Also known as **HIP 64956**, and BL **Canum Venaticorum**.
HD 115444, mag. 8.97, 13 16 42.46 +36 22 52.7, is a barium star. Also known as **HIP 64786**.
TX CVn, mag. 9.34, 12 44 22.07 +36 45 50.7, is a rotating ellipsoidal variable star with a period of 199.75 days.

Stars beyond magnitude 10 that are of interest:

Gliese 521, mag. 10.26, 13 39 24.10 +46 11 1.4, is a red dwarf star with a possible planet in orbit. Also known as **HIP 66625**, **GJ 521**, and **BD +46 1889**.
Gliese 490, mag. 10.52, 12 57 40.26 +35 13 30.0, is a binary variable flare star, with a period of 3.17 days. Also known as **HIP 63253**, and **BF Canum Venaticorum**.
UX CVn, 12 14 48.5 +36 38 49.3, is both a rotating ellipsoidal variable star and an eclipsing binary star.
HAT-P-12, mag. 12.84, 13 57 33.48 +43 29 36.7, has a transiting planet with a period of 3.21 days, and one unconfirmed planet with a period of 8.85 days. Also known as **GSC 03303-00706**, and **2MASS J13573347+4329367**.
DG CVn, mag. 12.19, 13 31 46.62 +29 16 36.7, is a flare star.

Asterisms:

San Kung, "The Three Honorary Guardians of the Heir Apparent", is composed of the three stars in or near the head of **Asterion** (the northern dog).
Al Karb al Ibl, "The Camel's Burden", is composed of the stars of the heads of the dogs.

Stars in Canes Venatici:

10 Σ; 2 OΣ; 59 Lettered; 22 Numbered; 2 Greek Lettered; 1 β; 1 h; 1 A; and 1 Ho, a total of 99.

Sky Happenings: July, 2021

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

July 1st - **Last Quarter Moon** occurs at 4:11 AM CDT.
July 2nd - Dusk: Low above the west-northwest horizon you can find **Venus**, in **Cancer**, near the **Beehive Cluster** (**M44**), with **Mars** about 5º to 6º to their upper left.
July 4th - The **Moon** passes 2º south of **Uranus** at 10 AM CDT,
Mercury is at greatest western elongation (22º) at 3 PM CDT.
July 5th - The **Moon** is at apogee (251,867 miles or 405,341 km from **Earth**) at 9:47 AM CDT,
Earth is at aphelion (94.5 million miles or 152,100,527 km from the **Sun**) at 5 PM CDT.

July 6th - Dawn: The waning crescent **Moon**, in **Taurus**, is about halfway between **Aldebaran** and the **Pleiades**.

July 7th - Dawn: The **Moon** is between the **Bull's Horns**, forming a wide triangle with **Aldebaran** and **Mercury**. **Mercury** is very low in the east-northeast, and will soon be washed out by the rising **Sun**.

July 8th - The **Moon** passes 4º north of **Mercury** at 12 AM (midnight) CDT,
Dawn: The **Moon**, one day short of new, is now 4.5º to the left of **Mercury**.

July 9th - New Moon occurs at 8:17 PM CDT. (Lunation 1219)

July 11th - Dusk: The two-day old **Moon** forms a line about 6º long with **Venus** and **Mars**, low in the west-northwest horizon.

July 12th - The **Moon** passes 3º north of **Venus** at 4 AM CDT,
The **Moon** passes 4º north of **Mars** at 5 AM CDT,
Mars is at aphelion (154.9 million miles from the **Sun**) at 7 PM CDT,
Dusk: **Venus** and **Mars** are within 0.5º of each other, with the **Moon** hovering to their upper left.

July 13th - **Venus** passes 0.5º north of **Mars** at 2 AM CDT.

July 16th - Evening: The waxing crescent **Moon**, in **Virgo**, is about 6º from **Spica**.

July 17th - **First Quarter Moon** occurs at 5:11 AM CDT,
Asteroid **Hebe** is at opposition at 6 AM CDT,
Pluto is at opposition at 6 PM CDT.

July 18th - Asteroid **Pallas** is stationary at 3 PM CDT.

July 19th - Evening: The waxing gibbous **Moon** is about 1º from **Beta Scorpii**, with **Antares** to the lower left.

July 21st - The **Moon** is at perigee (226,503 miles or 364,520 km from **Earth**) at 5:24 AM CDT,
Venus passes 1.2º north of **Regulus** at 2 PM CDT.

July 23rd - **Full Moon** occurs at 9:57 PM CDT.

July 24th - Dawn: The **Moon**, one day past full, and **Saturn** form a graceful vertical pair in the southwest, with **Jupiter** to the upper left,
The **Moon** passes 4º south of **Saturn** at 12 noon CDT.

July 25th - Dawn: The waning gibbous **Moon** is between **Jupiter** and **Saturn** in the southwest,
The **Moon** passes 4º south of **Jupiter** at 8 PM CDT.

July 26th - Dawn: Above the southwest horizon the **Moon** is 5º below **Jupiter**.

July 27th - The **Moon** passes 4º south of **Neptune** at 1 PM CDT.

July 29th - **Mars** passes 0.7º north of **Regulus** at 11 AM CDT,
Double shadow transit of **Jupiter** starts at 3:06 PM CDT,
Dusk: **Mars** and **Regulus** are low on the western horizon, with **Venus** at their upper left.

July 30th - All night: The **Southern Delta Aquariid** meteor shower peaks,
Asteroid **Victoria** is at opposition at 8 AM CDT.

July 31st - **Last Quarter Moon** occurs at 8:16 AM CDT,
The **Moon** passes 1.8º south of **Uranus** at 7 PM CDT.

Planets:

Mercury – **Mercury** reaches greatest western elongation (22º) from the **Sun** on July 4th, when it will rise 80 minutes before sunrise. It will be low in the eastern sky, at magnitude 0.5. **Aldebaran**, in **Taurus**, will rise a half-hour earlier, and will be 11.5º due west of the planet when it rises. On the 7th, the planet will glow at magnitude 0.2, and will stand 8º below the waning crescent **Moon**. On the 8th, the planet, at magnitude -0.1, will be level with the thin crescent **Moon** (2.4% illuminated) above the horizon, with both rising 85 minutes before the **Sun**. At 60 minutes before sunrise they will stand only 3.5º high in the east, with **Zeta Taurii** 0.5º above the planet. On the 12th, at magnitude -0.3, the planet will stand 3º high an hour before sunrise. On the 15th, the planet and the star **Mu Geminorum**, only 7º high at start of civil twilight, will be only 5' apart above the east-northeast horizon. By the 19th, the planet has brightened to magnitude -1.0, and at 45 minutes before sunrise it is only 3º high. The planet will sink quickly over the next week,

becoming lost in twilight as it approaches next month's superior conjunction on August 1st.

Venus – Venus, at magnitude -3.9, will be low in the west-northwest sky soon after sunset, positioned just to the right (north) of the **Beehive Cluster** (**M44**), or **Praesepe**, in **Cancer**. The planet is just 1.5º to the west. The objects are only 10º high a half-hour after sunset. On the 2nd, the planet is within the northern regions of **M44**, with the planet setting around 10 PM local time. The planet is an 89% lit gibbous disk spanning 11" through a telescope. On the 11th, the planet crosses into **Leo**, with a two day old crescent **Moon** joining it in the western sky with **Mars** – the two planets are less than 1º apart, with the **Moon** about 5º to the right of **Venus**. On the 12th, the **Moon** is east of the planets, with **Mars** nearly 33' due south of **Venus**. On the 21st, **Venus** is 1.1º north of **Regulus**. The planet continues to cross **Leo** throughout the last 10 days of the month, and spans nearly 13" by the end of the month.

Mars – Mars, 7º east of **Venus**, shines at magnitude 1.8 on July 1st. On the 11th, **Venus** and the **Moon** join the planet, with **Venus** at magnitude -3.9 at just 1º to the right of **Mars**, with the lunar crescent about 5º to the right of **Venus**, low in the west-southwest as twilight dims. **Mars** and **Venus** close the separation to just a little more than 0.5º on the 12th before they begin to move apart. On the 28th, **Mars** is slightly northwest of Regulus, in **Leo**, and slightly northeast of the star on the 29th. On the 29th, the planet and the star will be separated by only 37' as they hang low in the west-northwest during twilight. It is most likely that after this, **Mars** will not be seen until it emerges at dawn late in November after its October conjunction with the **Sun**. See while you can!

Jupiter – Jupiter is entering the peak viewing season for 2021. The planet rises an hour before midnight on July 1st, and by the end of twilight at the end of the month. The planet is moving retrograde in **Aquarius**, near its border with **Capricornus**, and lies about 20º east of **Saturn**. The planet shines at magnitude -2.7 most of the month, reaching magnitude -2.8 by the end of the month. Telescopic views show a 48" wide disk. On the 24th/25th evening, the nearly full **Moon** is flanked by **Jupiter** and **Saturn**, as the trio rise in the southeast. On the evening of the 25th, the rising **Moon** will be 4.5º below and slightly right of **Jupiter**. There will be a double shadow transit on **Jupiter** on the 29th. It starts with **Callisto's** shadow's ingress at 10:57 AM CDT, followed by **Io's** shadow's ingress at 3:06 PM CDT. **Io** starts transit at 3:38 PM CDT, followed by **Callisto's** shadow's egress at 3:40 PM CDT. **Callisto** starts transit ingress at 4:11 PM CDT. **Io's** shadow will egress at 5:24 PM CDT, followed by **Io's** egress at 5:56 PM CDT. **Callisto** will egress from transit at 8:32 PM CDT. There is one mutual satellite event this month (moons eclipsing moons). On July 5th, from 5:54 AM CDT to 5:57 AM CDT, **Io** will eclipse **Europa**.

Saturn – Saturn is within a month of its August 2nd opposition, and will rise around 10 PM local time on July 1st. At local midnight it is more than 16º high in the southeast, reaching meridian around 3 AM local time. By month's end, it reaches meridian about two hours earlier. On the evening of July 4th/5th, the planet is 1' due east of **IC 1339** (14th magnitude). The planet will brighten from magnitude 0.3 to +0.2 by the end of the month in **Capricornus**. A telescope will reveal its 18" diameter disk, with the ring system spanning 42" on its long axis, and 12" along its short axis. The planet's polar diameter of 17" shows off more of the south polar region than in recent years. The moon **Titan**, magnitude 8.5, will lie north of the planet on the 2nd and 18th, and south of the planet on the 10th and 26th. Three smaller moons, (**Tethys**, **Dione**, and **Rhea)**, at 10th magnitude, orbit closer to the planet. **Enceladus**, at 12th magnitude, hugs the outer regions of **Ring A**. **Iapetus** will reach western elongation (9' due west of the planet), at 10th magnitude on the 4th. By the 24th, **Iapetus** will dim to near 11th magnitude while in superior conjunction. On the 24th, late in the evening, the full Moon is flanked by **Jupiter** and **Saturn** as the trio rise in the southeast.

Uranus – Uranus, an hour before dawn, is high in the southeast among the faint stars of southern **Aries**, at magnitude 5.8, and is visible with binoculars. On July 1st, the planet is 12' due north of the 5.8 magnitude star **Omicron Arietis**. During July, the planet will trek northeastward and is nearly 1º from **Omicron Arietis** on the 31st, and 14' due north of a faint (magnitude 6.7) field star. Through a telescope, the planet forms a 4" wide blue-green disk. A waning crescent **Moon** lies in the vicinity of the planet the morning of July 4th, with the planet 4.5º to the northeast of the **Moon**.

Pluto – Pluto, at magnitude 14.3, will need a dark sky and an 8" or larger telescope to see it. The planet is in eastern **Sagittarius**. By my estimate, the planet will be around 19 51 40 -22 30 15 on July 3rd. It is moving retrograde at about 10' every 4 days, and will end the month, by my estimate, at about the position of 19 48 45 -22 40.

Moon – The **Moon** is at apogee on July 5th, and perigee on the 21st. On the 29th, the waning gibbous **Moon**

will interfere with viewing the peak of the **Southern Delta Aquariid** meteor shower.

Favorable librations: **Lagrange Crater** on the 8th; **Belkovich Crater** on the 22nd; **Mare Humboldtianum** on the 23rd; and **Compton Crater** on the 24th.

Greatest north declination on the 9th (+25.5º)

Greatest south declination on the 23rd (-25.5º)

Libration in longitude: East limb most exposed on the 27th (+6.2º)
West limb most exposed on the 14th (-5.6º)

Libration in latitude: North limb most exposed on the 27th (+6.6º)
South limb most exposed on the 14th (-6.7º)

Asteroids / Minor Planets Asteroid **1 Ceres** – **Ceres** position, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On July 25th – 03 47.97 +13 25.6, at magnitude 9.1.

Asteroid **2 Pallas** – **Pallas's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On July5th – 23 32.73 +08 37.6, at magnitude 9.9; on the 15th – 23 34 34 +08 17.0, at magnitude 9.8; and on the 25th – 23 34.11 +07 37.7, at magnitude 9.6.

Asteroid **4 Vesta** – **Vesta's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On July 5th – 11 48.41 +08 37.8, at magnitude 7.7; on the 15th – 12 02.63 +06 43.2, at magnitude 7.8; and on the 25th – 12 17.66 +04 44.4, at magnitude 7.8. **Vesta's** positions, ***by my estimates***, are as follows: On July 1st – about 0.8º due north of **Xi Virginis**; on the 5th – about 1.2º due east of **Xi Virginis,** or just over 1º north-northeast of **Nu Virginis**; on the 10th – about 1.3º northwest of **Pi Virginis**; on the 15th – about 0.7º due east and a little south of **Pi Virginis**; on the 20th – just over 3ºeast and a little south of **Pi Virginis**; on the 25th – about 1.2º north and a little west of **16 Virginis**, or less than 1º west and a little north of **M61**; on the 27th – 20' south of **M61**; and on the 30th – 1.5º east and a little north of **16 Virginis**, or just on the west edge of **NGC 4457**.

Asteroid **6 Hebe** – **Hebe's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On July 5th – 19 50.37 -08 43.9, at magnitude 8.6; on the 15th – 19 41.43 -10 02.9, at magnitude 8.4; and on the 25th – 19 31.89 -11 38.9, at magnitude 8.4. **Hebe's** positions, ***by my estimates***, are as follows: On July 3rd – just over 2.3º north and a little south of **51 Aquilae**; on the 7th – about 2º north and a touch west of **51 Aquilae**; on the 11th – just under 2º northwest of **51 Aquilae**; on the 15th – about 1.5º east and a little north of **37 Aquilae**; on the 19th – about 0.6º east and a touch south of **37 Aquilae**; on the 23rd – just under 1º southwest of **37 Aquilae**; on the 27th – about 2º southwest of **37 Aquilae** – just over the border into **Sagittarius**; and on the 31st – about 3º southwest of **37 Aquilae** – just over the border into **Sagittarius**.

Asteroid **89 Julia** – **Julia's** positions, according to the ***RASC Observer's Handbook, 2021 USA Edition***, are as follows: On July 15th – 22 34.95 -05 25.5, at magnitude 9.9; and on the 25th – 22 30.76 -03 53.7, at magnitude 9.6.

Asteroid **349 Dembowska** – **Dembowska's** position, according to the ***RASC Observer's Handbook***, ***2021 USA Edition***, are as follows: On July 25th – 21 59.80 -25 21.1, at magnitude 9.9.

Comets **–** Comet **4P/Faye** (a morning object) – Faye's positions, according to ***ALPO***, are as follows: On July 1st – 01 57 36 +13 47, at magnitude 12.1 in **Aries**; on the 11th – 02 24 12 +15 24, at magnitude 11.8 in **Aries**; on the 21st – 02 51 36 +16 47, at magnitude 11.5 in **Aries**; and on the 31st – 03 19 36 +17 52, at magnitude 11.2 in **Aries**. **Faye's** positions, ***by my estimates***, are as follows: On July 1st - 4º due south of **Iota Arietis**; on the 5th – 4.5º southeast of **Iota Arietis**; on the 10th - 5º due south and a little east of **Theta Arietis**; on the 15th – about 6.3º northwest of **38 Arietis**, or 2.5º west-northwest of **Omicron Arietis**; on the 20th – about 1º south of **Pi Arietis**; on the 25th – about 2º east and a little south of **Rho Arietis**; and on the 30th – about 2.5º southeast of **Delta Arietis**.

Comet **6P/d'Arrest** (an evening object) – **d'Arrest's** positions, according to ***ALPO***, are as follows: On July 1st – 16 13 06 +14 56, at magnitude 16.5 in **Heracles**; on the 11th – 16 09 48 +11 53, at magnitude 15.9 in **Serpens**; on the 21st – 16 10 54 +07 55, at magnitude 15.2 in **Serpens**; and on the 31st – 16 16 48 +03 13, at magnitude 14.5 in **Serpens**.

Comet **8P/Tuttle** (morning object, parent of the **December Ursid** meteor shower) – **Tuttle's** positions, according to ***ALPO***, are as follows: On July 1st – 05 24 48 +39 08, at magnitude 12.7 in Auriga; on the 11th – 06 02 06 +35 25, at magnitude 12.1 in **Auriga**; on the 21st – 06 37 54 +30 47, at magnitude 11.4 in **Auriga**; and on the 31st – 07 12 00 +25 14, at magnitude 10.7 in **Gemini**.

Comet **15P/Finlay** (a morning object) – **Finlay's** positions, according to ***ALPO***, are as follows: On July 1st – 02 44 42 +12 51, at magnitude 10.9 in **Aries**; on the 11th – 03 30 00 +17 22, at magnitude 10.4 in **Taurus**; on the 21st – 04 14 06 +20 57, at magnitude 10.0 in **Taurus**; and on the 31st – 04 56 18 +23 36, at magnitude 9.9 in **Taurus.**

Comet **67P/Churyumov-Gerasimenko** (a morning object, a contact binary, and site of the **ESA Rosetta** orbiter and the **Philae** lander) – **67P's** positions, according to ***ALPO***, are as follows: On July 1st – 00 29 54 -01 21, at magnitude 15.2 in **Cetus**; on the 11th – 00 50 12 +00 40, at magnitude 14.8 in **Cetus**; on the 21st – 01 11 36 +02 48, at magnitude 14.3 in **Pisces**; and on the 31st – 01 34 30 +05 02, at magnitude 13.8 in Pisces.

Comet **C/2021 A1 (Leonard)** – **Leonard's** positions, according to ***ALPO***, are as follows: On July 1st - 10 28 00 +51 35, at magnitude 17.0 in **Ursa Major**; on the 11th – 10 28 42 +49 45, at magnitude 16.8 in **Ursa Major**; on the 21st – 10 31 12 +47 59, at magnitude 16.6 in **Ursa Major**; and on the 31st – 10 35 06 +46 17, at magnitude 16.4 in **Ursa Major**.

Meteor Showers – There are two major meteor showers (Class I) active in July. The **Southern Delta Aquariids**, active from July 17th through August 12th, peaks on July 30th with a mzhr of 20; and the **Perseids**, active from July 22nd through August 23rd, peaks on August 12th.

There are two minor meteor showers (Class II) active in July. The **Alpha Capricornids**, active from July 12th through august 12th, peaks on July 30 with a mzhr of 4; and the **Kappa Cygnids**, active from July 28th through September 2nd.

There are no variable meteor showers (Class III) in July.

There are 13 weak meteor showers (Class IV) active in July (all have a mzhr of <2); The **Microscopids**, active from June 25th through July 17th, peaks on July 6th; the **c-Andromedids**, active from June 25th through July 26th, peaks on July 9th; the **July Chi Arietids**, active from June 26th through July 22nd, peaks on July 10th; the **July Pegasids**, active from June 21st through July 28th, peaks on July 10th; the **Phi Piscids**, active from June 11th through July 22nd, peaks on July 11th; the **Northern June Aquilids**, active from June 26th through July 22nd, peaks on July 15th; the **Zeta Cassiopeiids**, active from July 7th through July 18th, peaks on July 16th; the **49Andromedids**, active from July 6thy through august 14th, peaks July 20th; the **Tau Cetids**, active from July 20th through July 23, peaks July 21st; the **July Gamma Draconids**, active from July 22 through August 2nd, peaks July 28th; the **Eta Eridanids**, active from July 22nd through September 2nd; the **Piscis Austrinids**, active from July 28th through August 18th; and the **August Draconids**, active from July 28th through September 2nd.

When to View the Planets:

Evening Sky	
Venus	**(west)**
Mars	**(west)**
Jupiter	**(east)**
Saturn	**(east)**

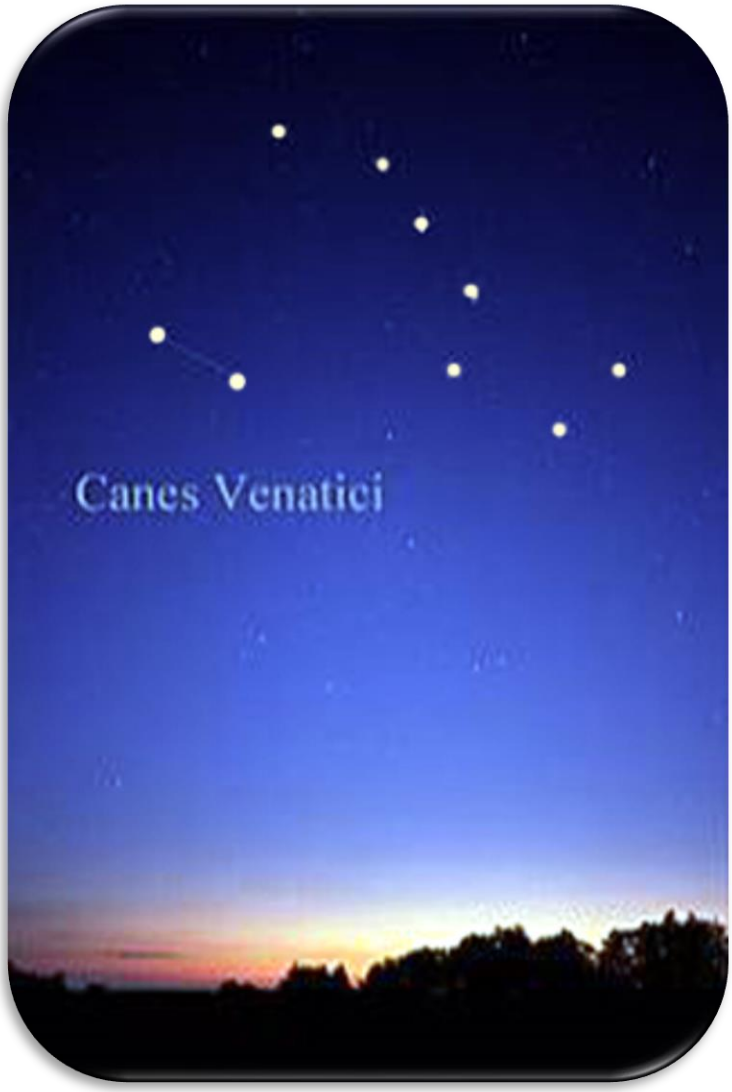
Midnight	
Jupiter	**(southeast)**
Saturn	**(southeast)**
Neptune	**(east)**

Morning Sky	
Mercury	**(east)**
Jupiter	**(south)**
Saturn	**(southwest)**
Uranus	**(east)**
Neptune	**(south)**

Mythology:

Canes Venatici –The Hunting Dogs

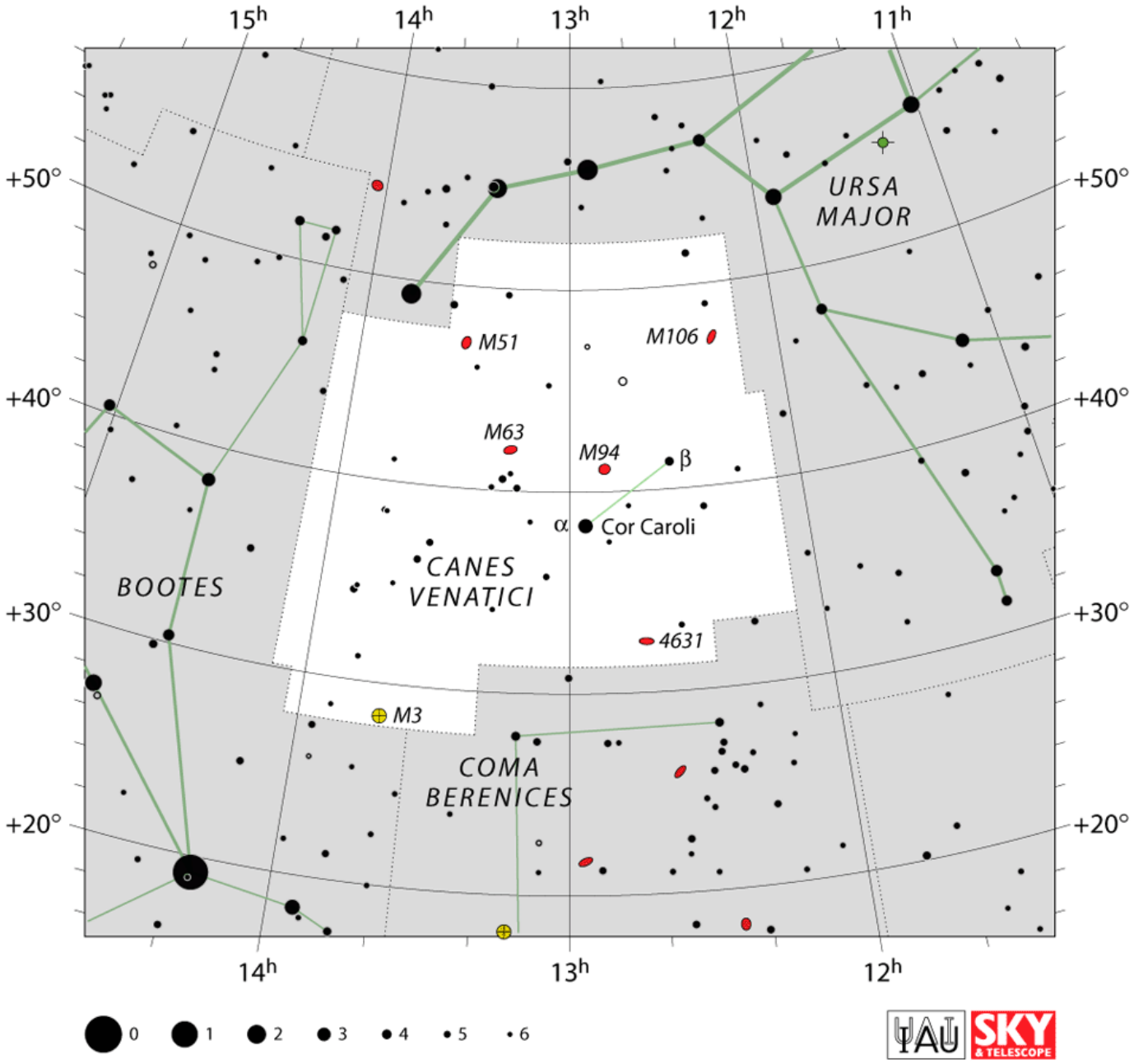
The Polish astronomer Johannes Hevelius formed this constellation in 1687 from stars that had been previously considered part of Ursa Major. Canes Venatici represents two dogs held on a lead by Boötes, snapping at the heels of the Great Bear. The southern dog is represented by the two brightest stars in the constellation, Alpha and Beta Canum Venaticorum.



The star Alpha is known as “Cor Caroli”, meaning “Charles’s Heart”, in honor of King Charles I of England. It was given this title by Sir Charles Scarborough, physician to King Charles II. Scarborough said that the star shone particularly brightly on the night of May 29th, 1660, when King Charles II returned to London at the restoration of the Monarchy. There has been much confusion over which King Charles the star is supposed to commemorate because of this, but it definitely refers to the first King Charles. It was originally shown in 1673 on a star map by the English cartographer Francis Lamb under the name “Cor Caroli Regis Martyris”, a reference to the fact that King Charles I was beheaded. Lamb and others, such as the English man Edward Sherburne in 1675, drew a heart around the star surmounted by a crown, turning it into a mini-constellation.

The star Beta is called “Chara”, from the Greek for “Joy”, the name given by Hevelius to the southern dog. The northern dog, called “Asterion” (starry), is marked only by a scattering of faint stars. Bode drew the dogs with their names written on their collars.

Canes Venatici contains a globular cluster of stars, M3, and a beautiful spiral galaxy, M51, called “The Whirlpool Galaxy”. M51 was the first galaxy in which the spiral form was noticed by the Irish astronomer Lord Rosse in 1845. It consists of a large galaxy in near-collision with a smaller Galaxy.


15h
14h
13h
12h
11h
+50°
+40°
+30°
+20°
URSA MAJOR
M51
M106
M63
M94
β
α
Cor Caroli
CANES VENATICI
BOOTES
4631
M3
COMA BERENICES
0
1
2
3
4
5
6
IAU
SKY & TELESCOPE

The End