



Night Visions

September 2017 Issue

Newsletter of the Baton Rouge Astronomical Society

Next Meeting: Monday, September 11th at 7PM at HRPO
(2nd Mondays, Highland Road Park Observatory)

September Program: GAE (Great American Eclipse) Membership Reports. Club members are invited to “approach the mike” and share their experiences travelling hither and thither to observe the August total eclipse.

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<http://brastro.org/newsletters.html>**





The Great American Eclipse is now a fond memory for our Baton Rouge community. No ornery clouds or “washout”; virtually the entire three-hour duration had an unobstructed view of the Sun.

Over an hour before the start of the event, we sold 196 solar viewers in thirty-five minutes. Several families and children used cereal box viewers; many, many people were here for the first time. We utilized the Coronado Solar Max II solar telescope and several nighttime telescopes, each outfitted with either a standard eyepiece or a “sun funnel”—a modified oil funnel that projects light sent through the scope tube to fabric stretched across the front of the funnel. We provided live feeds on the main floor from NASA and then, ABC News. The official count at 1089 patrons makes this the best-attended event in HRPO’s twenty years save for the historic Mars Opposition of 2003.

HRPO personnel were interviewed by the *Advocate*, WJBO, 107.3 The Eagle, LPB and Channel 33 prior to the 21st; and WAFB, Channel 33, 107.3, *Tiger Rag* and WBRZ the day of the Eclipse. Hopefully LSU’s astronomy/physics degree program and the Baton Rouge Astronomical Society got some exposure.

Special thanks: to **BREC Director of Special Facilities Brandon Smith** for answers to my constant questions. Thanks to **Amy Broulliette, Justin Northrop, Jordan Cobbs** and **Tom Northrop** for operating up to three telescopes just outside the doors. Thanks to **BREC Marketing Manager Chelsea Borruano** for the great marketing and photography and last-minute photocopying of the upcoming HRPO schedule. Thanks to **LSU Physics’ External Relations Manager Mimi Laval** and **BRAS Outreach Chairman Ben Toman** for spreading the word of HRPO’s offering. Thanks to **Stargazers Camp Director John LeBlanc** who showed up with his personal equipment. Thanks to **BRAS President John Nagle** for working the front desk. Thanks to BRAS members **Karen Des Roches** and **Jacob D.** for creating extra sun funnels and staffing that equipment at the front viewing pad. Thanks to Apprentice **Taylor C.** for working telescopes and helping insure as many as possible without solar viewers took turns looking through some provided by HRPO. Thanks to **BRAS member Briar Richard** for giving tours of the 200GS dome. Thanks to guitarist **Billy Callaway** for the great music at the back viewing pad. Thanks to **BREC Risk Safety Manager David Noland** for his early morning cautions and the wonderful **Rangers** for keeping the traffic tidy. Thanks to **Professor Marty Horn** of the Louisiana Geological Survey for setting up an instrument to gather data on the Earth’s magnetic field, giving us something else to discuss. Thanks to **Mario’s City Gelato** and **Leila’s Leila Lagniappe** food trucks; I know the crowd appreciated their presence (as evidenced by the full trash cans). Several patrons verbally thanked us for being open; I guess they knew a lot of us would have been out-of-state. I admit I was completely stunned that the change in light during maximum coverage could be discerned so easily.

~Article by Christopher Kersey, HRPO Manager

~ Photo by Charles Northrop



President's Message

The Great American Eclipse of 2017 is over (except relating experiences and pictures). Many of our members traveled to observe totality. Ben Toman, with his wife Ashley, in Casper, Wyoming, live streamed the eclipse on BRAS's Facebook page. Brad Schaefer and his wife Marta were also in Casper. Two of our members, Susan Miller and Roz Readinger (her writeup is in this newsletter somewhere), also attended the ALCON meeting in Casper and saw the eclipse. Several of our members who did not travel, volunteered at HRPO for the eclipse (HRPO estimates that there were 1089 people in attendance that day, and Christopher has submitted a wonderful writeup for this newsletter.

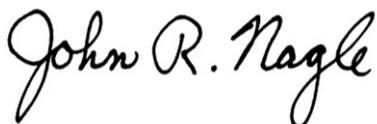
The Library Telescope program of the Astronomical League (wherein the AL gives a telescope to one member astronomy club per region that sent in an entry) has made the selections, and announced them at the final dinner at ALCON. I am pleased to announce that our club won for the AL South East Region. We have 30 days after receiving the telescope to donate it to a library, with pictures and contact person to be sent to AL. The main branch of the library has the telescope we donated a few years ago, so which branch should this telescope go to?

Members of BRAS that are applying for the 2017 Solar Eclipse Special Observing Award from AL, all data must be sent in to AL and it must be in the hands of the coordinator by September 21, 2017.

The Horkheimer/O'Mera Journalism Award has a deadline of March 2018. Our own Ephraim Craddock has won second place two years in a row. Rules and application form can be found on the AL web page www.astroleague.org/al/awards.html.

HRPO's Natural Sky Conference will take place on Friday November 17th. The following day, Saturday, November 18th is the HRPO 20th Anniversary Celebration. Everyone is encouraged to come out and support HRPO and BRAS.

Clear Skies,



John R. Nagle
President of BRAS and Observing Chairperson

P.S. Do you know what a **Tom Swifty** is? It's a joke, kind of a play on words. Michele has hidden one somewhere in this newsletter. It contains the word "Tom". Find it, copy and send it to me (jonagle@cox.net). 1st 3 entries I receive who also come to the September BRAS meeting get a free raffle ticket).

P.S. The PAS-sponsored **Star Gaze is October 17th (Tuesday) to October 22nd (Sunday)**. You can access the "Deep South Star Gaze Registration and Liability Form by joining this Yahoo group:

<https://groups.yahoo.com/neo/groups/Deep-South-Star-Gaze/info>

If you are already signed up, the form is located here:

https://groups.yahoo.com/neo/groups/Deep-South-Star-Gaze/files/2017%20DSSG%20Registration%20and%20Liability%20Release/DSSG_2017%20Fall%20Registration_and_Liability_Form.pdf



Secretary's Summary of August Meeting

- Meeting opened by John Nagle
- Eclipse glasses were distributed to club members and representatives from 3 local schools (Westdale Heights Academic Magnet, Galvez Primary, and St. Jude the Apostle Elementary School)
- Plans for eclipse viewing at HRPO were discussed
- Thomas Halligan talked about the Light Pollution Committee efforts
- Merrill Hess gave a presentation on solar eclipses and what to prepare to see from different vantage points
- Chris Desselles gave a presentation on simple imaging of the eclipse
- Ben Toman gave a brief talk about the Night Sky Network material the club has acquired so far
- Raffle was held
- Meeting adjourned

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



Hi Everyone,

The eclipse is now in the past and you can read about the successful endeavors of the HRPO elsewhere in the newsletter. The rest of the month was pretty quiet when we weren't talking about the eclipse.

Now that school is back in session, we'll probably begin fielding requests for STEM nights and of course, it's time to start our Sidewalk Astronomy up again. Here is our one call out, so far, for outreach in September:

Tuesday, September 26th
Perkins Rowe Shopping Center
6:30pm-8:30pm
Sidewalk Astronomy

with a backup date in case of clouds or rain of Thursday, September 28th. Same time.

The sunset on that day is at 6:56pm so the days are getting shorter. We should have at least a good Moon to look at and maybe Saturn.

As always, please let me know if you plan to assist with any of the outreach events. The more the merrier!

Clear Skies,



Ben Toman
Outreach Coordinator





BRAS Light Pollution Committee Report

Meeting takes place at 6:45, 45 minutes before the regular monthly meeting.
Everyone is welcome to join in.

Light Pollution Chairperson, Thomas Halligan
Secretary, Krista Dison



BRAS Member Roz Readinger reports on the Eclipse:

We had fun out in Casper! We attended lectures during the day relating to eclipse information. We also took advantage of a field trip to the Tate Geological Museum at Casper College on Wednesday afternoon and one to the local planetarium on Friday afternoon. During the evenings stargazing was offered on the far side of Casper Mountain south of town. We convoyed out there on Wednesday evening and got to see the Milky Way and a few meteors as well satellites the usual evening constellations for this time of year. For the eclipse we used one of the sites set up by the convention out at Casper College. We kept it simple, using solar binoculars mostly to keep up with the progress of the eclipse. Totality was way too short. I tried to take a couple of pictures, look at the sun with regular binoculars, and look around at the pink horizon; it was over almost before I could get going good. We are already looking forward to April 8, 2024! It was good to see Brad and Martha Schafer out there as well as Ben and Ashley Toman, too.



Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum. There are also nine active polls. The Forum has reached 4800 posts.

New Video Previews [James Webb Space Telescope Launch](#)
[Space Launch System Engine](#) Test-Fired

Did Most Baton Rougeans Miss [Moon-Saturn Conjunction?](#)
[Geomagnetic Storms](#) from “Quiet” Sun Surprise Earthlings

Overcast Destroys [Perseid Peak](#) Viewing

Will Hurricane Harvey Trounce Views of [Julia?](#)

[Summer Triangle](#) Dominates Sky





20/20 Vision Campaign **GLOBE at Night: 12 to 21 September [Cygnus]**

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.

Shreya probably has to turn in data to her instructor very soon! If you have not done so, please take a measurement and send it in as soon as possible.

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.





Messages from HRPO

Highland Road Park Observatory



FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

1 September: “The Search for Extraterrestrial Intelligence” The question: whether there are companion beings in the Galaxy who also have politics, art, music, religion and dreams. The formal investigation: ongoing for several decades. The presenter: newcomer Robert Parks, physics professor at LSU.

8 September: “Great American Eclipse Review” The Tens of millions of American experienced a wonderous celestial event together. Science was also gathered via photography, orbiting spacecraft and balloon.... Imagery and data from all three HRPO partners create an incredible review of a spectacular day!

22 September: “Dawn at Ceres and Vesta” At the tenth anniversary of its leaving home, we’ll cover the major discoveries by—and the future of—this ongoing mission.

29 September: “HRPO—Twenty Years of Skygazing” As the November anniversary celebration proper has no lecture, HRPO gives an early outline covering the founding, history and future of your friendly neighborhood observatory.

SCIENCE ACADEMY

Saturdays from 10am to 12pm

For ages eight to twelve. \$5/\$6 per child.

2 September: “Expedition 7”

9 September: “Weather Forecasting”

16 September: “Clouds”

23 September: “Storms!”

30 September: “Expedition 8”



ONE-TIME CALLS FOR VOLUNTEERS

***Friday 8 September, 7:30pm to 8:30pm.** *Two or three volunteers.* Great American Eclipse Preview. Any BRAS members who have firsthand accounts or images from the GAE (partial or total location) please consider recounting your story **offhandedly** to our patrons at this time.

***Saturday 9 September, 7pm to 10pm.** *One or two volunteers.* Evening Sky Viewing Plus. Telescope operation, physical science demonstrations, front desk duty. Easy to moderate difficulty.

***Friday 15 September, 4:30am to 7:30am.** *One or two volunteers.* Cassini’s Grand Finale. Information to patrons, front desk duty, telescope operation, physical

science demonstrations. Low to moderate difficulty.

***Friday 29 September, 7:30pm to 8:30pm.** *One to four volunteers.* [HRPO—Twenty Years of Skygazing.](#) Any personal accounts, memorabilia displays or anecdotes would be appreciated.

***Saturday 30 September, 12pm to 2pm.** *One or two volunteers.* [Solar Viewing.](#) Telescope operation, physical science demonstrations, front desk duty. 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.



11th Annual Spooky Spectrum **Saturday 21 October from 6pm to 10pm** **No admission fee. For all ages.**

Come visit on this moonless night—if you dare—as HRPO delves into the eerie side of astronomy, physics and aeronautics *for the eleventh consecutive year*. We'll have creepy science demonstrations, some of which we've never used. And don't forget the stories. Strange sky phenomena...extra dimensions... extraterrestrials. Be warned—we want to make you think!



Observe the Moon Night **Saturday 28 October from 7pm to 10pm** **No admission fee. For all ages.**

Our nearest celestial neighbor and [constant companion](#) has been visited by twelve human beings on six different occasions. There's nothing, however, to stop us from doing the next best thing! During this night of [lunar excitement](#) telescopes [around the world](#) will be pointed at our [sole natural satellite](#). HRPO will showcase the best historical lunar imagery, fascinating displays describing [fact-finding missions](#), Apollo landings, myths and [little-known facts](#) about the Moon. There will be a visual, unaided-eye tour of the Moon. Telescope viewing will occur as usual, with the Moon being the prime focus.



Observing Notes:

by John Nagle

Draco – The Dragon

Position: RA 17, Dec. +65°

Named Stars

Thuban (Alpha Dra), “head of the serpent”, “the Snake”, “the Basilisk”, “the Dragon”, mag. 3.67, 14 04 23.43 +64 22 32.9, is a binary star consisting of a white giant star with a companion being a red or white dwarf star, with an orbital period of 51 days. **Thuban** was the pole star from 3942 BC to 1793 BC, and due to precession, it will once again be the pole star around the year 21,000 ADE. One of the air shafts of the **Great Pyramid of Khufu** was lined up to show **Thuban** at the time the pyramid was built.

Rastaban (Beta Dra), “the head of the serpent” (one of the Dragon’s eyes), mag. 2.79, 17 30 25.98 +52 18 04.9, is a binary system with the primary being a yellow star halfway between the bright giant and supergiant evolutionary stages, and the secondary, at mag. 11.5, is a dwarf star with a separation of about 320 AU.

Eltanin (Gamma Dra), “the Great Serpent”, mag. 2.24, 17 56 36.38 +51 29 20.2, is an orange giant star with a companion, at mag. 13.4, that is most likely a red dwarf star.

Altais (Delta Dra), “the Goat”, mag. 3.07, 19 12 33.15 +67 39 40.7, is a yellow giant star.

Tyl (Epsilon Dra), mag. 3.84, 19 48 10.21 +70 16 04.2, is a binary star, the primary being a yellow giant star, and the companion is an orange dwarf star at mag. 7.3, located 3.2 arc seconds away.

Aldhibah (Zeta Dra), “the Hyenas”, “Nadus III (the third knot)”, mag. 3.17, 17 08 47.23 +65 42 52.7, is a blue giant star.

Aldhibain (Eta Dra), mag. 2.73, 16 23 59.51 +61 30 50.7, is a yellow giant star with a faint companion at mag. 8.2, located south of the primary at a separation of 4.8 arc seconds.

Edasich (Iota Dra), mag. 3.29, 15 24 55.78 +58 57 57.7, is a giant star with a planet in orbit around it. This was the first planet discovered to orbit a giant star.

Gianfar (Lambda Dra), “Dragon”, mag. 3.82, 11 34 24.29 +69 19 52.0.

Arrakis (Mu Dra), “Al Rakis”, “The Dancer”, mag. 4.91, 17 05 20.18 +54 28 11.5, is a double star composed of two white stars, with an orbital period of 670 years and a separation of 1.91”, or about 70 AU. A 13th magnitude companion at 14” separation, or about 400 AU, is a dwarf star. (**Arrakis** – shades of “Dune”!).

Kuma (Nu Dra), “at last”, is a binary star. Nu¹ Dra, mag. 4.89, 17 32 10.42 +55 11 02.8; Nu² Dra, mag. 4.86, 17 32 15.88 +55 10 22.1, both stars are white dwarfs with a separation of 62 arc seconds. The primary star is a hydrogen fusing star, and the secondary has a dimmer, low mass companion orbiting it every 38.6 days.

Grumium (Xi Dra), “jaw”, mag. 3.73, 17 53 31.63 +56 52 20.8, is an orange giant star.

Alsafi (Sigma Dra), “cooking tripod”, mag. 4.67, 19 32 20.59 +69 39 55.4, is a main sequence dwarf star with a companion the size of **Jupiter**, discovered in 2007.

Batentaban Australis (Phi Dra), “Batn al Thuban”, mag. 4.22, 18 20 45.44 +71 20 15.8, is a multiple star system composed of hydrogen fusing dwarf stars, with the two brighter components in the system orbiting each other with a period of 307.8 years. The primary star is an un-resolvable binary star.

Batentaban Borealis (Chi Dra), “Batn al Thuban”, mag. 3.55, 18 21 02.34 +72 44 01.3, is a spectroscopic binary with the primary star a yellow-white, and the secondary being an orange star at mag. 5.67. The two stars have an orbital period of 280.55 days, with an average separation being just under 1 AU.

Dziban (Psi Dra), “the two jackals”, Psi¹ Dra A, mag. 4.57, 17 41 56.31 +72 08 58.2, a yellow-white star; **Psi¹ Dra B**, mag. 5.81, 17 41 58.04 +72 09 27.3, a yellow star; **Psi² Dra**, mag. 5.43, 17 55 11.14 +72 00 18.5. The separation between **Psi¹ A** and **Psi¹ B** is 30.3”.

Deep Sky:

M 102 (NGC 5866), “The Spiral Galaxy”. Mag. 9.9, 15 06 58 +55 42 03, 4.70’x1.90’ in size, is one of the “missing” Messier objects. The discoverer, Mechain, “disowned” it in a letter to Bernouilli at Berlin in 1783 as a duplicate observation of **M 101**. The letter was published in the “Berliner Astronomisches Jahrbuch” for 1786. A translation of the relevant paragraph of the letter is as follows: ‘on page 267 of the “Connaissance des Temps for 1784”, M. Messier lists under **No. 102**, a nebula which I have discovered between **Omicron Bootis** and **Iota Draconis**’. This is nothing but an error. This nebula is the same as the preceding **No. 101**. In the list of my nebulous stars communicated to him, M. Messier was confused due to an error in the sky chart.’ There is still a controversy about this Messier object.

NGC 6543, “Cat’s Eye Nebula”, Caldwell 6, PK 96+29.1, mag. 8.1, 17 58.6 +66 38, 20” in size, is a very bright, irregular, oblong disk planetary nebula; photo mag. 8.8; central star at mag. 11.1. Located halfway between **Delta** and **Zeta Draconis**, and 9.6 arc minutes away from the **North Ecliptic Pole** to the west-northwest. Related to **IC 4677**, a nebula that appears as a bar 1.8 arc minutes to the west of **NGC 6543**. This was the first planetary nebula to be observed with a spectroscope.

NGC 4125, mag. 9.5, 12 08.1 +65 10, 5.1’x3.2’ in size, is a pretty bright, pretty large, and quite elongated galaxy. Paired with NGC 4121.

NGC 4236, Caldwell 3, Holmberg 357a, mag. 9.6, 12 16.7 +69 28, 22’x6’ in size, is a very faint, extremely large, and very elongated galaxy. Paired with galaxy Holmberg 357b.

NGC 5866, mag. 9.9, 15 06.5 +55 46, 6.0’x3.1’ in size, is a very bright and quite large Seyfert galaxy; elongated, thin, edge on; very bright nucleus with dark lane. **NGC 5867** is nearby.

Draco Dwarf Galaxy, UGC 10822, mag. 9.9, 17 20.24 +57 55, 37’x23’ in size, is a spheroidal galaxy. It contains five **Carbon Stars**, four suspected asymptotic giant branch (**AGB**) stars, a number of red giant branch (**RGB**) stars, and more than 260 variable stars, all but five of which are of the **RR Lyrae** type. This galaxy is believed to contain a large amount of dark matter.

PGC 39058, UGC 7242, 12 14 08.4 +66 05 41, 1.95’x0.8385, is a dwarf galaxy, obscured by a bright star in front of it.

Arp 188, UGC 10214, “Tadpole Galaxy”, mag. 14.4, 16 06.25 +55 26.0, is a disrupted (collided) barred spiral galaxy, and is noted for its enormous trail of stars, about 280 thousand light years long.

Abell 2218, 16 35 54 +66 13 00, is a galaxy cluster containing about 10 thousand galaxies and a mass equal to 10,000 galaxies, and has been used as a gravitational lens to find an object that is a 13 billion years old galaxy. **Abell 2218** has a red shift of $z=+0.175$.

Q 1634+706 is a quasar, mag. 14.4, 16 24 39 +20 31 33, noted for being the most distant object in the night sky that can be seen in an amateur telescope, and is roughly 12.9 billion light years distant at a red shift of $z=+0.905$.

The Lozenge, “Dragon’s Head”, an asterism composed of **Beta, Gamma, Xi, and Nu Draconis**.

Items Beyond magnitude 10 – 135 NGC’S; 18 IC’S; 35 UGC’S; 4 CGCG’S; 7 MGC’S; 17 ARP’S; 4 HCG’S; 4 UGCA’S; 4 Mrk’s; 6 Shk’s; and 1 AGC.



Other Stars:

Theta Draconis, mag. 4.01, 16 01 53.70 +58 53 52.0, is a yellow-white main sequence star, and is a very close spectroscopic binary star with an orbital period of 3.0708216 days. It is a fast rotator, with a speed of 28 km per second or more at the equator, which means that it completes a rotation in less than 4.5 days. The companion star is believed to be a dwarf star.

Kappa Draconis, mag. 3.85, 12 33 29.04 +69 47 17.6, is a blue giant star.

Omicron Draconis, mag. 4.63, 18 51 12.01 +59 23 17.8, is a double star with the primary being an orange star at mag. 4.6, and the secondary is a blue star at mag. 7.8, and a separation of 34.2”.

42 Dra, mag. 4.82, 18 25 58.99 +65 33 48.8, is a giant star with a super-Jupiter (gas giant) planet in orbit around it.

39 Dra, mag. 4.98, 18 23 54.65 +58 48 02.1, is a triple star. The primary is a blue star at mag. 5.0, the secondary is a yellow star at mag. 7.4, and the tertiary star is at mag. 8.0 and appears to be a close companion to the primary star.

17 Dra, mag. 5.07, 16 36 13.73 +52 55 27.7, is part of a triple star (with **16 Dra**), with the primary being a blue-white star being itself a binary with the components being mag. 5.4 and 6.5, and a separation of 3.4”. The secondary is **16 Dra**.

16 Dra, mag. 5.53, 16 36 11.43 +52 53 59.9, is part of a triple star system with **17 Dra**, and has a separation of 90.3”.

26 Dra, mag. 4.47, 17 34 59.25 +61 52 33.0, is a triple star system composed of a spectroscopic double star with an orbital period of 76 years and a separation of 1.6”. The third star is a red dwarf, separated from the main pair by 12.2 arc seconds.

41 Dra, mag. 5.74, 18 00 09.07 +80 00 13.7, is a spectroscopic binary with **40 Dra**. Both stars are orange dwarfs, and have a separation of 19.3”.

40 Dra, mag. 6.11, 18 00 03.37 +80 00 01.9, is a spectroscopic binary with **41 Dra**.

HD 139357, mag. 5.97, 15 35 16.22 +53 55 19.7, has one planet in orbit.

HD 113337, mag. 6.01, 13 01 47.15 +63 36 36.6, has one planet in orbit.

UX Dra, mag. 6.22, 19 21 35.53 +76 33 34.6, is a variable carbon star.

20 Dra, mag. 6.40, 16 58 25.32 +65 02 20.6, is a binary star with a white hued primary of mag. 7.1 and a yellow hued secondary star of mag. 7.3, located east-northeast of the primary. The two stars are separated by 1.2 arc seconds, and have an orbital period of 420 years.

RY Dra, mag. 6.63, 12 56 25.89 +65 59 39.9, is a variable carbon star.

BY Dra, mag. 8.07, 18 33 55.77 +51 43 08.9, is a multiple star system composed of a close binary star with components orbiting each other every 5.98 days. The two stars are believed to be pre-main sequence, still in the process of collapsing gas. The third star in this system is separated from the main pair by 17 arc seconds, and is a red dwarf star. The system may have a fourth component, but this has not been confirmed yet.

HD 156279, mag. 8.08, 17 12 23 +63 21 08, has one planet in orbit.

HD 163607, mag. 8.15, 17 53 40+56 23 31, has two planets in orbit.

HIP 91258, mag. 8.65, 18 36 53.0 +61 42 09, has one planet in orbit.

HD 109246, mag. 8.77, 12 32 07.19 +74 29 22.4, has one planet in orbit.

HD 173739, mag. 8.94, 18 42 46.7 +59 37 49, is a component of **Struve 2398**, and is a flare star.

HD 173740, mag. 9.70, 18 42 46.9 +59 37 36, is a component of **Struve 2398**, and is a flare star.

Struve 2398 is a binary star consisting of two red dwarf stars (**HD 173739** and **HD 173740**) at a separation of 15.3” (56 AU). The binary is found just between **Omicron Draconis** (which is to the east) and **39 Draconis**. Both stars are a known source of X-rays.

Beyond mag. 10 – 5 stars with planets; a white dwarf star with a helium rich atmosphere and is a high magnetic field white dwarf; 55 Struve stars; and 7 Otto Struve stars.



Sky Happenings: September, 2017

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

- Sept. 4th - **Mercury** stationary at 11 AM CDT.
- Sept. 4-6 - **Mars** is less than 1° from **Regulus** with **Mercury** about 3° to the right or upper right of the pair on these mornings. Use binoculars to pickup all three very low in the east, about 16° below or to the lower left of **Venus**.
- Sept. 5th - **Neptune** is at opposition at 12 AM CDT,
Jupiter passes 3° north of **Spica** at 6 AM CDT.
- Sept. 6th - The **Moon** passes 0.8° south of **Neptune** at 12 AM CDT,
Full Moon occurs at 2:03 AM CDT.
- Sept. 8th - Asteroid **Julia** is at opposition at 4 PM CDT.
- Sept. 9th - The **Moon** passes 4° south of **Uranus** at 5 AM CDT.
- Sept. 10th - **Mercury** passes 0.6° south of **Regulus** at 7 AM CDT, with **Mars** about 3° to the lower left of the pair at dawn,
Dusk: **Spica** is about 3° to the lower left of **Jupiter**, very low in the southwest in bright twilight.
- Sept. 11th - A waning gibbous **Moon** is in the **Hyades** from mid-night to dawn.
- Sept. 12th - **Mercury** is at greatest western elongation (18°) at 5 AM CDT,
The **Moon** passes 0.4° north of **Aldebaran** at 8 AM CDT.
- Sept. 13th - **Last Quarter Moon** occurs at 1:25 AM CDT,
The **Moon** is at perigee (229,820 miles from **Earth**) at 11:06 AM CDT.
- Sept. 15th - Space probe **Cassini**, orbiting **Saturn**, wraps up its 13 year mission by plunging into **Saturn's** atmosphere.
- Sept. 16th - Dawn: Look for first magnitude **Regulus** 4½° below **Venus**, with **Mercury** and **Mars** 7° to the lower left of **Regulus**.
Mercury passes 0.06° north of **Mars** at 1 PM CDT.
- Sept. 17th - The **Moon** passes 0.5° south of **Venus** at 8 PM CDT.
- Sept. 18th - The **Moon** passes 0.09° north of **Regulus** at 12 AM CDT,
Dawn: **Venus**, **Regulus**, the hair thin waning **Moon**, faint **Mars**, and **Mercury** form a nearly vertical line some 12° long, in that order from top to bottom, low in the east as dawn brightens,
The **Moon** passes 0.1° north of **Mars** at 3 PM CDT,
The **Moon** passes 0.03° south of **Mercury** at 6 PM CDT.
- Sept. 19th - **Venus** passes 0.5° north of **Regulus** at 6 PM CDT.
- Sept. 19/20 - Dawn: **Venus** is less than 1° from **Regulus** these two mornings.
- Sept. 20th - **New Moon** occurs at 12:30 AM CDT.
- Sept. 22nd - The **Moon** passes 4° north of **Jupiter** at 3 AM CDT,
Autumnal equinox occurs at 3:02 PM CDT,
Dusk: The thin waxing crescent **Moon** hangs about 7° to the upper left of **Jupiter** in the west-southwest.
- Sept. 25th - Asteroid **Pallas** is stationary at 6 AM CDT.
- Sept. 26th - The **Moon** passes 3° north of **Saturn** at 7 PM CDT.
- Sept. 27th - The **Moon** is at apogee (251,250 miles from **Earth**) at 1:50 AM CDT,
Asteroid **Vesta** is in conjunction with the **Sun** at 9 AM CDT,
First Quarter Moon occurs at 9:54 PM CDT.
- Sept. 28th - **Pluto** is stationary at 3 AM CDT.

Planets:

Mercury – **Mercury**, **Mars**, and **Regulus** form a tight trio on the morning of Sept. 5th, but are too dim and low in the bright twilight to see with the naked eye, look about 15° below or to the lower left of **Venus**. At

dawn on Sept. 10th, higher **Mercury**, brightened to 0 magnitude, shines $\frac{1}{2}^\circ$ to the lower right of **Regulus**. **Mars**, at mag. 1.8, is 3° below or to the lower left of the pair. **Mercury** reaches the peak of its best morning appearance of the year on Sept. 12, when it reaches greatest western elongation (18°), and stands 11° high in the east $\frac{1}{2}$ hour before sunrise. Shining at magnitude -0.4, it appears conspicuous in morning twilight. Use binoculars to pick out magnitude 1.8 **Mars**, 3° to **Mercury's** lower left. On the morning of the 14th, **Mercury** is $11''$ below or to the lower left of **Venus**. On the 16th, **Mercury** and **Mars** are within $10'$ of each other. **Mercury** spans $6.4''$, and is about $\frac{2}{3}$ lit; **Mars** is $3.6''$ across and full lit. A waning crescent **Moon** adds to the scene on the 17th. The slim crescent hangs 6° above **Venus** with **Regulus** 3° below, and with **Mars** and **Mercury** 11° below **Venus**. On the 18th, a wafer thin crescent **Moon** then lies below **Venus** and above the **Mercury** and **Mars** pair, with just 1.5° separating the paired planets. **Mercury's** magnitude has improved from +0 to -1.0 by now. During the month's final week, **Mercury** falls back toward the **Sun** and disappears from view.

Venus – **Venus** passes 1° south of the **Beehive** star cluster (**M44**) on the mornings of September 1st and 2nd. On Sept. 10th, **Venus** crosses from **Cancer** into **Leo**, where it remains for the rest of the month. On the mornings of Sept. 19th and 20th, **Venus** and **Regulus** are 1° apart. **Venus** is circling away from us toward the far side of the **Sun**; its gibbous disk dwindles to about $11''$ wide this month, while its phase increases to 90%.

Mars – See **Mercury** above.

Jupiter – **Jupiter** hangs low in the west-southwest during the evening twilight all month. It sets within two hours of the **Sun** in early September and less than an hour after sundown late in the month. At magnitude -1.7, **Jupiter** is too low for sharp telescope views, with it starting September at about 10° high in the west-southwest 45 minutes after sunset. By the end of the month it is only 4° high at dusk. **Jupiter** lies among the background stars of **Virgo**, spending most of September within 4° of **Spica**, passing due north of this star on the 5th. If you plan to observe **Jupiter** through a telescope, do so early in the month. Not much detail will be seen on its $32''$ diameter disk.

Saturn – **Saturn**, at magnitude +0.5, stands nearly 30° above the southern horizon soon after sunset. The planet resides in southern **Ophiuchus** near the 4th magnitude **Xi Ophiuchi**, beginning September about 0.9° due south of **Xi Ophiuchi** and moves to 1.4° southeast of the star by month's end. The pair will set just before 12:30 AM local daylight time on September 1st, and about a half-hour earlier each passing week. **Saturn** will dim from magnitude +0.5 to +0.4 during September and its equatorial diameter shrinks from $17''$ to $16''$, with the rings tilted at nearly 27° from our line of sight. **Saturn** reaches eastern quadrature (90° east of the **Sun**) on September 14th. Most telescopes will reveal several of the planet's moons. The brightest is 8th magnitude **Titan**. **Titan** will approach within $1.3'$ of **Saturn** when it passes north of the planet on September 11th and 27th; or south of the planet on September 3rd and 19th. The moon strays $2.9'$ from **Saturn** at greatest eastern and western elongation. While it takes **Titan** 16 days to orbit **Saturn**, five dimmer moons complete their circuits in less than five days. **Tethys**, **Dione**, and **Rhea** glow at 10th magnitude and will show up through a $4''$ telescope on clear nights. To capture 12th magnitude **Enceladus** or 13th magnitude **Mimas**, you will need at least a $6''$ instrument with good optics. The former revolves around **Saturn** in 33 hours, while the latter takes 23 hours. Both lie near the ring's edge and often get lost in the glare. The best opportunity to see them is on September 17th, when they reach greatest western elongation within two hours of each other. Also on the 17th is the best evening to look for **Iapetus**, which takes 79 days to complete an orbit. If you draw a line from **Saturn** to **Titan**, and then extend the line an equal distance, **Iapetus** will be right there, at 11th magnitude. On September 15th, the **Cassini** probe will end its 13 year mission by plunging into the atmosphere of **Saturn**.

Uranus – **Uranus** climbs clear of the eastern horizon in the late evening, glowing at magnitude 5.7. **Uranus** resides among the background stars of **Pisces**, not far from 4th magnitude **Omicron Piscium**. The planet will stand 1.0° north of this star on September 1st, and will move to a point 1.2° northwest of the star by the 30th. A telescope will reveal the planet's distinctive blue-green disk, spanning $3.7''$.

Neptune – **Neptune** reaches opposition on the night of September 4th/5th, when it lies opposite the **Sun** in our sky. You can find it climbing in the southeastern sky after darkness falls. It peaks in the south around 1 AM local daylight time in early September, and by 11 PM late in the month. On the evenings of the 4th and 5th, the full **Moon** lies near **Neptune** and makes viewing difficult. **Neptune** will shine at magnitude 7.8 all month. In early September, **Neptune** lies 1.2° due east of **Lambda Aquarii**, with the planet's westward

motion bringing it to 0.7° southeast of the star by month's end. **Neptune** will pass just 1' south of an 8th magnitude background star on the night of September 18th/19th. **Neptune** will show a distinct disk measuring 2.4" across, and will appear blue-gray in color.

Sun – The **Sun** reaches the equinox at 3:02 PM CDT on September 22nd, marking the start of **Autumn** for the **Northern Hemisphere**.

Moon – The waning gibbous **Moon** will occult **Aldebaran** for western **North America** on the morning of September 18th. The **Moon** will pass 0.4° north of **Aldebaran** at 8 AM CDT for the rest of us. On September 18th, the slim, waning lunar crescent is centered between the **Venus** and **Regulus** pair and the **Mars** and **Mercury** pairing. On the 19th, just 30 minutes before sunrise, binoculars may reveal the very thin lunar crescent very low above the eastern horizon. On September 26th, back in the evening sky, the thick waxing lunar crescent is about 3° above **Saturn** at dusk.

Asteroids – Asteroid **3122 Florence** is perfectly placed for evening viewing from the **Northern Hemisphere**. It comes closest to **Earth** on September 1st, when it sweeps within 4.4 million miles of **Earth** and appears among the background stars of eastern **Delphinus**. **Florence** moves at some 9° per day, which translates into 22" per minute. **Florence** glows at 9th magnitude on September's first three nights, and dims to 10th magnitude the following three nights. On the 5th, **Florence** will sweep 1° west of 2nd magnitude **Gamma Cygni**.

Comets – Comet **PANSTARRS (C/2015 ER61)** will remain within 3²/₃ of the **Pleiades (M45)**, or the *Seven Sisters*, throughout September. The 10th magnitude comet begins September nearly due east of the **Pleiades**, then heads slowly east before reversing course and moving more quickly to the south and west. You can observe it with a 4-inch telescope, but for details, you will need a 6-inch or 8-inch telescope.

Meteor Showers – A minor shower, the **Aurigids**, peaks on September 1st. The best views should come shortly before dawn, once the waxing gibbous **Moon** has set and the radiant has climbed high. Under a dark sky, observers can expect to see an average of six meteors per hour.

When to View the Planets:

Midnight

Jupiter (west)
Saturn (south)
Neptune (southeast)

Evening Sky

Uranus (southeast)
Neptune (south)

Morning Sky

Mercury (east)
Venus (east)
Mars (east)
Uranus (southwest)
Neptune (west)

DARK SKY VIEWING - PRIMARY ON SEPTEMBER 23RD, SECONDARY ON SEPTEMBER 30TH



Mythology!

Draco – The Dragon

Coiled around the sky's **North Pole** is the celestial dragon, **Draco**. Legend has it that this is the dragon slain by **Heracles** during one of his labors, and in the sky the dragon is depicted with one foot of **Heracles** (in the form of the neighboring constellation **Hercules**) upon its head. This dragon, named **Ladon**, guarded the precious tree on which grew golden apples.

Hera had been given the golden apple tree as a wedding present when she married **Zeus**. She was so delighted with it that she planted it in her garden on the slopes of **Mount Atlas** and set the **Hesperides**, daughters of **Atlas**, to guard it. Most authorities say there were three **Hesperides**, but **Apollodorus** names four. They proved untrustworthy guards, for they kept picking the apples. Stern measures were required, so **Hera** placed the dragon **Ladon** around the tree to ward off pilferers.

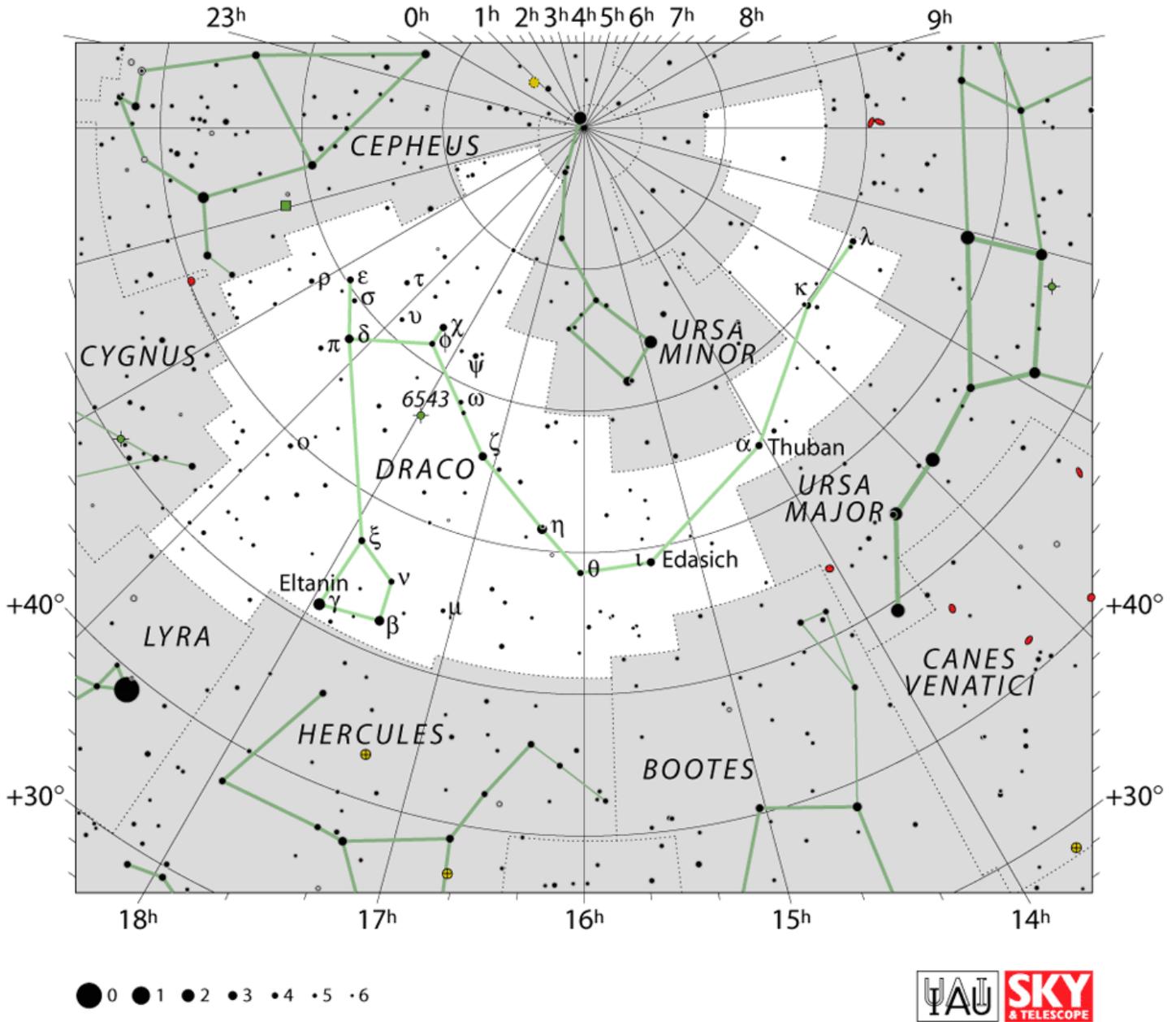
According to **Apollodorus**, **Ladon** was the offspring of the monster **Typhon** and **Echidra**, a creature half woman and half serpent. **Ladon** had one-hundred heads, says **Apollodorus**, and could talk in different voices. **Hesiod**, though, says that the dragon was the offspring of the sea deities **Phorcys** and **Ceto**, and he does not mention the number of heads. In the sky, the dragon is shown with one head.

The great hero **Heracles** was required to steal some apples from the tree as one of his labors. He did so by killing the dragon with his poisoned arrows (reference **Hydra**). According to **Apollonius Rhodius**, the **Argonauts** came across the body of **Ladon** the day after **Heracles** had shot him. The dragon lay by the trunk of the apple tree, its tail still twitching, but the rest of its coiled body bereft of life. Flies died in the poison of its festering wounds while nearby the **Hesperides** bewailed the dragon's death, covering their golden heads with their white arms. **Hera** placed the image of the dragon in the sky as the constellation **Draco**.

There is a Greek legend that tells the story of **Draco** as a horrible dragon that guarded a sacred spring and slew the soldiers of **Cadmus** (the first king of **Thebes**), who had been sent to gather water. **Cadmus** then fought the dragon and won. After the dragon died, **Athena** appeared and told **Cadmus** to sow the ground with the creature's teeth. The teeth immediately sprang up as a group of armed soldiers who helped **Cadmus** to found **Thebes**.

That's the last time I pet a dragon!" Tom said offhandedly.

DRACO



The End

