Newsletter of the Baton Rouge Astronomical Society

Next Meeting: Saturday, July 15th, 11 a.m., at LIGO

(This special meeting will NOT be held at the usual time and place.)

PROGRAM: BRAS Potluck and LIGO Tour

(Laser Interferometer Gravitational-Wave Observatory)

19100 LIGO Lane, Livingston, LA 70754

https://www.ligo.caltech.edu/LA

What's In This Issue?

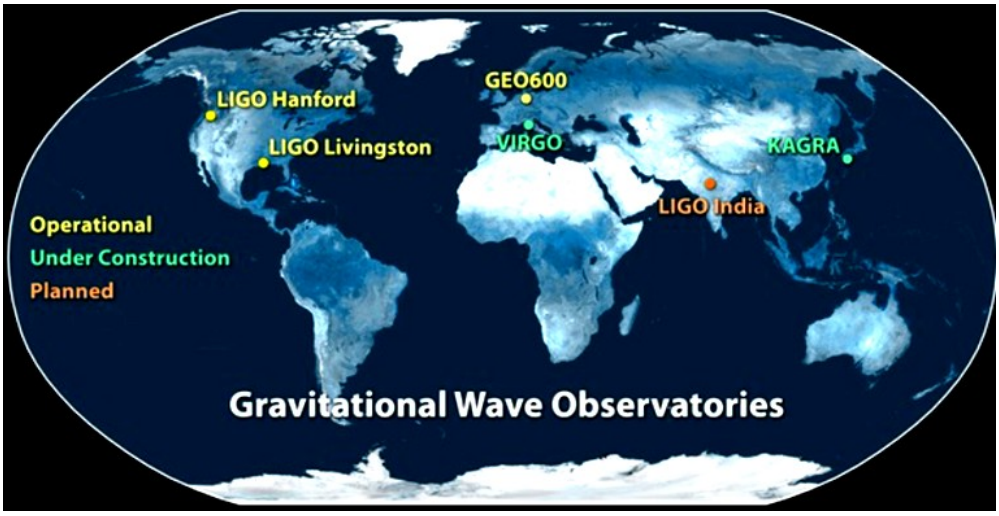
Like this newsletter? See past issues back to 2009 at

http://brastro.org/newsletters.html

President's Message

July is here, half the year is gone. This month's meeting will be at LIGO in Livingston on July 15th, along with the pot luck picnic, gates will open to BRAS members and family members at 11:00 a.m. After the picnic and a short meeting, we will assist LIGO on their public day along with solar viewing. If you and yours have not been to LIGO, you are in for a treat! Open to the public from 1 to 5 p.m.

We will sell a few more tickets for the Meade telescope, and then announce the winner! Last month's riddle winners, Scott Cadwallader, Bart Bennet, and Roz Readinger will get their free raffle tickets for being the first 3 to send me the answer to last month's question, if they show up at the picnic.



In the June issue of Astronomy Magazine, page 65, there was a full page ad for "The Great Courses", featuring Dr. Brad Schaefer's course,

"The Remarkable Science of Ancient Astronomy".

BRAS has purchased a copy of the course, and it is available for any BRAS member to check it out for up to a month.

This month's newsletter is late because of me. It is hard to sit with a leg outstretched and propped up, and type all of the Observing Notes. For those of you who have not heard, I shattered my right heel bone into multiple pieces, and although the foot is in a boot, I cannot put any pressure on it or any weight for at least another month.

The Light Pollution Committee meeting (this month only) will be on Wednesday, July 12, at 5:45 at HRPO, just before the regularly scheduled Business meeting at 6:30 PM. Everyone is invited to attend both or either meetings.

Clear Skies,

John R. Nagle

John R. Nagle
President of BRAS and Observing Chairperson

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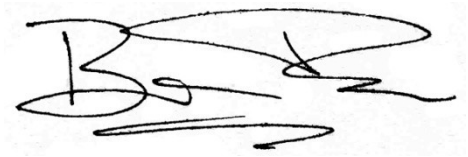
P.S. No riddle this month because there was no raffle at the last meeting. We gave Dr. Gonzalez, our speaker, all the time she wanted.

Secretary's Summary of June Meeting

- Meeting opened by John Nagle (President) 33 people in attendance
- Kathy Holt (LIGO) introduced who in turn introduced our guest speaker, Dr. Gabriela González
- Dr. Gonzalaz gave a talk about work being done a LIGO
- Short break where we got a group photo
- Call to order for business
- Don Weinell's book has been released
- July meeting will be at LIGO on July 15th at 11am
- New HRPO shirts are ready to order
- Upcoming HRPO events mentioned by Chris Kersey
- Raffle for ETX 90 winning ticket to be drawn at the LIGO meeting in July
- Chris Raby mentioned some helpful tips for observing the Solar Eclipse
- Merrill mentioned a previous guest speaker and the possibility of another visit. (Regarding microbial life in space.)
- Meeting adjourned

Clear Skies,



Ben Toman
BRAS Secretary (For all the good I'm worth!)

2017 Officers:

President: John Nagle
Vice-President: Craig Brenden
Secretary: Ben Toman
Treasurer: Trey Anding

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

Committees/Coordinators:
Outreach:
Ben Toman
Observing:
John Nagle
Light Pollution:
Thomas Halligan
Webmaster:
Frederick Barnett
Newsletter:
Michele Fry

Observing Clubs & How To Earn Awards

(excerpt from our website) **www.brastro.org**

"Astronomical observing is the primary activity of most amateur astronomers. . . . In order to bolster interest . . . and provide some observing goals for novice and advanced observers alike, the **Astronomical League**, of which all B.R.A.S. members are a part of, offers their **Observing Club Awards**.

Inspired by their idea, **B.R.A.S. is now offering our own Observing Club Awards.** Many of these clubs are simply scaled down versions of the same clubs offered by the Astronomical League. By following the same guidelines and recording procedures outlined by the AL clubs but requiring fewer observations, obtaining an Observing Award from B.R.A.S. should be within reach of even the busiest part-time observer. Also, in most cases, any observations made towards a B.R.A.S. Observing Award will count toward the same award for the Astronomical League."

Want to get started? Check out **Observing Clubs** on our website menu.

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BRAS Outreach Report

Hi Everyone,

Summer is upon us, but we've still been fairly active as far as Outreach. A big thank you to Chris Kersey for hitting all of the library outreaches so far. There are a few left this Summer!

Also, Chris Raby and his wife were able to go twice to the Military Kids Camps in Bunkie to provide some nighttime and solar observing for the campers and counselors. He said they had a great time and it was definitely something we should do again in the future.

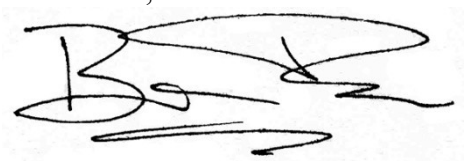
Finally, we closed out June 2017 with some night sky viewing at the Renaissance Baton Rouge Hotel. We were fortunate to have some very clear sky, but it was pretty steamy. We got to show people the Moon and Jupiter (until they went behind the building) and ended with great views of Saturn. We got a couple of people ready to go buy their first telescopes! Thanks to Chris Raby, Bill Arcediano, Craig Brenden and Ben Toman for coming out for this one.

As I mentioned, here are the few remaining library outreaches this Summer. Requests for the fall will start to come in, so be on the lookout for some notifications. Also, we'll be taking the steps to getting everyone access to the Night Sky Network site soon. We've been keeping up with that and subsequently received two new Outreach Tool Kits. Our Magnetic Sun and Space Rocks. Both of these will be a lot of fun to implement at some of our outreach events.

Monday, 3 July, Scotlandville Community Library, 7373 Scenic Highway
Thursday, 6 July, Eden Park Community Library, 5131 Greenwell Springs Road
Monday, 10 July, Carver Community Library, 720 Terrace Street

Thursday, 13 July, Bluebonnet Regional Library, 9200 Bluebonnet Boulevard

Clear Skies,



Ben Toman
Outreach Coordinator

Here's a picture from our June Outreach Event at the Renaissance Hotel

L to R: Ben Toman, Chris Raby,
Bill Arcediano. Not pictured: Craig Brenden

AKA: "4 Gung-Ho Guys"

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BRAS Light Pollution Committee Report

This month only, the meeting will take place at HRPO before the Business Meeting at 5:45 on June 12th. This is because the regular meeting is going to be a potluck, set for 11 a.m. on Saturday at LIGO.
One does not need to be a BRAS member to attend.

Several items are on the agenda, including how to achieve in 2017 the goal of 200 GaN measurements that was *not* reached in 2016.

Thomas Halligan
Light Pollution Chairperson

Space is right overhead—double stars, nebulae, the Milky Way Galaxy and other galaxies. We can see it if we let it through.

Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum. There are also nine active polls. The Forum has reached 4600 posts.

Christopher Kersey reports there were "no forum updates of note" to report for June.
I suspect everyone was taking advantage of the last of the Spring weather to plant flowers in their moon gardens.

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20/20 Vision Campaign

GLOBE at Night: 15 to 24 July [Hercules]

OBSERVATIONS NEEDED FOR SCHOOL PROJECT

BRAS is in the process of assisting yet another student at St. Joseph's Academy acquire raw data. This young lady (named Shreya) will need data concerning how light pollution effects the view of certain variable stars while they are at their minima.

Below is our suggested list of variable stars for Shreya. Dates are the times during which the star is at least thirty degrees above the horizon at 9pm Standard Time and 10pm Daylight Time. All periods (time from maximum to maximum) are fewer than ninety days. All chosen stars have a difference of at least 1.0 between maximum and minimum magnitude.

RX Leporis
Magnitude Range: 5.4 to 7.4 Period: 75 days Class: K
Dates: 11 December to 9 March

T Monocerotis
Magnitude Range: 5.6 to 6.6 Period: 27 days Class: G
Dates: 14 December to 12 April

S Leporis
Magnitude Range: 6.0 to 7.6 Period: 89 days Class: K
Dates: 12 January to 4 March

ST Ursae Majoris
Magnitude Range: 6.0 to 7.6 Period: 81 days Class: M
Dates: 12 February to 15 July

g Herculis
Magnitude Range: 4.4 to 6.0 Period: 80 days Class: M
Dates: 29 April to 28 September

R Lyrae
Magnitude Range: 3.9 to 5.0 Period: 46 days Class: M
Dates: 5 June to 6 November

Sheliak
Magnitude Range: 3.3 to 4.4 Period: 12.9 days Class: B
Dates: 8 June to 31 October

X Cygni
Magnitude Range: 5.9 to 6.9 Period: 16.4 days Class: F
Dates: 5 July to 29 November

Algol
Magnitude Range: 2.1 to 3.4 Period: 2.87 days Class: B
Dates: 9 October to 9 March

Observations should only be made when the Moon is below the horizon. Each observation should include the location's GLOBE at Night measurement or SQM measurement. Use all of these parameters to report your results to observatory@brec.org.

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Messages from HRPO

Highland Road Park Observatory

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

7 July: "Wonders of the Summer Sky" The temperature heats up as July's constellations settle high overhead early in the night. BREC Education Curator Amy Brouillette takes the audience on a fascinating tour of Baton Rouge's summer season. She highlights the celestial gems that will sparkle throughout the next three months—gems that visitors will be able to see live if they continue to visit HRPO!

14 July: "The Uses of Mapping" The nonprofit LARSGIS Institute will present an overview of geospatial technology; explain how it can apply to archaeology, engineering and the military; and show an example of "storymapping" with Scott Kelly's Year in Space!

21 July: "South Pole Science" Americans have occupied and worked continuously at the South Pole since 1956. The famous Dome of the South Pole Station was closed in 2007 after more than thirty years in action; a new elevated structure took over as the main building in 2008. BREC Center Supervisor Tom Northrop reveals the scientific secrets from the "bottom of the world"!

28 July: "Great American Eclipse Preview" The 21 August solar eclipse is talk of every town in America! Do you still have time to plan a trip to the path of totality? If you stay in Baton Rouge, what will you see? The presentation will also cover safety guidelines for viewing the Sun.

SCIENCE ACADEMY

Saturdays from 10am to 12pm
For ages eight to twelve. $5/$6 per child.

1 July: "Expedition 6"
8 July: "Mercury"
15 July: "Summer Day"
22 July: "Saturn"
29 July: "Cadet's Choice"

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ONE-TIME CALLS FOR VOLUNTEERS

***Saturday 22 July, 7pm to 10pm.** *One or two volunteers.* **Evening Sky Viewing Plus.** Telescope operation, physical science demonstrations, front desk duty. Low to moderate difficulty.

***Saturday 29 July, 12pm to 2pm.** *One or two volunteers.* **Solar Viewing.** Telescope operation, physical science demonstrations, front desk duty. Low to moderate difficulty.

***Friday 11 August, 10pm to 2am**. *One or two volunteers.* **Perseid Meteor Shower.** Front desk duty, telescope operation, monitoring. Low difficulty.

***Monday 21 August, 11am to 3pm**. *Three or four volunteers.* **Partial Solar Eclipse.**

Telescope viewing, front desk duty, eclipse explanations. Low to moderate difficulty.

ONGOING CALL FOR VOLUNTEERS

HRPO periodically needs BRAS volunteers for crafting (gluing, cutting, painting, etc.); training is offered for these easy to moderate tasks. We also have plenty of "grunt work". We are asking any members with the time to do so to assist. Thank you.

Perseid Meteor Shower

Friday, 11 August from 10pm to 2am
No admission fee. For all ages.

ABOUT THE PERSEIDS: The Perseids are one of the major meteor showers of the year, caused by debris left from the passings of Comet Swift-Tuttle. Come learn about meteors and let's see if we can spot some "earthgrazers." Although telescopes aren't needed for the Perseids, we'll have a telescope available from 10:00 pm to midnight for leisurely gazing at other celestial objects. But look fast for the meteors; Perseid meteoroids hit our atmosphere traveling about sixty kilometers a second! If you're lucky, you may see a fireball…
POSITION OF THE MOON: The Moon, sadly, will interfere with viewing during the last half of this viewing program. The waning gibbous Moon will be in the constellation Cetus during this event and will rise at 10:30 pm CDT.

OTHER OBJECTS FOR VIEWING
10pm to 11pm = Saturn
11:30pm to 12am = Neptune

Partial Solar Eclipse

Friday, 21 August from 11am to 3pm
No admission fee. For all ages.

Ten of millions of Americans will view live and in real time the stunning sight of the Moon passing in front of the Sun. For those fortunate souls within a narrow track, this eclipse will be total! The eclipse, sadly, will *not* be total in the Baton Rouge area. However, the phenomenon will still yield a wonderful partial eclipse of the Sun.
LIVE FEEDS FROM TOTALITY LOCATIONS: HRPO will provide live feeds from at least three different locations within the path of totality.
SOLAR VIEWERS: Beginning 21 July, HRPO will have hundreds of solar viewers for sale to high schoolers and adults. They will be $2.00 each (tax already included) and can be sold at a maximum of two per purchaser per day.

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Observing Notes:

by John Nagle

Scorpius – The Scorpion

Position: RA 16.8875, Dec. -30.7367°

Named Stars

Antares (Alpha Sco), "The Rival of Mars", Cor Scorpionis", "The Heart of the Scorpion", "Kalb al-Akrab", mag. 0.91, 16 29 24.47 -26 25 55.0, is a red giant star that is the 16th brightest in the night sky. **Alpha Scorpii** is a visual binary star. The secondary star, **Alpha B Scorpii**, is a 6.5 magnitude green star with a separation of 3.0" from **Alpha A Scorpii**.

Acrab (Beta Sco), "al-Agrab", "The Scorpion", also called "Graffias", "The Claws", mag. 2.62, 16 05 26.23 -19 48 19.4, is a six star system divided into two parts – each consisting of three stars. **Beta Sco** appears as a binary star with the two components separated by 13.5 arc seconds. The brighter of the two components is itself a binary star with an orbital period of 610 years, ant it's own brighter component is a spectroscopic binary, with the components separated by only 1.42 milli-arc seconds, and orbiting each other every 6.82 days. The other visual component also has two sub-components with an angular separation of 0.1328 and an orbital period of 39 years. The dimmer sub-component is yet another spectroscopic binary star with an orbital period of 10.7 days.

Dschubba (Delta Sco), from the Arabic "jabhat", "the forehead", mag. 2.29, 16 00 20.01 -22 37 17.8, is a triple star system. **Delta Sco** has a companion star orbiting it every 20 days and another star in a very eccentric orbit around the primary with a period of 10 years.

Sargas (Theta Sco), of Sumerian origin with meaning unknown, mag. 1.86, 17 37 19.13 – 42 59 52.2,is a bright yellow giant star with a mag. 5.36 companion located 6.470 arc seconds away. Just 1.7° south is **NGC 6388**, and 2.3° southeast is the planetary nebula **IC 4663**.

Apollyon (Iota Sco), the Bayer designation is shared by two stars. Iota¹ Sco mag. 2.99, 17 47 35.08 -40 07 37.1, is an evolved star on the verge of becoming a supergiant star. **Iota¹ Sco** has a 10th magnitude companion at a separation of 37.5 arc seconds. **Iota² Sco**, mag. 4.78, 17 50 11.11 -40 05 25.5, is a supergiant star with an 11th magnitude star as a companion at a separation of 32.6 arc seconds**. Iota² Sco** lies 15" to the east of **Iota¹ Sco**. The galactic star cluster **H17** is about 1.2° to the west.

Girtab (Kappa Sco), in Sumerian "Scorpion", mag. 2.39, 17 42 29.28 -39 01 47.7, is a spectroscopic binary star that can't be resolved with a telescope. They have an orbital period of 196 days. **Kappa Sco** is located 2½° southeast of **Lambda Sco**. The faint galactic cluster **H 17** is 1° to the south-southwest, and **Iota Sco** is about 1.4° to the southeast.

Shaula (Lambda Sco), "The Sting", mag 1.62, 17 33 36.53 -37 06 13.5, is a triple star system, and the 25th brightest star in the night sky. **Lambda Sco B** has a separation of 42 arc seconds from **Lambda Sco A**, and **Lambda Sco C** is at 12th magnitude at 95 arc seconds away from **Lambda Sco A**. The small galactic star cluster **H 16** is 0.5° to the northwest, and **NGC 6400** is 1.3-° east and slightly north. Due to **Lambda Sco** being in close proximity to **Upsilon Sco**, the bright pair have earned the nickname **"Cat's Eyes".**

Denebakra (Mu Sco), shared by two star systems separated by 0.1°. Mu¹ Sco, mag. 2.99, 16 51 52.24 -38 02 50.14, is a binary system with a period of 1.44027 days, classified as an eclipsing binary star of the **Beta Lyrae** type, with the primary being a main sequence star. **Mu² Sco**, mag. 3.56, 16 52 20.15 -38 01 02.9, is a sub-giant star. The separation between **Mu¹ Sco** and **Mu² Sco** is about 55,000 **AU**, or 0.88 light years. **NGC 6281** lies 2.3° to the east, and **NGC 6242** lies about 1.5°to the south-southeast.

Jabbah (Nu Sco), "forehead", mag. 4.00, 16 11 59.74 -19 27 38.3, is a quintuple star system, with component **A** being a spectroscopic binary star, composed of two groups of stars separated by 41 arc seconds, called **A** and **C**. Stars **A** (mag. 4.4) and **B** (mag. 5.4) have a separation of 1.2"; Stars **C** (mag. 6.3, 16 11 58.60 -19 26 59.0) and **D** (mag. 8.0) separated by 2.3". **Nu Sco** is in the midst of a large, but faint nebulosity, **IC 4592**, and illuminates it.

Girtab (Xi Sco), mag. 4.77, 16 04 22.10 -11 22 23.0 (**Xi A Sco**) is a sextuple star system. **Xi B Sco**, mag. 5.07, 16 04 22.3 -11 22 18.0, forms a close binary with **Xi A Sco**, with a period of 45.7 years and a separation of 0.39". **Xi C Sco** is separated from the pair **A-B** by 7.4", is an orange dwarf star at mag. 7.2, and is in a slow retrograde motion around the system with a period that probably exceeds 1000 years. The double star ∑ **1999** (Struve 1999), located 283' to the south, is a physical member of the **Xi Sco** system. The Struve components are 11.4" apart, at mag. 7.4 and 8.1, and a projected separation from **Xi A-B** of about 7,000 AU.

Iclil (Pi Sco), mag. 2.89, 15 58 51.12 – 26 06 50.6, is a triple star system, with the brightest components forming an eclipsing binary (period of 1.571 days) classified as a **Beta Lyrae** type. Both stars are hot, blue-white dwarf main sequence stars, and are rapid rotators with a projected rotational velocities of 108 km/s and 87 km/s. Separation is believed to be only about 15 solar radii. The third component is a distant companion at mag. 12.2 and a separation of at least 7,000 **AU.**

Al Niyat (Sigma Sco), "an-niyāt", "the arteries", shares the name with **Tau Sco** (these two stars mark the arteries around the scorpion's heart), mag. 2.90, 16 21 11.32 -25 35 33.9, is a multiple star system. The brightest star in the system is a spectroscopic binary star, composed of two unresolved stars orbiting each other every 33.01 days. The primary is a giant star classified as a **Beta Cephei** type variable star. The other component of this system is a main sequence star. There is another star in the system orbiting the main pair at a separation of ½ arc second. At a separation of 20 arc seconds, a dwarf star at mag. 8.7 is also orbiting the main pair. **M 4** lies about 1° to the south-southeast.

Al Niyat (Tau Sco), name shared with **Sigma Sco** (see above), mag. 2.82, 16 35 52.96 -28 12 57.5, is a hydrogen fusing blue-white dwarf star with a strong, complex magnetic field. About 1° to the east-northeast lies the faint double star **h4878**, a pair of stars at mag. 8.5 each, and a separation of 8" from **Tau Sco**. The southern components are a very close and equal pair of about 0.1" separation.

Lesath (Upsilon Sco), "lasά", "pass (orbiting) of a poisonous animal", mag. 2.70, 17 30 45.84 -37 17 44.7, is a blue sub-giant star, located in the scorpion's stinger, close to **Lambda Sco**, and the two form a pair sometimes known as the "**Cat's Eyes**" (a separation of 35' between them). Galactic cluster **H 16** is 0.5° north of **Upsilon Sco**.

Jabhat al Akrab (Omega Sco), "the forehead of the scorpion", is a binary system with **Omega¹ Sco** at mag. 3.93, 16 06 48.43 -20 40 08.9, being a blue-white dwarf star. **Omega² Sco**, mag. 4.31, 16 07 24.30 -20 52 07.2, is a bright yellow giant star. Separation between the two stars is 0.24°.

Deep Sky:

M4 (NGC 6121), mag. 5.9, 16 23.6 -26 32, 34' in size, is a globular cluster with a low concentration of stars; very well resolved; interior appears to contain a line of stars; elongated vertically. Located approximately 1° west of **Antares (Alpha Scorpii)**. Brightest star is at mag. 10.8. The total number of stars down to magnitude 19.3 has been counted 10,300. A millisecond pulsar was found in 1987, the first observed in a globular cluster, that spins 10 times faster than the **Crab Nebula** pulsar. In 1995, **M4** was found to contain white dwarf stars – with a planet orbiting one of them, and is believed to be as old as the cluster itself (13 billion years). **NGC 6144** is 50' to the east-northeast (30' northwest of

Antares).
M6 (NGC 6405), "The Butterfly Cluster", mag. 4.2, 17 40.1 -32 13, 15' in size, is an open cluster of 80 stars; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 6.2. Age of the cluster is believed to be about 95 million years. **NGC 6383** is 1.2° to the west-southwest, and **NGC 6416** is 50' to the east. **NGC 6404** is 1°south of **M6. M7** is located about 3½° to the southeast.
M7 (NGC 6745), "The Ptolemy Cluster", mag. 3.3, 17 53.9 -34 49, 80' in size, is an open cluster of 80 stars; detached, weak concentration of stars; moderate range in brightness; very large, very bright; magnitude of brightest star is 5.6. **M7** is 220 million years old. **M7** was first reported as a glowing region of faint stars by *Ptolemy* circa 130 AD. **NGC 6453** is 20' to the northwest, and 45' southeast is galactic cluster **H18.**
M80 (NGC 6093), mag. 7.2, 16 17.0 -22 59, 8' in size, is a globular cluster with a high concentration of stars; large, very bright, well resolved, extremely rich. **M80** contains hundreds of thousands of stars. A nova, **Nova 1860 AD**, was observed on April 21, 1860 – its progenitor star was **T Scorpii**. **M80** is located halfway between **Antares (Alpha Sco)** and **Acrab (Beta Sco),** and just below the parallel of **Delta Sco. M4** is 4° to the southeast.
NGC 6231, Caldwell 76, Collinder 315, Melotte 153, Dunlop 499, "The Northern Jewel Box", Table of Scorpius, mag. 2.6, 16 54.0 -41 48, 15' in size, is an open cluster of 120 stars; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 4.7; bright, quite large. This cluster is involved in a very large (about 6°) emission nebula that is best seen with a nebula filter. The brightest star in the group is **van den Bos 1833**, a splendid binary star. Located less than 1° north of **Zeta Sco**, with **Zeta¹ Scorpii** a member of the group. **NGC 6231** is believed to be around 3.2 million years old.
NGC 6281, mag. 5.4, 17 04.8 -37 54, 7' in size, is an open cluster of 70 stars; detached, weak concentration of stars; moderate range in brightness; magnitude of brightest star is 7.9; large cluster4; involved in a large, faint emission nebula. Believed to be 220 million years old. **NGC 6281** is the brightest open cluster in **Scorpius**. Located about 2° east of **Mu Scorpii.**
NGC 6383, mag. 5.5, 17 34.8 -32 34, 5' in size, is an open cluster of 40 stars; not well detached from the surrounding star field; large range in brightness; magnitude of brightest star is 5.6. **NGC 6383** is involved in a faint, large (80'x30') emission nebula.
NGC 6416, mag. 5.7, 17 44.4 -32 21, 18' in size, is an open cluster of 40 stars; not well detached from the surrounding star field; small range in brightness; magnitude of brightest star is 8.4; very large cluster.
NGC 6124, Caldwell 75, Dunlap 514, Melotte 145, Collinder 301, mag. 5.8, 16 25.6 -40 40, 28' in size, is an open cluster of 100 stars; detached, weak concentration of stars; large range in brightness; magnitude of brightest star is 8.7; bright, large. **NGC 6124** is 51 million years old.
NGC 6322, mag. 6.0, 17 18.5 -42 57, 10' in size, is an open cluster of 30 stars; detached, strong concentration of stars; moderate range in brightness; magnitude of brightest star is 7.5; very large cluster; cluster is 10 million years old.
NGC 6242, mag. 6.4, 16 55.6 -39 30, 8' in size, is an open cluster of 40 stars; detached, strong concentration of stars; magnitude of brightest star is 7.3; bright and large; cluster is 51 million years old.
Tr 27, mag. 6.7, 17 36.2 -33 29, 7' in size, is an open cluster of 35 stars; detached, strong concentration of stars; moderate range in brightness; magnitude of brightest star is 8.4.
NGC 6388, mag. 6.8, 17 36.3 -44 44, 6' in size, is a globular cluster with a high concentration of stars; very bright, large, and round.
NGC 6178, mag. 7.2, 16 35.7 – 45 38, 4' in size, is an open cluster of 12 stars; detached, strong concentration of stars; large range in brightness; magnitude of brightest star is 8.4; small, bright.
NGC 6425, mag. 7.2, 17 46.9 -31 32, 7' in size, is an open cluster of 35 stars; detached, strong concentration of stars; small range in brightness; magnitude of brightest star is 10.2; pretty small.

NGC 6441, mag. 7.2, 17 50.2 -37 03, 10' in size, is a globular cluster with a high concentration of stars; very bright, pretty large, and round. Located less than 3 arc minutes east of mag. 3.3 **G Scorpii**
Tr 29, mag. 7.5 (photo), 17 41.6 -40 06, 8' in size, is an open cluster of 30 starts; detached, weak concentration of stars; large brightness range.
Tr 28, mag. 7.7, 17 36.8 -32 29, 7' in size, is an open cluster of 30 stars; detached, weak concentration of stars; moderate brightness range; magnitude of brightest star is 9.8; involved in nebulosity.
NGC 6259, mag. 8.0, 17 00.7 -44 40, 10' in size, is an open cluster of 120 stars; detached, no concentration of stars; moderate range in brightness; magnitude of brightest star is 11.6; bright, very large; cluster age is 220 million years.
Cr 338, mag. 8.0 (photo), 17 38.2 -37 34, 25' in size, is an open cluster of 40 stars; detached, no concentration of stars; moderate brightness range.
NGC 6249, mag. 8.2, 16 57.6 -44 47, 6' in size, is an open cluster of 30 stars; detached, weak concentration of stars; small brightness range; magnitude of brightest star is 9.8.
NGC 6451, "Tom Thumb Cluster", mag. 8.2 (photo), 17 50.7 -30 13, 7' in size, is an open cluster of 80 stars; detached, weak concentration of stars; small range in brightness; brightest star is about mag. 12.0 (photo); pretty large, with a central dark lane.
NGC 6192, mag. 8.5 (photo), 16 40.3 -43 22, 7' in size, is an open cluster of 60 stars; detached, strong concentration of stars; moderate range in brightness; pretty large, irregularly round; brightest star is at magnitude 11.0 (photo).
NGC 6396, mag. 8.5, 17 38.1 -35 00, 3.0' in size, is an open cluster of 30 stars; detached, weak concentration of stars; large brightness range; magnitude of brightest star is 9.8.
NGC 6496, mag. 8.6, 17 59.0 -44 16, 3.3' in size, is a globular cluster with a low concentration of stars; pretty large and elongated.
Tr 24, mag. 8.6 (photo), 16 57.0 -40 40, 60' on size, is an open and poor cluster; no well detached from background stars; moderate range in brightness; involved with nebula **IC 4628**.
NGC 6144, mag. 9.0, 16 27.2 -26 02, 16' in size, is a globular cluster with a low concentration of stars; quite large and very well resolved.
NGC 6139, mag. 9.1, 16 27.7n -38 51, 7' in size, is a globular cluster with a high concentration of stars; large range in brightness; magnitude of brightest star is 9.3; quite large; age is 630 million years.
NGC 6302, "Bug Nebula", Butterfly Nebula", Caldwell 69, mag. 9.6, 17 13.7 -37 06, 49" in size, is a bipolar planetary nebula, pretty bright; an elongated figure eight; photo mag. is 12.8; central star, 10th magnitude, is fainter than magnitude 21 (photo) due to dust covering it; expansion velocity is 8 km/sec (5 miles/sec). Huge amounts of dust lie within the nebula – very special dust. Early studies show the dust to be composed of hydrocarbons, carbonates, and iron. At one time, carbonates were believed to be associated with liquid water, and **NGC 6302** is one of only two regions known to contain carbonates – perhaps in a crystalline form. The central star, a white dwarf, has a surface temperature in excess of 200,000 *Kelvin*, which makes it one of the hottest stars in the galaxy. The "butterfly" stretches for more than two light-years.
NGC 6334, "Cat's Paw Nebula", "Bear Claw Nebula", Gum 64, 17 20.5 -35 43, 39'x30' in size, is an emission nebula that has numerous stars involved in several faint, very large patches of nebulosity. It is a vast star forming region and one of the most active stellar nurseries containing some of the most massive stars known in the **Milky Way**. It is believed to contain tens of thousands of stars.
NGC 6357, "War and Peace Nebula", "Lobster Nebula", 17 24.6 -34 10, 50'x39' in size, is a faint, large, elongated, mottled , and irregularly shaped diffuse nebula, containing many proto-stars and young stars. On photographs taken with a red filter, it looks something like a faint version of **M42**. **NGC 6357** got the name "**War and Peace Nebula**" because, when observed in infrared, the nebula's western part resembles a dove, while the eastern part resembles a skull. The nebula contains **Pismis 24,** an open star cluster that includes several very massive stars. One of the stars, designated **Pismas 24-1**, has almost 300 solar masses and it was thought to be the most massive star known until it was discovered to be a binary or multiple star system.

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IC 4592, 16 12.0 -19 28, 2.5°x1.0° in size, is a very large, elongated, and extremely faint nebula; outer region is red due to light from the star **Antares (Alpha Scorpii)**; brightest in region surrounding the star **14 Sco**. Dark nebula **B40** is located in the northeast portion of the nebula.
IC 4601, 16 20.0 -20 02, 19'x9' in size, has stars of 6th and 7th magnitude involved in a large, diffuse nebula consisting of several components. Located between dark nebula **B41** and the southeast part of bright nebula **IC 4592**.
IC 4605, 16 30.2 -25 06, 30' in size, is a very large, extremely faint nebula; illuminated by a magnitude 4.8 star, **22 Scorpii**. Located about 1° north of **Antares (Alpha Sco)** and immediately southwest of dark nebula **B44.**
IC 4606, 16 31.6 -26 03, 60'x40' in size, is a nebulosity surrounding **Antares (Alpha Sco)**.
IC 4628, 16 57.0 -40 20, 90'x60' in size, is an elongated nebula; very irregular shape. Located in northern part of open cluster **Tr 24**, which is on the eastern edge of **Collinder 316**.
vdB 107, Ced 132,16 29.2 -26 27, 90'x80' in size, is a very red nebulosity shining by the reflected light of **Antares (Alpha Sco).**
Beyond magnitude 10: 12 NGC, 2 IC, 1Pk, 1 Abell, 18 Barnard Dark Nebulas, 3 Lynd Dark Nebulas, 4 Sh, 9 SL, and 118 more objects.

Other Stars:

Zeta Sco, this designation is shared by two stars separated by 7 arc minutes. The stars are not physically related, but appear close in our line of sight and form a naked double star. Zeta¹ Sco, mag. 4.70, 16 53 59.73 -42 21 43.3, is a luminous blue hyper-giant star (one of the most luminous stars known) in **NGC 6231**. Zeta² Sco, mag. 3.62, 16 54 35.11 -42 21 38.7, is an orange giant star.
Eta Sco, mag. 3.32, 17 12 09.18 -43 14 18.6, is a yellow-white sub-giant star evolving into a giant star. It is believed to be around 1.1 billiom years old. Eta Scorpii is a rapid rotator, with a projected rotational velocity of 150 km/sec. It emits X-rays, and shows an enhanced abundance of barium in its spectrum.
U Sco, mag. 8.0 to 19.3, 16 22 30.8 -17 52 43.2, is the fastest known nova and one of the ten known reoccurring novae in the **Milky Way Galaxy**. The last eruption was observed in 2010 and the next one is expected to occur in the year 2020.
HD 147513, mag. 5.37, 16 24 01.24 – 39 11 34.8, has a planet in orbit.
HD 147628, mag. 5.42, 16 24 31.77 -37 33 57.5, is a suspected rotating ellipsoidal variable star.
HD 149404, mag. 5.46, 16 36 22.57 -42 51 31.9, is a rotating ellipsoidal variable star.
18 Sco, mag. 5.49, 16 15 37.13 -08 22 05.7, is a solar analog, a yellow main sequence star. It is located on the northern border of the constellation. No planets have been discovered yet orbiting the star.
HD 159176, mag. 5.69, 17 34 42.49 -32 34 54, is a trinary star, a rotating ellipsoidal variable star, and is in **NGC 6383**.
V 1003 Sco, mag. 5.83, 16 38 26.3 -43 23 54.2, is a rotating ellipsoidal variable star.
Gliese 667A, is a triple star system. Gliese 667A, mag. 5.91, 17 18 56.36 -34 59 22.5, is a main sequence star, orbiting Gliese 667B with a period of 42.15 years.
Gliese 667B, mag. 7.24, 17 19 01.94 -34 59 33.3, orbits Gliese 667A.
Gliese 667C, mag. 10.22, 17 18 58.69 -34 59 48.3, is a red dwarf star orbiting **Gliese 667A** and **B** at an angular separation of 30". Two planets orbit **Gliese 667C**, with a third planet a strong possibility.
HD 142250, mag.6.15, 15 54 30.12 -27 20 18.9, has one planet in orbit.
V900 Sc0, mag. 6.29, 16 53 58.85 -41 59 39.6, is a rotating ellipsoidal variable star in **Trumpler 24**.
HD 151932, mag. 6.49, 16 52 19.25 -41 51 16.2, is a *Wolf-Rayet* star in **Trumpler 24**.
4U 1700-37, mag.6.51, 17 03 56.77 -37 50 38.9, is a rotating ellipsoidal variable star and a high-mass X-ray binary star.
HD 160529, mag. 6.66, 17 41 59.03 -33 30 13.7, is a luminous blue variable star.
HD 143567, mag. 7.18, 16 01 55 -21 58 49, has one planet in orbit.
HD 159868, mag. 7.27, 17 38 59.53 -43 08 43.8, is a yellow dwarf star with two planets in orbit.

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HD 153950, mag. 7.39, 17 04 30.87 -43 18 35.2, has one planet in orbit.
HD 145377, mag. 8.2, 16 11 36.45 -27 04 41.4, has one planet in orbit.
HD 144432, mag. 8.19, 16 06 57.95 -27 43 09.8, is a triple star system; a *Herbig Ae/Be* star.
HD 326823, mag. 9.03, 17 06 53.91 -42 39 39.7, is a luminous blue variable star.
HD 162020, mag. 9.12, 17 50 38.35 -40 19 06.1, has a brown dwarf companion.
GSC 06214-00210, mag. 9.15, 16 21 55 -20 43 07, has one planet in orbit.
Pismis 24-1, mag. 10.43, 17 24 43.41 -34 11 56.5, is one of the most luminous stars known. It is the largest star in the open cluster **Pismis 24**, located within nebula **NGC 6357**.
Scorpius X-1, mag. 11.1, 16 19 55.07 -15 38 24.8, is a low mass X-ray binary star composed of a neutron star that drains material off a donor star. **Scorpius X-1** was the first X-ray source discovered outside the solar system, and it is the strongest source of X-rays in the sky second to the **Sun**. The X-ray flux is associated with the star **V 818 Scorpii**, a blue variable star which is the optical counterpoint to **Scorpius X-1.**
PSR B1620-26, mag. 21.30, 16 23 38.22 -26 31 53.8, is a binary star system in **M4**, consisting of a pulsar (**PSR B1620-26A**) and a white dwarf star (**PSR B1620-26B**). A planet was discovered orbiting the two stars in 2000.

Sky Happenings:July, 2017

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

July 1st - The **Moon** passes 3° north of **Jupiter** at 2 AM CDT,
The waning gibbous **Moon** is 5° north of **Spica** and 8° east of **Jupiter**, forming a broad triangle in the southwest.
July 2nd - Asteroid **Juno** is a t opposition at 8 AM CDT,
Mercury passes 5° south of **Pollux** at 7 PM CDT.
July 3rd - **Earth** is at aphelion (94.5 million miles or 152,092 kilometers from the **Sun**) at 3 PM CDT.
July 3 - 7 Dawn: **Venus** shines about 7° south (lower right) of the **Pleiades**, low in the east.
July 5th - The **Moon** is at apogee (252,236 miles from **Earth**) at 11:28 PM CDT.
July 6th - The waxing gibbous **Moon** passes 3° north of **Saturn** at 10 PM CDT.
July 8th - **Full Moon** occurs at 11:07 PM CDT.
July 10th - **Pluto** is at opposition at 12 AM (midnight) CDT.
July 11th - Dawn: **Venus**, low in the east, lines up with the **Pleiades** above , orange **Aldebaran** below.
July 13th - The **Moon** passes 0.9° south of **Neptune** at 1 PM CDT.
July 13/14 Dawn: **Venus** is 3° north (upper left) of **Aldebaran**.
July 14th - **Venus** passes 3° north of **Aldebaran** at 6 AM CDT.
July 16th - **Last Quarter Moon** occurs at 2:26 PM CDT,
The **Moon** passes 4° south of **Uranus** at 7 PM CDT.
July 19th - The **Moon** passes 0.4° north of **Aldebaran** at 7 PM CDT.
July 20th - The **Moon** passes 3° south of **Venus** at 6 AM CDT.
July 21st - The **Moon** is at perigee (224,462 miles from **Earth**) at 12:12 AM CDT.
July 23rd - **New Moon** occurs at 4:46 AM CDT.
July 24th - Dusk: The super thin waxing crescent **Moon** is 5° to the lower right of **Mercury**, very low in the west soon after sunset, with **Regulus** just to **Mercury**'s upper left.
July 25th - The **Moon** passes 0.9° north of **Mercury** at 4 AM CDT,
The **Moon** passes 0.07° north of **Regulus** at 6 AM CDT,
Dusk**: Mercury** is 1° below **Regulus**, very low in the west in the evening twilight,
The crescent **Moon** is 8° east of the **Mercury-Regulus** pair, very low at dusk.
July 26th - **Mercury** passes 1.1° south of **Regulus** at 4 AM CDT,
Mars is in conjunction with the **Sun** at 8 PM CDT.
July 27th - The modest but long lasting **Delta Aquariid Meteor Shower** peaks this morning. The shower

is best observed from southerly latitudes.

July 28th - The **Moon** passes 3° north of **Jupiter** at 3 PM CDT,
Dusk: The thicker waxing crescent **Moon** hangs 3 ° above or upper right of **Jupiter**, with blue-white **Spica** about 8° to their left.

July 30th - **Mercury** is at greatest eastern elongation (27°) from the **Sun** at 12:00 midnight CDT,
First Quarter Moon occurs at 10:23 AM CDT.

Planets:

Mercury – On July 1st, **Mercury** stands 3° high in the west-northwest 30 minutes after sunset. **Mercury** will shine at magnitude -1.0. The planet's altitude doubles by the 9th, when it passes through the northern edge of the **Beehive** star cluster (**M44**). On July 24th and 25th, **Mercury** and **Regulus** are 1° apart. On July 24th, the waxing crescent **Moon** lies 5° to the lower right of the close pair; the following evening, the **Moon** moves 8° to the pair's upper left. **Mercury** shines at magnitude 0.2, and both **Mercury** and **Regulus** climb nearly 10° high in the west a half hour after sunset. **Mercury**'s disk spans 7" and appears about half lit.

Venus – Venus rises about 2½ hours before the **Sun** as July opens and 3 hours before the **Sun** as July closes. Its altitude an hour before sunrise is already almost 20°. During July **Venus** fades perceptibly from magnitude -4.2 to -4.0, as its gibbous phase increases from 63% to 74% sunlit and its disk shrinks from 18" to 15". During the month, **Venus** treks eastward against the backdrop of **Taurus the Bull**. On July 5th, **Venus** is about 7° south (lower left) of the **Pleiades (M45)**. During the next week it skirts the **Hyades**, passing just 3° north of **Aldebaran** on July 13th and 14th. As **Venus** continues its march east, it meets up with a wandering crescent **Moon** on July 20th, with the two lying 3° apart and making a spectacular pair in the morning twilight. Then **Venus** passes less than 1° south of the **Crab Nebula (M1)** on the 26th, and 0.4° north of 3rd magnitude **Zeta Taurii** the following morning. **Venus** spends the final two days of July in the narrow northern sector of **Orion**, approaching **M35** in **Gemini.**

Mars – Mars is too close to the **Sun** for observations in July.

Jupiter – Jupiter dominates the low southwest at dusk. It sets around 1 AM (daylight savings time) as July begins, but about 2 hours earlier as the month ends. The giant planet dims subtly from magnitude -2.0 to -1.9 during July, and shrinks from 37" to 34" wide at the equator. **Jupiter** lies among the background stars of **Virgo**, northwest of the maiden's brightest star, 1st magnitude **Spica**. The gap between the two closes from 11° to 8° during July. A gibbous **Moon** stands nearly 10° to **Jupiter's** upper left on July 1st. On the 28th, a crescent **Moon** passes just 3° above **Jupiter.** Late last year, amateur astronomers noticed an outbreak of storms in **Jupiter's South Equitorial Belt**, the first since 2010-2011. This activity continued into 2017, and likely will endure this summer. Also, keep an eye out for Jupiter's four **Galilean** satellites, **Io, Europa**, **Ganymede,** and **Callisto** (in order of distance from the planet), will show up easily through any telescope. . On July 15, you will find **Callisto** due north of the planet. The orbital plane of the moons now tilts 3° to our line of sight. This slope means that the outermost satellite clears the planet's disk when the two are in conjunction with each other. On July 18th, the moons string out in distance order west of the planet. Astroimagers should try to photograph **Jupiter** on July 31st, when it stands 9' west of 11th magnitude spiral galaxy **NGC 4941**. You will need to take multiple exposures to capture the bright planet, its moons, and the faint galaxy. Once you have the exposures right, you will be ready to shoot on August 1st, when **Jupiter** stands right in front of the galaxy.

Saturn – Saturn is at its highest around midnight on July 1st, but before 10 PM by the month's end. Shining in southeast **Ophiuchus**, above the body of **Scorpius, Saturn** is almost as far south as it can be in the zodiac, and it's rings are now open by 26.7°, very nearly their greatest possible tilt. **Saturn** shines at magnitude 0.2, far brighter than any of the background stars in **Ophiuchus**. A nearly full **Moon** passes 3° north of **Saturn** on the evening of July 6th. **Saturn** peaks some 30° above the southern horizon around midnight, local daylight time, on July 1st, reaching the same position a half-hour earlier with each passing week. Small telescopes will reveal **Saturn**'s 18"-diameter disk and the spectacular ring system that spans 41" and tilts 27° to our line of sight. Any telescope reveals the 8th magnitude moon, **Titan**, which orbits the planet every 16 days. It passes due south of the planet on July 1st and 17th, and due north on the 9th and 25th. The moons **Tethys, Dione**, and **Rhea** all shine at 10thy magnitude and orbit well inside **Titan**'s path. You can spot them through a 4-inch telescope on most clear nights. Their tighter orbits mean they circle **Saturn**

a bit faster than **Titan**, so they change positions significantly from night to night. Distant moon **Iapetus** takes 79 days to complete an orbit around **Saturn**, and barely budges its position most nights. Your best chance to see it comes in the week or so around its July 25 greatest western elongation. **Iapetus** will then shine brightest, at 10th magnitude, some 9' (13 ring diameters) west of **Saturn**.

Uranus – Start searching for **Uranus** in the hour before twilight starts to paint the sky. It then lies 40° high in the east-southeast among the background stars of **Pisces the Fish**, 1° north of magnitude 4.3 **Omicron Piscium**. Although you can see the magnitude 5.8 planet with the naked eye under a dark sky, binoculars make the task much easier. When viewed through a telescope, **Uranus** appears 3.5' across and has a distinctly blue-green color.

Neptune – Neptune rises in the east before midnight, local daylight time, and climbs highest in the south around the time twilight commences. The planet glows at magnitude 7.8, bright enough to show up through binoculars if you know where to look. To find it, first locate 4th magnitude **Lambda Aquarii**. **Neptune** lies 2° east of this star and just south of 6th magnitude **81 Aqr**. **Neptune** begins July 0.2° southeast of **81 Aqr** and moves to a position 0.3° southwest of the star by month's end. A telescope reveals **Neptune**'s 2.3" diameter disk and a subtle blue-grey color.

Pluto – Pluto, at magnitude 14.2, lies 25° east of **Saturn** in **Sagittarius the Archer. Pluto** reaches opposition and peak visibility on the night of July 9th/10th, but it remains a worthy target through an 8-inch or larger instrument all month. To find **Pluto**, start at the **"Teapot Asterism"**. Next, scan north of the teapot's handle to pick-up a chain of four stars – **Rho, Pi, Omicron**, and **Xi² Sagittarii** – that form the constellation's less conspicuous **"Teaspoon Asterism"**. Using magnitude 2.9 **Pi Sgr** as a starting point to star hop to the vicinity of **Pluto**. The star **SAO 187913**, at magnitude 8.18, lies 1.7° east-southeast of **Pi Sgr**. On July 1st, **Pluto** passes 4' due south of magnitude 8.2 **SAO 187934** (about 0.3° east of **SAO 187913**). On July 10th/11th, **Pluto** skims past **SAO 187913** and its magnitude 9.8 neighbor. These two stars appear 37" apart. At 8:30 PM CDT on July 10th, **Pluto** lies 29" due north of the brighter star. At 11:30 PM CDT, **Pluto** appears 23" northeast of this star and just two hours later (at 1:30 AM on July 11th), the gap shrinks to 16". **Pluto** passes only 7" due north of the star at 5 AM CDT.

Earth – Earth arrives at aphelion, its farthest point from the **Sun** in space, at 3 PM CDT on July 3rd. **Earth**'s distance from the **Sun** at aphelion is only 3.3% farther than at perihelion in January.

Moon – The waxing gibbous **Moon** forms a triangle with **Jupiter** and **Spica** on the evening of July 1st. The nearly full **Moon** beams just above **Saturn** on July 6th. The waning lunar crescent nears **Aldebaran** and the **Hyades** at dawn on July 19th, and it is about 3° to the lower right of **Venus** the next morning. The waxing crescent **Moon** hangs 4° to 5° to the lower right of the **Mercury-Regulus** pairing about 30 minutes after sunset on July 24th, and the next evening it is about 8° to the upper left of the pair. A thicker lunar crescent curves 3° above **Jupiter** on July 28th.

Asteroids **–** Asteroid **6 Hebe**, in the globular cluster **NGC 6366** in **Ophiuchus**, on July 3rd, masquerades as the brightest star on the cluster's northern fringes. On July 4th, **Hebe** lies on the other side of the cluster and about halfway toward the magnitude 4.5 star **SAO 141665**. Located on the serpent bearer's hipbone halfway between **Beta** and **Eta Ophiuchii**, **SAO 141665** sits in an empty field. **Hebe** is at 9th magnitude. This month, on the evenings of July 12th-17th, **Hebe** slides just south of a pair of 6th magnitude stars. By the end of the month, the asteroid stands nearly in front of an un-cataloged strip of dark nebulosity.

Comets **–** Comet **Johnson (C/2015V2),** which should glow at 6th or 7th magnitude in the evening sky during July. Early in the month, binoculars will show it as a cotton ball some two fields of view to the upper left of 1st magnitude **Spica** in **Virgo**. A 6-inch telescope should reveal a fuzzy ball with both a gas and dust trail flowing to the east. If we are lucky, the gas trail might glow bright enough to show a subtle green color through a 10-inch telescope. On the evening of July 1st, the comet lies just 0.3° south of magnitude 4.2 **Kappa Virginis**. It then heads south, passing 2° west of magnitude 4.5 **Lambda Virginis** on the 4th. The comet enters **Hydra** in mid-July, and skirts 3° east of magnitude 3.3 **Pi Hydrae** on July 22nd. It crosses into **Centaurus** during July's final week, where it will hang low in the southwest after darkness falls.

Meteor Showers – In late July, the **Southern Delta Aquariid** shower peaks on the morning of July 30th, when the **First Quarter Moon** sets just after midnight, local daylight time, and leaves the pre-dawn hours free from its unwelcome light. Under a dark sky, observers can expect to see up to 25 meteors per hour, and rates stay above 20 per hour from July 27th to August 1st.

When to View the Planets:

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

DARK SKY VIEWING - PRIMARY ON JULY 22ND, SECONDARY ON JULY 29TH

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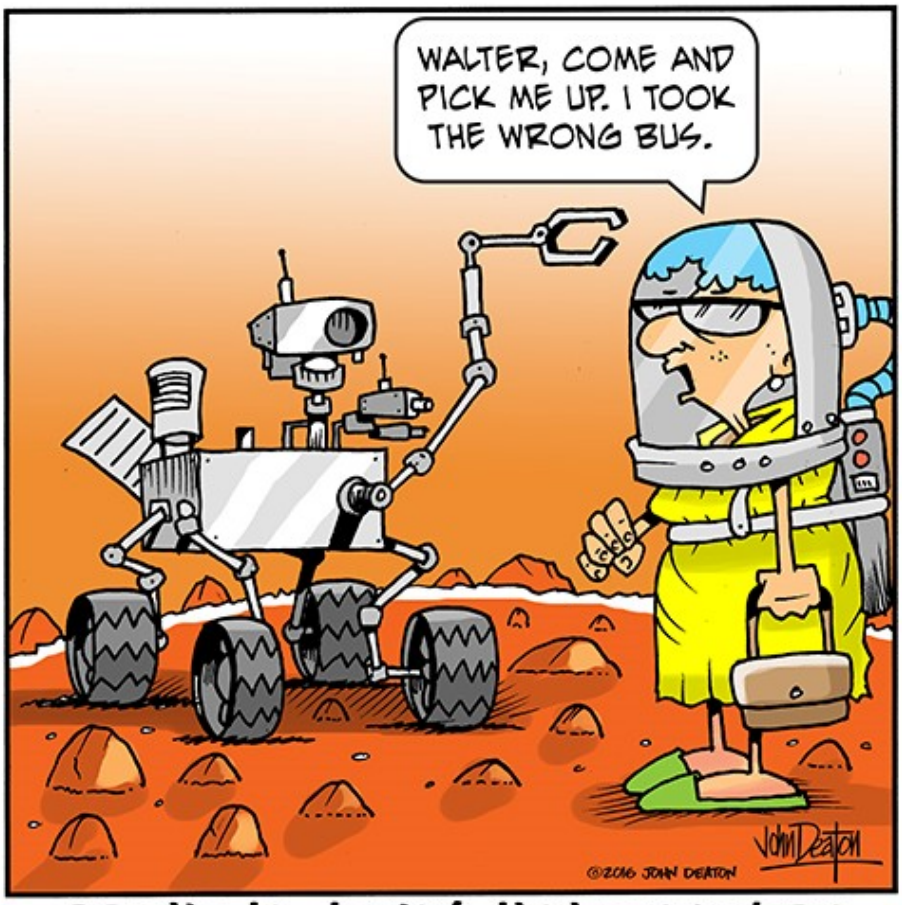
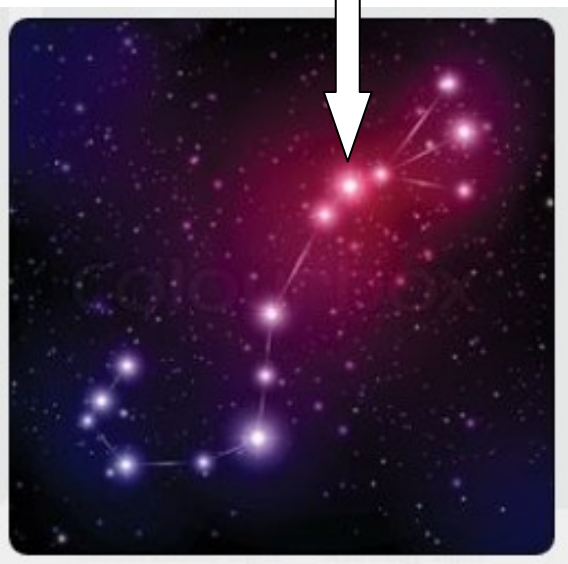


BREAKING NEWS! NASA DISCOVERS WIFE ON MARS!

Mythology:

Scorpius – the Scorpion



'There is a certain place where the scorpion with his tail and curving claws sprawls across two signs of the zodiac, 'said Ovid in his "*Metamorphoses*". He was referring to the ancient Greek version of **Scorpius**, which was much larger than the constellation we know today. The Greek scorpion was in two halves; one half contained his body and its stinger, while the front half comprised of the claws. The Greeks called this front half "*Chelae*", meaning "claws". In the first century BC, the Romans made the claws into a separate constellation, **Libra, the Balances**.

In mythology, this is the scorpion that stung **Orion the Hunter** to death, although accounts differ as to the exact circumstances. Eratosthenes offers two versions. Under his description of **Scorpius**, he says that **Orion** tried to ravish Artemis, the hunting goddess, and that she sent the scorpion to sting him, an account that is supported by Aratus. But in his entry for **Orion**, Eratosthenes says that the **Earth** sent the scorpion to sting **Orion** after he boasted that he could kill any wild beast. Hyginus also gives both stories. Aratus says that the death of **Orion** happened on the island of Chios, but Eratosthenes and Hyginus place it in Crete.

In either case, the moral is that **Orion** suffers retribution for his hubris. This seems to be one of the oldest Greek myths, the origin of which may lie in the sky itself, since the two constellations are placed opposite each other so that **Orion** sets as his conqueror, the **Scorpion,** rises. But the constellation is much older than the Greeks, for the Sumerians knew it as **GIR-TAB**, **the Scorpion**, over 5,000 years ago.

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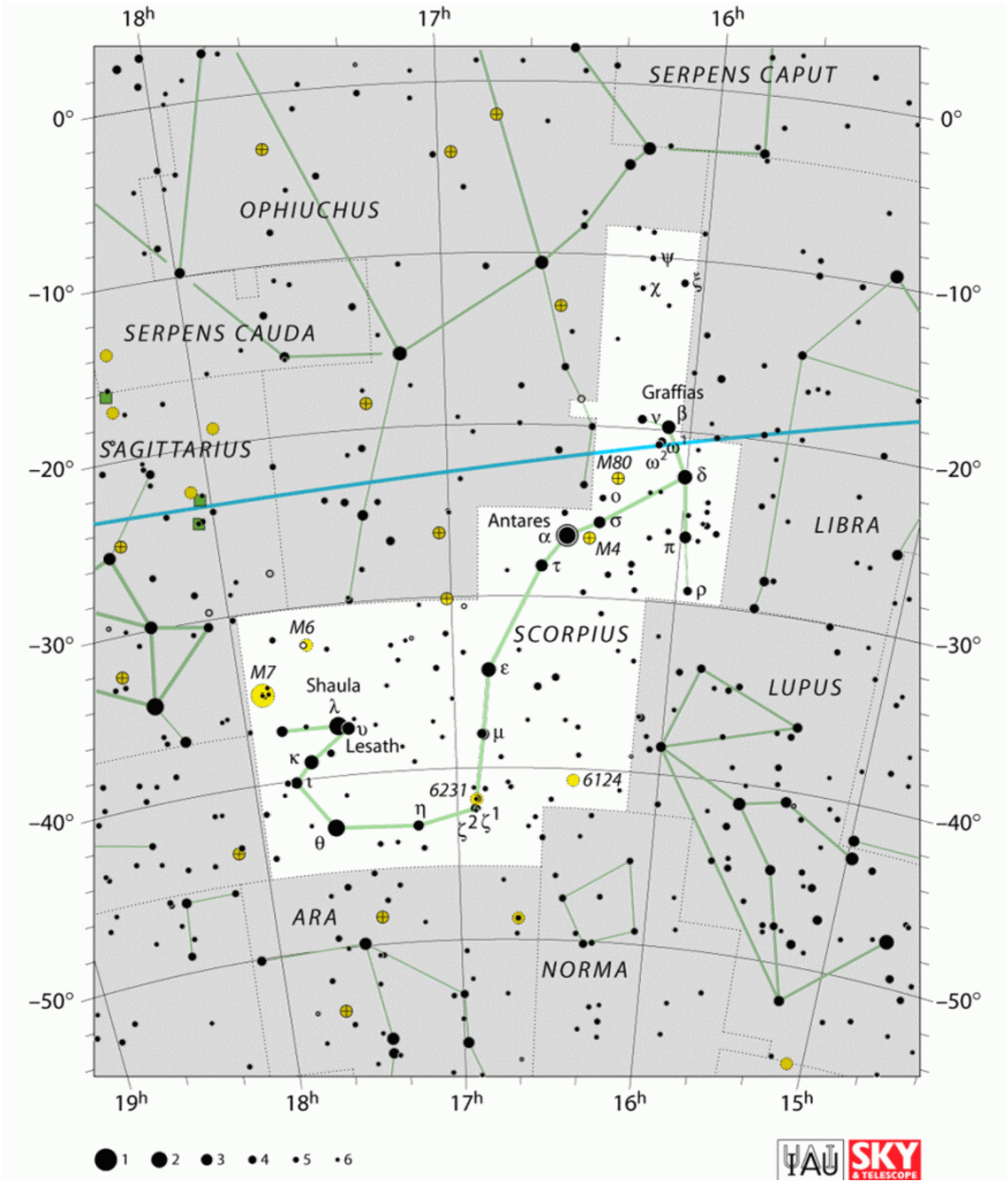
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17h
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OPHIUCHUS
−10°
SERPENS CAUDA
Graffias
SAGITTARIUS
−20°
M80
Antares
LIBRA
M4
M6
SCORPIUS
−30°
M7
Shaula
LUPUS
Lesath
6231
6124
−40°
ARA
NORMA
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