Newsletter of the Baton Rouge Astronomical Society

Next Meeting: Saturday, August 20th at LIGO in Livingston Parish

(from 11 a.m., a Potluck Dinner – See Secretary's Message for details)

What's In This Issue?

BRAS President's Message

Here we are, in August, with over half the year already gone. Time flies. Fall and Winter are coming, and a lot of activity with them. School will be back in session, and outreach requests with it. We plan on bringing back "Sidewalk Astronomy" again this fall and winter at different Libraries and businesses. More details when plans are set.

Congratulations to Ephraim Craddock! His essay has won 2nd place in the Astronomical League's "Horkheimer/O'Meara Journalism Award". Ephraim will have his picture published in the "Reflector" magazine along with a notice of his award. Congratulations again Ephraim!

Four members of BRAS have volunteered to assist three members of Boy Scout Troop 205 in completing the requirements for the Astronomy merit badge. Thanks to the volunteers: Wally Pursell; Trey Anding; John Nagle; and Christopher Kersey.

BRAS has a volunteer for the Chairperson of the Light Pollution Committee! Thomas Halligan has volunteered and been accepted by the committee members. Congratulations Thomas! This is an appointed position, same as the Observing Chairperson and the Outreach Chairperson. Terms of service are one year, same as elected Officers, but the one exception is that there are no term limits.

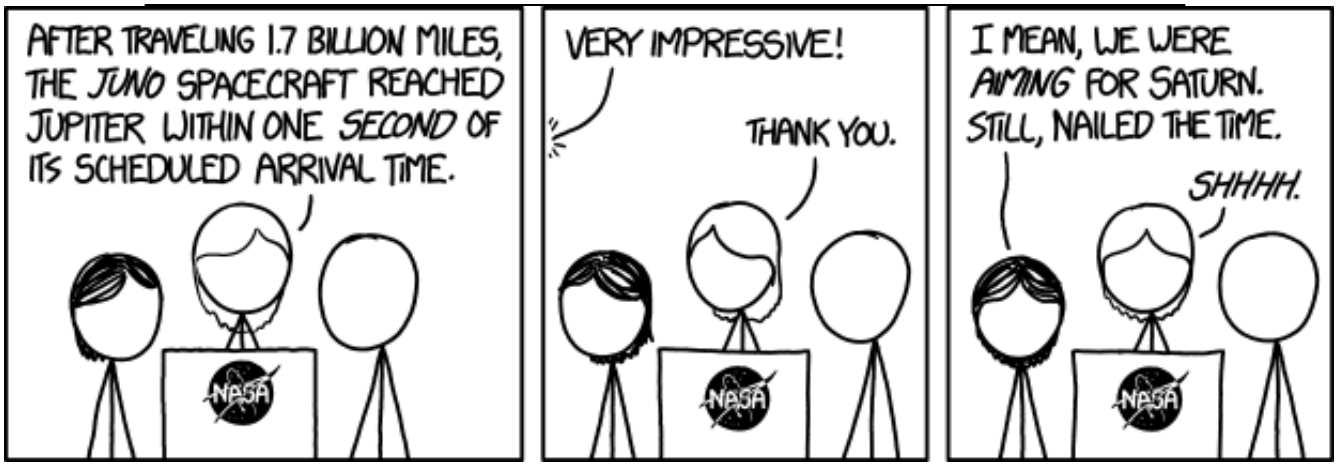
BRAS still needs an Outreach Chairperson. Duties are to receive outreach requests, notify Bras members of such requests via e-mails, notices in the Night Visions newsletter, announcing at BRAS meetings, and follow up reminder e-mails. Is there a BRAS member who wants to serve the organization? Contact Ben Toman, interim Outreach Chairperson.

The August Meeting of BRAS will be held at LIGO, in Livingston Parish, on Saturday, August 20th, at 11:00 AM. BRAS will furnish a main dish, utensils, and beverages. We will set up solar viewing for our members, LIGO personnel, and the public, for this is also the public day at LIGO. BRAS has participated in the past, and will help out in any way we can. See you at the meeting!

Clear Skies,

John R. Nagle

John R. Nagle
President of BRAS
Observing Chairperson



BRAS Secretary's Summary from July Meeting

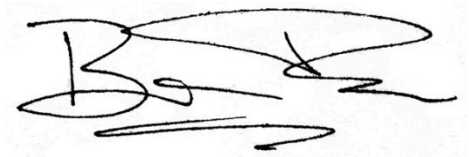
- -Meeting started, John Nagle presiding.
- -It was announced that Thomas Halligan would be stepping up to be the chairperson for the Light Pollution committee.
- -Don Weinell mentioned that Hodges Gardens State Park survived the state budget cuts and would remain open so the Hodges Gardens Star Party should be on as planned for 2017.
- -Brad Schaefer announced that the Kickstarter campaing for Tabby's Star was successful. Thank you a to all that donated!
- -Ben Toman gave a short report on the results of the AL/NASA Mercury Transit observing award.
- -Raffle prizes for after the meeting were introduced.
- -Guest speaker, Jay Lamm, was introduced. He gave a presentation on the state of the Pennington Planetarium and its current and future shows.
- -Upcoming outreach events were discussed.
- -It was mentioned that the August meeting will be held at LIGO on their Science Saturday that month ***(See NOTICE below)***
- -Meeting adjourned followed by raffle.

NOTICE *(sent out via email): Our next meeting will be* ***Saturday, August 20th at LIGO in Livingston Parish****. This will be a pot luck* ***picnic*** *early in the day followed by hanging out at LIGO for their Science Saturday. Our picnic will begin at* ***11am in the pavillion****. (Yes, sometimes it's a bit warm, but we always deal with it and have fun!) As always, BRAS will provide a main dish type food and you are encouraged to bring a side dish of some sort for sharing. BRAS will also provide beverages, plates, cups and utensils.*

Last year, we also set up ***solar scopes*** *outside the LIGO Science Center providing solar viewing to the public during their event. They provided a canopy tent for that, too. The time of that event will be 1pm-5pm.*

Again, our picnic will start at 11am, before the public arrives. You may then attend Science Saturday events which go on from 1pm-5pm. You don't have to stay for the whole time. In fact, you can come and go whenever you like between those times. If you want to bring out a solar scope and help out, please do!

Clear Skies,



Ben Toman
BRAS Secretary

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BRAS Outreach Report

Greetings Everyone,

We had a pretty busy Summer and many successful outreaches. As fall begins its approach, we already have a few events lined up. Come on out and join the fun!

Thursday, August 11th - Perseid Meteor Shower
Highland Road Park Observatory
10pm-2am
Please note: As this is a BREC event at HRPO, you must have filled out your consent to a background check provided by BREC. See Christopher Kersey at the HRPO for more details.

Thursday, September 8th - Lutcher Library, 1879 West Main St.
7:15-9:15pm
Telescope Viewing

Thursday, September 15th - LSU Art Museum Downtown Baton Rouge
6:30-9:00pm
Telescope Viewing, Q&A

Tuesday, October 11th - Vacherie Library, 2593 Highway 20
6:30-8:30pm
Telescope Viewing

Both library events will have event flyers on Facebook so you can check those out. The event at the LSU Art Museum is still in the works, but sounds like it will be a fun evening. More details to follow.

In addition to these events, I would like our Sidewalk Astronomy to start up in September, October at the latest. We are in the process of pinning down locations around town. Please let me know if you are interested in helping out with the Sidewalk Astronomy. If we have enough volunteers, we may even do two locations a month either separate or simultaneously.

As always, please let me know ASAP if you are available to help out with any of these events. Not only could we use your help, we depend on it in order to be successful!

Clear Skies,

Ben Toman
Interim Outreach Coordinator

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BRAS Light Pollution Committee Report

Monday, 8 August from 7pm to 8:30pm

The LPC usually meets the second Monday of the month from 6:15pm to 7pm, before the BRAS public meeting. However, since the August meeting takes place off site, the Committee Chairman has set a double-length meeting for August.

This meeting will…

- *introduce the general public to the LPC
- *explain the LPC's benefit to amateur astronomers, nature lovers, homeowners and taxpayers
- *summarize the accomplishments of BRAS in this endeavor (including listing those entities with which BRAS has communicated)
- *instruct those interested in seeing as much of the Perseid Meteor Shower as possible what steps to take to maximize their view of that celestial event.

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

Thomas Halligan
Light Pollution Chairperson

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No BRAS Event Summaries for last month, BUT. . . . .

Your BRAS event photos can go here. So

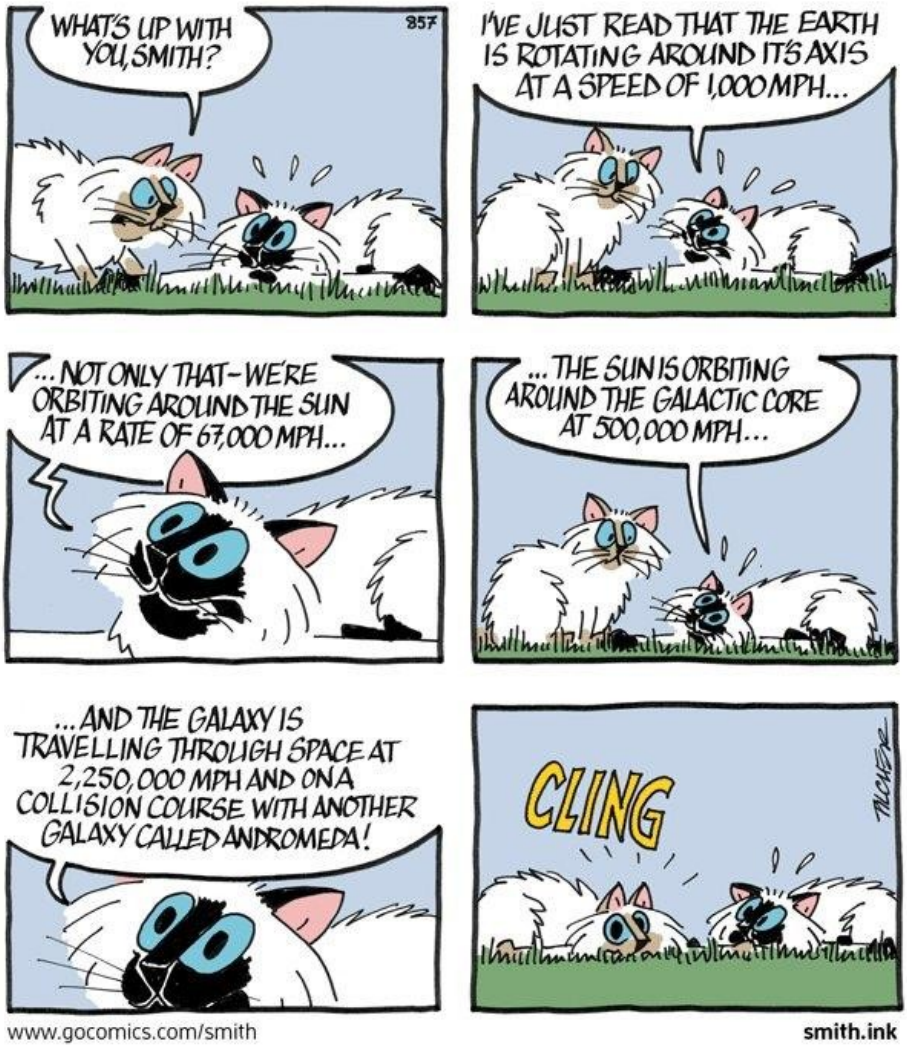
snap, snap, snap.

Got one or more BRAS event photos? Send them to newsletter@brastro.org, att'n Michele, with a caption, preferably by the 26th of the month for inclusion, (space permitting), in this newsletter. Cite photographer' credits too.

Recent Entries in the BRAS Forum

Below are selected recent additions to the BRAS Forum. There are also nine active polls. The Forum has reached 4000 posts.

Ninth Successful Dragon Cargo Craft Launch
ARRL Field Day: Fun was Had by All
2016 Deep South Regional StarGaze Takes Place 25 to 30 October
Juno Spacecraft Orbit Insertion is Perfect
ISS Research-and-Development Conferences Took Place in July
More Talk about the 2020 Martian Rover
Fortieth Anniversary for the Viking Mission
Jupiter's Great Red Spot Warmer than Previously Thought
HRPO Apprentice Judah S. Captured Moon-Aldebaran Conjunction
Inclement Weather Hinders 30 July Solar Viewing at HRPO
OSIRIS-REx Team Prepare to Send Spacecraft to Bennu



BRAS's 20/20 Vision Campaign

GLOBE at Night: until 6 August

2016 GOAL: 200 Measurements. CURRENT: 45

OBSERVATIONS NEEDED FOR SCHOOL PROJECT

BRAS is in the process of assisting a student at St. Joseph's Academy acquire raw data. She needs descriptions of views of five Messier objects—Pleiades, Orion Nebula, Andromeda Galaxy, Beehive Cluster, Whirlpool Galaxy—together with date and time, and the observing location's GaN measurement and quality of view. Parameters have been set defining whether each observation yields a poor, good or excellent view. An alert will also be sent out describing this exercise. The student needs very much this information with at least three sky views (different limiting magnitudes). The observation parameters for this project are as follows…

M45 [Pleiades] *Aperture: binocular. Magnification: 10x – 25x.*
Poor View: fifteen stars or fewer seen.
Good View: sixteen to twenty-nine stars seen.
Excellent View: thirty or more stars seen.

M44 [Beehive Cluster] *Aperture: 50mm – 70mm. Magnification: 10x – 25x.*
Poor View: indistinct blob seen.
Good View: at least ten distinct stars seen.
Excellent View: eleven or more distinct stars seen.

M31 [Andromeda Galaxy] *Aperture: at least 80mm. Magnification: 20x – 40x.*
Poor View: only core of the galaxy seen.
Good View: arms of the galaxy seen.
Excellent View: galaxy's companion (M32) seen.

M51 [Whirlpool Galaxy] *Aperture: at least 8". Magnification: 25x – 50x.*
Poor View: indistinct blob seen.
Good View: arms of the galaxy seen.
Excellent View: galaxy's companion (NGC 5195) seen.

M42 [Orion Nebula] *Aperture: at least 80mm. Magnification 60x – 100x.*
Poor View: only Trapezium (the four brightest stars) seen.
Good View: fifth star seen.
Excellent View: sixth star seen.

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

The Highland Road Park Observatory will be closed on 24 June.

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

5 August: **"Voyager"** LSU physics student Rory Bentley's second HRPO lecture focuses on one of the most legendary NASA missions.

12 August: **"Perseid Report"** This brief presentation will summarize the successes and failures of this year's Perseid peak monitoring across the globe.

26 August: **"OSIRIS-REx...to an Asteroid"** Over forty years ago, Earthlings acquired their first lunar samples. Now it's time for the asteroids! An automated trip to the asteroid Bennu launches from Earth in September. What are its goals? What will the results teach us?

SCIENCE ACADEMY

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

6 August: "Meteor Showers"
13 August: "Asteroids and Comets"
20 August: "Dwarf Planets"
27 August: "Expedition 10"

ONE-TIME CALLS FOR VOLUNTEERS

*Thursday 11 August, 10pm to 2am. *Two or three volunteers.* **Perseid Meteor Shower.** Front desk duty, viewing grounds duty. Easy to moderate difficulty.

*Friday 19 August, 6:30pm to 8:30pm. *Two or three volunteers.* **All Unaided-Eye Planets.** Telescope operation. Moderate difficulty.

*Saturday 20 August, 7pm to 10pm. *Two or three volunteers.* **Evening Sky Viewing Plus.** Telescope operation, physical science demonstrations. Easy 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 would more than welcome any who can help for at least one or two hours anytime during Stargazers Camp. We are asking any BRAS volunteers with time to assist. Thank you.

UPCOMING HRPO EVENTS

(click links for more detailed info)

Perseid Meteor Shower

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

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 until midnight for leisurely gazing at other celestial objects.

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All Unaided-Eye Planets

Friday, 19 August from 6:30pm to 8:30pm
at the Burbank Soccer Complex
No admission fee. For all ages. Binocular recommended.

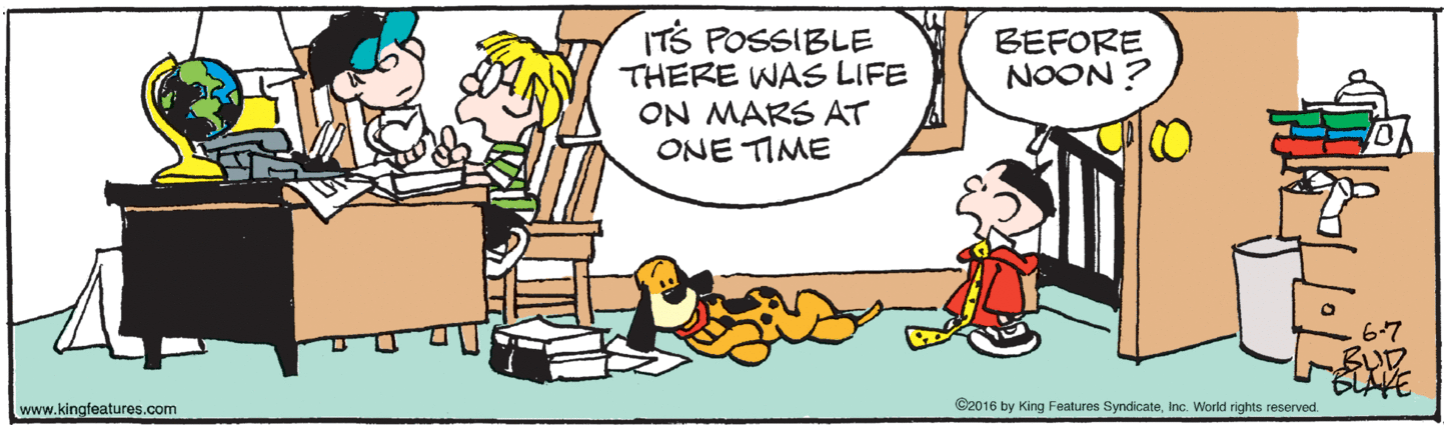
For several nights in late August skywatchers will notice all five of the Solar System's planets that are visible without equipment will be prominent in the evening twilight sky. On this night only HRPO personnel will have telescopes ready at the back of the Burbank Soccer Complex, between the long lake and the Dog Park. Come learn about the constellations in which they're residing (including a "long-lost" zodiac constellation), get your last telescopic view of Jupiter for 2016, and see Saturn's magnificent rings. Mars, Jupiter and Saturn all have orbiting spacecraft studying them at this time, and there is a "robot geologist" rolling around on Mars!

Triple Conjunction with Moon

Friday, 2 September from 5:45pm to 7:45pm
at the Burbank Soccer Complex
No admission fee. For all ages. Binocular recommended.

This astounding sight is a "one night only" thrill. Three planets will form a fairly large triangle (Mercury and Venus will be as far apart as possible for its proximity to still earn the label "conjunction"). The accompanying Moon will only be a scant 1.5 day-old—certainly some sort of vision test!

Please mark your calendars now:
the next **International Astronomy Day**
is **29 April 2017**, again from **3pm to 11pm**.



RECENT HRPO EVENTS

RESULTS OF JUNO ARRIVAL PARTY (4 July 2016)

Well, considering the fireworks on the levee and the work night, it was good to get forty-one patrons to our party.

In case you've been living under a rock, the Juno spacecraft successfully inserted itself into the correct Jovian orbit! The science gathering begins in about twenty-five days.

The night of 4 July during the post-JOI (Juno Orbital Insertion) briefing the science team released an absolutely stunning video, showing for the first time (in what can honestly be termed a "video") a group of moons orbiting its parent body. It's really amazing. It's called "Jupiter Approach Movie of Jupiter and the Galilean Moons".

Thanks to BREC Education Curator Amy, BREC CS Tom, BREC PA Hayley and BRAS member Roz for the great help. Thanks to Science Academy Cadets Ephraim C., Maria V., William D., Holden F. and SA Recruits Blakely and Dolly and their families for the support. *Article by Chris Kersey*

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ARTICLE: From Brainpickings.org

How Astronomer Jocelyn Bell Burnell Shaped Our Understanding of the Universe by Discovering Pulsars, Only to Be Excluded from the Nobel Prize

In July of 1967, the month of her twenty-fourth birthday, Northern Irish astrophysicist **Jocelyn Bell Burnell** (b. July 15, 1943) discovered the first pulsar. This was landmark evidence that neutron stars — the collapsed core left behind by the final explosion of a dying star, first proposed a year after the discovery of the neutron in 1933 — were real. But the most significant implication of the discovery was that if neutron stars could result from stellar death, so could black holes, which even Einstein considered a neat but limited, purely mathematical, and possibly unprovable theoretical construct.

Pulsars — enormous, rapidly spinning, extremely dense spheres of nuclear matter magnetized with a strength exceeding Earth's magnetic fields by an order of millions, even thousands of trillions — thus shaped our present understanding of the universe. Bell Burnell discovered the first four.

Jocelyn Bell Burnell, 1960s

The groundbreaking paper announcing the discovery was published four months later, listing Bell Burnell's name second and Antony Hewish, her thesis supervisor, first.

On October 15, 1974, the Nobel Prize in Physics was awarded to Hewish and his English colleague Martin Ryle for their work in radioastronomy. The Swedish Academy cited Hewish's "decisive role in the discovery of pulsars" in the official announcement.

Bell Burnell was excluded from the prize.

In a 1977 speech, Bell Burnell insisted on not feeling slighted by the Nobel committee, citing the difficulty of resolving "demarcation disputes between supervisor and student" and the belief that "it would demean Nobel Prizes if they were awarded to research students." But it is hard to read such sentiments without wondering whether there might be a kind of Stockholm Syndrome of the disenfranchised at work — after all, those systematically marginalized and discriminated against by any power structure have no choice but to rationalize injustice as a coping mechanism if they are to continue operating within that ecosystem without being broken by its biases.

Cosmologist **Janna Levin** explores Bell Burnell's pioneering contribution to science, its far-reaching implications, and the complexities surrounding the Nobel controversy in a portion of ***Black Hole Blues and Other Songs from Outer Space*** (*public library*), which remains among one of the very finest books I've ever read — an altogether spectacular chronicle of how the century-long quest to detect gravitational waves ushered in a new era of astronomy.

Levin writes:

There is nothing like plain observation to finally resolve a theoretical standoff. Jocelyn Bell Burnell found evidence of a neutron star. Added to the sheer intrinsic fascination of that discovery was the promise of even more, the promise of black holes. (An illustrious colleague is reported to have intercepted her at a meeting to declare, "Miss Bell, you have made the greatest astronomical discovery of the twentieth century.")

With her characteristic subtlety and sensitivity to nuance, Levin shares in the skepticism about such wholesale acquittal of prejudice:

Hewish need not defend his credibility as a Nobel laureate. As the advisor he set his student to the task — even if the task was to look for quasars. Harder to comprehend is the omission of Jocelyn Bell Burnell from the list of recipients. I ask her if she thought her former advisor should have done something more, and she says with no resentment, "If you get a prize, it's not your job to explain why you got the prize." She also adds that the slight has worked out for her quite well. She continues to get seemingly every other prize, medal, honor, and accolade ever invented. Fair compensation she seems to imply. Dame (Susan) Jocelyn Bell Burnell: dame commander of the Most Excellent Order of the British Empire, fellow of the Royal Society, president of the Royal Society of Edinburgh, fellow of the Royal Astronomical Society, many distinguished medals, dozens of honorary doctorates etc., etc., etc.

The specter of bias had haunted Bell Burnell since the dawn of her career. According to Ron Drever — the cantankerous Scottish genius comprising one third of the famed LIGO Troika, who served as young Jocelyn's undergraduate advisor in Glasgow — she was denied employment at England's foremost radio astronomy center in the mid-1960s on account of her gender. Levin follows the thread:

[Drever] relays, "They wouldn't take her on, and the story was that it was because she was a woman. But that's not official, you see. So she was very disappointed." He adds, hoping the absurdity was obvious, "Her second best was to go to Cambridge. You see?" He considered this a very fortuitous and happy turn. He laughs. "So she went to Cambridge and discovered pulsars. You see?"

Later in her career, Jocelyn Bell Burnell moved into X-ray astronomy to work on the team that built the British-American Ariel 5 X-ray astronomy satellite. On October 10, 1974, early in the morning, Ariel launched successfully, and at noon she heard the announcement of the Nobel Prize for the discovery of pulsars. There were two aspects of the announcement that were of particular significance to her. For one, the Nobel committee had finally acknowledged astrophysics as a subfield worthy of the Nobel Prize in

Physics. In the 1920s Edwin Hubble had campaigned for such a shift unsuccessfully. For another, she was not among the recipients.
To grasp the scope of this systemic predicament: Crowning the hierarchy of British academia are the so-called "full professors," distinguished from the vast court of mere doctors. Even at the height of her career, Bell Burnell was one of only two women among the 150 such full professors in Britain.

And yet in the midst of this maelstrom of politics and esteemed extrinsic validation is the perennial heart of science itself, that utmost intrinsic reward of curiosity — the sublime exhilaration of discovery. Levin telescopes to that luminous moment, which changed Bell Burnell's life and changed our basic understanding of the cosmos:

As a twenty-four-year-old graduate student at Cambridge, [Bell Burnell] and her advisor, Antony Hewish, were looking for quasars, bright radio sources that looked as small as stars. At the time that she was stringing radio antennae in the field, quasars were still called quasi-stellar radio objects and the sources were a mystery. The radio antennae worked well at finding quasars, poorly at resolving their sizes, and brilliantly at changing the course of astrophysics. Among the quasars detected were many glitches and peculiarities recorded on the reams of chart paper, quantified by the length of paper in feet. She examined hundreds (thousands?) of feet of paper meticulously. Most of the anomalies were attributable to human-made sources or some form of detector interference. But one funny signal persisted. She became convinced that the source was astronomical in origin. She said the realization that she had seen something truly important came gradually. As is often reported, the regularity of the signal earned the sources the internal nickname of LGM, for "little green men." It turns out that there are even more precise clocks than those manufactured by the civilizations of little intelligent green men. And those would be pulsars.

When Jocelyn Bell Burnell discovered the first pulsar in 1967, all she could deduce for certain was that there was a very regular series of pulses, a little over a second apart, and that they were coming from the sky.

When the second one appeared in the data, "that was the sweet moment," she says. That's when the oddity began to take on the features of a discovery. "Once I'd seen one scruffy signal, I was open to seeing more." She found the first four pulsars ever discovered by human beings.

A year later a pulsar was discovered in the center of the Crab Nebula, a luminous remnant ejected during a supernova explosion. The Crab Nebula was seen from Earth and noted in historical records as an astronomical event in 1054 AD. The implication: Neutron stars are the collapsed core that remains after a dying star explodes. We now extrapolate that there are hundreds of millions of neutron stars in our galaxy, and hundreds of thousands of these are pulsars.

When Jocelyn Bell Burnell discovered the first pulsar in 1967, all she could deduce for certain was that there was a very regular series of pulses, a little over a second apart, and that they were coming from the sky.

Composite X-ray and optical Hubble image of the Crab Nebula depicting synchrotron emission in the surrounding pulsar wind nebula, powered by magnetic fields and particles from the central pulsar

Article found on Brainpickings. https://www.brainpickings.org/2016/07/15/jocelyn-bell-burnell-pulsar-nobel/?mc_cid=0412440b33&mc_eid=3256cb7ec5

Observing Notes:

by John Nagle

Scutum – The Shield

Position: RA 18.7, Dec. -10

Named Stars:

Ionnina (Alpha Sct), "**of John**", mag. 3.85, 18 35 12.44 -08 14 35.9, is an orange giant star. **Alpha Scuti** used to belong to the **Aquila** constellation and was previously designated as **1 Aquilae.**

Deep Sky:

M 11 (NGC 6694), "Wild Duck Cluster", mag. 5.8, 18 51.1 -06 16, 14' in size, is an open cluster that has about 2,000 stars; detached, strong concentration of stars; moderate range in brightness; very bright and large. Resembles a flight of wild ducks in shape. Brightest star is mag. 8.0 near the cluster's center – it may be in the foreground. Two 9th magnitude stars lie just to the southeast of **M 11**. The cluster is estimated to be about 220 million years old. **M 11** is located 2° west and slightly south of **Eta Sct.** A double star (**ADS 11719**), mag. 6.7 and 8.7, lies 40' to the northwest. The variable star **R Sct** lies 1° to the northwest.

M 26 (NGC 6705), mag. 8.0, 18 45.2 -09 24, 15' in size, is an open cluster of 30 stars; detached, strong concentration of stars; small range in brightness; large; brightest star in cluster is mag. 10.3. **M 26** is located 1° east-southeast of **Delta Sct** (mag. 4.5), or 3° south of **M 11**and then 1½° west. **Delta Sct** is a double star (A-mag. 5.5, B-mag. 10). **NGC 6712** is 2° east and 1° north of **M 26.**

NGC 6664, mag. 7.8, 18 36.7 -08 13, 15' in size, is an open cluster of 50 stars; detached, no concentration of stars; moderate range in brightness; mag. of brightest star is 10.2.

NGC 6712, mag. 8.1, 18 53.1 -08 42, 8' in size, is a globular cluster with a low concentration of stars; pretty bright, very large, very well resolved, but irregularly shaped.

Tr 34, mag. 8.6, 18 39 47.2 -08 25 42, 7' in size, is an open cluster.

UY Sct, mag. 8.6 to 10.5, 18 27 36.53 -12 27 58.9, is a pulsating red supergiant star, with a period of about 750 days. **UY Scuti** is the leading candidate for the title of the largest known star.

Basel 1, mag. 8.9, 18 48 08.7 -05 51 30, is an open cluster.

NGC 6649, mag. 8.9, 18 33.50 -10 24, is an open cluster.

NGC 6625, mag. 9.0, 18 23.20 -12 03, is an open cluster.

NGC 6704, mag. 9.2, 18 50.90 -05 12, is an open cluster located 1.1° north of **M 11**.

Tr 35, mag. 9.2, 18 42 59.6 -04 13 06, 9.0' in size, is an open cluster located 1.2° west-northwest of **Beta Sct** (mag. 4.22, 18 47 10.48 -04 44 52.2).

NGC 6683, mag. 9.4, 18 42.20 -06 17, is an open cluster.

Sh 2-53, 18 25.2 -13 13, 15' in size, is a bright nebula; irregularly shaped; consists of several parts; set in a starry field.

Sh 2-55, 18 32.2 -11 46, 19' in size, is a bright nebula of irregular shape; very faint and diffuse nebulosity set in a rich star field. The western edge has two bright stars separated by approx. 0.5'.

Sh 2-161, 18 33.4 -04 58, 20' in size, is an emission nebula located 1.1° west of the 7th magnitude star near **NGC 6682**'s (18 41.6 -04 46) edge.

RSGC – 1, 18 37 58.0 -06 53 00, 2.67' x 2.67' in size, is an open cluster. It is a young (10 to 14 million years old), massive star cluster with 12 red supergiant stars, one yellow hyper-giant star, and one intermediate star. The cluster cannot be seen in visible light – it was discovered in 2006 using data from several infrared surveys. It is one of the most massive known clusters in our galaxy.
RSGC – 2, "Stevenson 2", 18 39 20.0 -06 01 42, 4.35' in size, is yet another young open cluster that cannot be observed in visible light. The cluster, discovered in 1990 using data obtained in an infrared survey, contains 26 red supergiant stars, and is believed to be 14 – 20 million years old.
RSGC – 3, 18 45 20.0 -03 24 43, 3.88' in size, is another massive young open cluster that cannot be detected in visible light. It contains 8 to 14 red supergiant stars, and was discovered in 2010.
RSGC – 4,**"Alicante 8",** 18 34 00 -07 14 00, is yet another massive, young open cluster that cannot be observed in visible light. Discovered in 2010, it contains 8 to 13 red supergiant stars. It is estimated age is about 16 to 20 million years old.
Mercer 3, 18 18 30 -16 58 36, 39" in size, is a heavily obscured globular cluster embedded in the disk of the **Milky Way**. **Mercer 3** is an old globular cluster with an age of about 12 billion years, with a mass estimated to be 2-3 hundred thousand **Sol** masses.
NGC 6682, 18 39.6 -04 46, 47' in size, is an absorption hole, a star cloud (a thinning of interstellar material that absorbs light from background stars). **NGC 6682** is located 1° west of **TR 35.**
B 95, 18 25.6 -11 45, 30' in size, is a dark nebula with high opacity, a cometary shape, includes a globule. Located about 2.6° northeast of the **"Eagle Nebula", M 16.**
B 97, 18 29.1 -09 56, 50' in size, is a dark nebula of medium opacity, and an irregular shape. Located approximately 2° southwest of **Alpha Sct.**
B 100/101, 18 32.7 -09 08, 39' x 14'in size, is a dark nebula with high opacity, a crescent shape, includes a globule. Located approximately 1°southwest of **Alpha Sct.**
B103, 18 39.2 -06 37, 39' in size, is a dark nebula of high opacity, and an irregular shape. Located on the northwest side of the **"Scutum Star Cloud"**, approximately 2° northeast of **Alpha Sct.**
There are 24 more Barnard objects, see me if you want the info.
Scutum Star Cloud is one of the brighter sections of the **Milky Way Galaxy**, and is one of the several parts of the **Milky Way** where no dust blocks our view. The**Wild Duck Cluster (M 11)** is located on the northern edge of the **Scutum Star Cloud.** E. Barnard called this the *"Gem of the Milky Way".*

Other Stars:

Zeta Sct, mag. 4.66, 18 23 39.55 -08 56 04.2, is a yellow giant star that is an *astrometric* binary system, a binary star that seemingly orbits around an empty space without a visible or detectable companion. The star has an orbital period of 6.5 years.

Delta Sct, mag. 4.70, 18 42 16.42 -09 03 09.2, is a triple star and the proto-type *Delta Scuti* variable star, sometimes known as *dwarf cepheids*. These are variable stars that exhibit fluctuations in luminosity as a result of both radial and non-radial pulsations of their surfaces. **Delta Scuti** is a yellow-white giant star with two line-of-sight companions, one with a visual magnitude of 12.2 located 15.2 arc seconds away, and another with a magnitude of 9.2, and 53 arc seconds away.
Epsilon Sct, mag. 4.88, 18 43 31.24 -08 16 30.9, is a multiple star system. The primary component is a yellow bright giant star, and has at least three companions: two magnitude 14 stars at a separation of 13.6 arc seconds and 15.4 arc seconds; and a 13th magnitude star separated by 30 arc seconds.
V 496 Sct, mag. 7.10, 18 43 45.57 -07 36 42.0, is a nova star.
V 475 Sct, mag. 8.4, 18 49 37.60 -09 33 15.9, is a nova star.
CRL 2136, 18 22 26.59 -13 30 15.7, is a massive young star.
PSR B1829-10, 18 32 40.9 -10 21 34, is a pulsar star – a magnetized rotating neutron star emitting a beam of electromagnetic radiation.
PSR B1822-09, 18 25 30.55 -09 35 22.1, is a pulsar star.
PSR B1823-13, 18 26 13.18 -13 34 46.8, is a pulsar star with a possible planetary companion.
PSR J1833-1034, 18 33 33.57 -10 34 07.3, is a pulsar star.

1E 1841-045, 18 41 19.34 -04 56 11.16, is a magnetar in a supernova remnant.
EU Sct, 18 56 13.12 -04 12 32.3, is a nova star.
V 368 Sct, 18 45 43.53 -08 33 00.9, is a nova star.
V 373 Sct, 18 55 26.71 -07 43 05.5, is a nova star.

Asterism: The asterism, faint as it is, does resemble a simple shield complete with handle (stars **Alpha, Beta, Gamma, and Delta Scuti**). Some see a dipper as well, standing on its handle. For this you will need to include **Delta** and **Eta Scuti** (there is a curving line of stars between **Delta** and **Eta Scuti**).

Beyond Magnitude 10: there are 6 stars of note; 38 planetary nebulae; two IC objects; 5 NGC objects; 10 open clusters; and four asterisms. See me if you want the info.

Sky Happenings:

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

Aug. 2nd – **New Moon** occurs at 3:45 PM CDT.
Aug. 3rd – Dusk – use binoculars to pick up **Jupiter** low in the west about 20 minutes after sunset. Look 16° to its lower right for **Mercury** and another 8° lower right of **Mercury** for **Venus**.
Aug. 4th – The **Moon** passes 3° south of **Venus** at 1 AM CDT,
The **Moon** passes 0.6° south of **Mercury** at 5 PM CDT,
Dusk – the thin crescent **Moon** pairs with **Mercury** about 15° below and right of **Jupiter** after sunset. Edge 9° lower and farther right to find **Venus**.
Aug. 5th – **Venus** passes 1.1° north of **Regulus** at 4 AM CDT,
Dusk – vivid **Jupiter** shines less than 2° above the waxing crescent **Moon**,
The **Moon** passes 0.2° south of **Jupiter** at 11 PM CDT.
Aug. 9th - The **Moon** is at apogee (251,197 miles from **Earth**) at 7:05 PM CDT.
Aug. 10th - Asteroid **Fortuna** is at opposition at 3 AM CDT,
First Quarter Moon occurs at 1:21 PM CDT.
Aug. 11th - Dawn – on this or the next few mornings, watch the east-southeast horizon about 20 minutes before sunrise for the helical rising (first visibility) of **Sirius** as it emerges from the **Sun**'s glare,
The **Moon** passes 8° north of **Mars** at 5 PM CDT.
Aug. 11th/12th - Late night to dawn – **The Perseid Meteor Shower** peaks on the morning of Aug. 12th. Skies will be dark after the **Moon** sets at around 1 AM local daylight time.
Aug. 12th - The **Moon** passes 4° north of **Saturn** at 7 AM CDT.
Aug. 13th - **Saturn** is stationary at 1 PM CDT.
Aug. 16th - **Mercury** is at greatest eastern elongation (27°) at 4 PM CDT.
Aug. 18th - **Full Moon** occurs at 4:27 AM CDT, a penumbral lunar eclipse.
Aug. 19th - The **Moon** passes 1.1° north of **Neptune** at 7 AM CDT.
Aug. 20th - Asteroid **Pallas** is at opposition at 7 AM CDT.
Aug. 21st - The **Moon** is at perigee (228,074 miles from **Earth**) at 8:19 PM CDT.
Aug. 22nd - The **Moon** passes 3° south of **Uranus** at 5 AM CDT.
Aug. 23rd/24th - Evening – **Mars** forms a vertical line about 6° long with **Antares** below and **Saturn** above, about half way up the southwest sky,
Mars passes 1.8° north of **Antares** at 11 PM CDT.
Aug. 24th - **Last Quarter Moon** occurs at 10:41 PM CDT.
Aug. 25th - Morning to afternoon – the **Moon** occults **Alderbaran** at mid-morning or early afternoon for much of the **United States** and **Central America,**
The **Moon** passes 0.2° north of **Alderbaran** at noon CDT for those that do not see an occult,

Mars passes 4° south of **Saturn** at 1 PM CDT.

Aug. 27th - **Mercury** passes 5° south of **Venus** at 12:00 midnight CDT**,**
Venus passes 0.07 ° north of **Jupiter** at 5 PM CDT. **Conjunction!**

Aug. 29th - **Mercury** is stationary at 8 PM CDT.

Planets:

Mercury, Venus, and **Jupiter** – On Aug. 1st, **Jupiter, Mercury, Regulus,** and **Venus -** in that order, from upper left to lower right – form a line nearly 27° long in the west after sunset. Look early in the twilight (use binoculars) because **Venus** is only about 4° above the horizon, even just 20 minutes after the **Sun** goes down. Magnitude -0.1 **Mercury** gleams about 8° to the upper left of magnitude -3.9 **Venus**, which sets a bit more than 45 minutes after the **Sun. Mercury** sets approximately 15 minutes later, and **Jupiter**, at magnitude -1.7, follows in another 45 minutes. A crescent **Moon** passes this trio during Augusts' first week. On Aug. 3rd, you will need a haze-free sky and an uncluttered horizon to spot a one day old **Luna** 3° below **Venus,** with the **Moon** setting about 30 minutes after the Sun. On Aug. 4th, the **Moon** will stand 2° to **Mercury**'s left and both objects lie 6° high 30 minutes after sunset. On Aug. 5th, a slightly fatter crescent **Moon** appears 1° below **Jupiter.** On Aug. 4th and 5th, **Venus** passes a little more than 1° from **Regulus**. **Mercury**, moving farther from the **Sun**, reaches greatest elongation on Aug. 16th, lying 27° east of the **Sun**, and appearing 4° below **Jupiter. Mercury** has faded to magnitude 0.2 by now, but remains relatively easy to see against the twilight. On Aug. 16th, **Venus** and **Jupiter** lie 11° apart, but continue to close in on each other as **Mercury** starts heading back towards the **Sun**. The three planets form an elegant triangle that changes shape each evening. On Aug. 19th, **Mercury,** at a maximum altitude of 6° and dimmed to magnitude 0.3, shines it's closest to **Jupiter**, which stands about 4°above it. **Venus** is 8° right of **Mercury**, closer to the **Sun**. On Aug. 28th, **Mercury** (at mag. 0.8) comes it's closest to **Venus**, hovering about 5° below and left of **Venus**. The best conjunction for mid-northern viewers occurs on Aug. 27th, when **Venus** and **Jupiter** draw as close as 0.1°, closer than any time since May, 2000. At their tightest, just 4.2' separate them. Regrettably, this happens in late afternoon for **North America**. By twilight, the two have pulled a bit away – 5.5' for the **East Coast** and 12.1' for the **West Coast**. **Jupiter**'s dim disk measures about 31" wide, and the 92% lit disk of **Venus** is 11" wide. On the same evening, Aug. 27th, the trio of **Venus, Jupiter**, and **Mercury** fit within their smallest circle of sky, just over 5° in diameter. **Venus** and **Jupiter** remain 2° apart or less from Aug. 25th to 29th. On the final evening of August, **Venus** appears 4° to **Jupiter**'s upper left. **Mercury** has faded considerably and is lost in the **Sun**'s glare.

MARS and **Saturn** – **Mars** and **Saturn** are together with **Antares**, and put on a rare and beautiful show in August. **Mars** shines at magnitude -0.8 with a disk 13" wide, on Aug. 1st, when it sits on the border between **Libra the Scales** and **Scorpius the Scorpion**, lying 6° north of **Antares**. As August starts, **Mars** crosses from **Libra** to **Scorpius** and then, around Aug. 9th, passes very close to the south of the bright and unpredictable variable star **Delta Scorpii**. **Mars** enters **Ophiuchus** on Aug. 21st, and two nights later, it passes 2°north of **Antares** and appears in a line with the star and **Saturn**. On the evenings of Aug. 23rd and 24th, **Mars** travels between **Saturn** and **Antares**. On both evenings **Mars** appears less than 2° north of **Antares** and a bit more than 4° south of **Saturn**. On Aug. 25th, **Mars** passes 4° due south of **Saturn. Mars** zooms east, away from **Saturn** and **Antares** as August ends. By Aug. 31st, both planets set at approximately 11:30 PM DST. You will notice that **Saturn**, during August, looks flattened – its equatorial diameter is nearly 10% bigger than its polar diameter. (In mid-August, these values are 17.2" and 15.8" respectively.) The flattening arises because **Saturn** is made of gas and spins rapidly. The ring system spans 39" at mid-month and tips 26° to our line of sight. Notice the dark **Cassini Division** that separates the outer **A ring** from the brighter **B ring**. The faint **C ring** appears as a slight darkening where it passes in front of the planet. **Saturn'**s moons – 8th magnitude **Titan** circles **Saturn** once every 16 days, passing due north of **Saturn** on Aug. 8th and 24th, and due south on Aug. 15th and 31st. Between those times, **Titan** can stray up to 2.8' from **Saturn**. The three brighter of the smaller moons – **Tethys, Dione,** and **Rhea** (all 10th magnitude), **Enceladus** at 12th magnitude, and **Mimas** at 13th magnitude, are more challenging to observe. **Enceladus** revolves around **Saturn** in 33 hours, and **Mimas** in just 23 hours. Each orbits the planet just beyond the edge of the rings, whose brightness typically masks them. You will need a 6-inch or larger telescope with good optics to pull them in, and then only when they lie near greatest elongation. Give it a

try on Aug. 8th when they reach greatest elongation within 10 minutes of each other. Distant **Iapetus** takes 79 days to complete a circuit of **Saturn**. The moon rarely appears close to the planet. Best bet for seeing it comes on Aug. 18th, when it glows at 11th magnitude and lies 2.1' due south of **Saturn**. On Aug. 31st, it shines at 10th magnitude some 7' west of **Saturn**.

Uranus –Uranus rises before 11 PM local daylight time for most of August and appears highest in the south as dawn breaks. At magnitude 5.8, **Uranus** is an easy target through binoculars and even shows up to the naked eye under a dark sky. You can find it in the southeastern corner of **Pisces the Fish**, in a relatively sparse region that makes it quite easy to identify the ice giant planet. First locate the 5th magnitude **Mu Piscium. Uranus** lies 2.5° north of **Mu Piscium** all month. Proof of sighting is that **Uranus** has a distinctive blue-green disk that spans 3.6'.

Neptune – Neptune rises in the southeast, reaching opposition and peak visibility in September. In August, **Neptune** remains in view all night among the background stars of **Aquarius the Water Bearer**, climbing highest in the south after midnight. **Neptune,** at magnitude 7.8, shows up nicely in binoculars. **Neptune** remains near 4th magnitude **Lambda Aquarii** all month. On Aug. 1st, Neptune lies 0.6° south of this star; by the 31st, it has moved to a point 1.2° southwest of **Lambda Aquarii**. To confirm a sighting, only **Neptune** will show a noticeable blue-gray hued disk, and at high power with steady seeing the disk will be 2.4" in diameter.

Pluto - Pluto spends the month of August in the **Sagittarius Teapot asterism**. The dwarf planet is observable with a large aperture telescope most of the night, but is higher in the sky in late evening.

Moon – The slender crescent **Moon** poses very low near **Venus, Mercury,** and **Jupiter** at dusk on Aug. 4th, and a bit higher near **Jupiter** on the 5th. The gibbous **Moon** forms a large, but dramatic equilateral triangle with **Mars** and **Saturn** at nightfall on Aug. 11th. On Aug. 25th, the **Moon** occults **Alderbaran** for much of the eastern and southern **United States** (including **Hawaii**) and **Central America**.

Asteroids **–** Asteroid **2 Pallas** – to locate, find **Epsilon Pegasi** (mag. 2.4), which marks the nose of **Pegasus,** and lies a bit west of **The Great Square of Pegasus**. **2 Pallas** begins Aug. 3° north-northwest of **Epsilon Pegasi**, and then on Aug. 9th, heads southwest, passing between **Epsilon Pegasi** and the globular cluster **M 15**. The asteroid reaches opposition and peak visibility on Aug. 20th, when it shines at magnitude 9.2, and remains visible all night. On Aug. 21st, **2 Pallas** will be about 3° to 3½° west and slightly south of **Delta Equuleus**, and on Aug. 26th, will be about 3° southwest of **Delta Equuleus**.

Comets **–** Comet **9P/Tempel,** a 4 mile wide object, returns after 11 years. This is the comet that **NASA's Deep Impact Probe** sent a copper "bullet" (coffee table sized) into the nucleus. It has returned two revolutions around the **Sun** later, mostly unharmed, as an 11th magnitude fuzzball sailing eastward away from **Spica**. It is best to try observing the comet during the first week of Aug. before the **Moon** shed too much light into the evening sky. Use the 5.5 magnitude star **86 Virginis**, which lies 5° east of **Spica**, as your guide. A 4-inch telescope will show **9P/Tempel**'s feeble glow, but you will need an 8-inch or larger telescope to get a decent look.

Comet **PANSTARRS (C/2003 x1**) glows a magnitude brighter than **9P/Tempel**, but it is a tougher target because it lies much lower in the sky. The haze and humidity common at this time of year conspire to obscure such objects near the horizon.

Meteor Showers **–** The annual **Perseid Meteor Shower** peaks the morning of Aug. 12th. Skies will be dark once the waxing gibbous **Moon** sets at around 1:00 AM Local Daylight Time. Although the **Perseids** usually rank among the strongest showers of the year, 2016 could be exceptional. Meteor scientists Mikhall Maslov and Esko Lyytinen think the background rate this year could reach 150 meteors per hour, some 50% higher than in typical years. The reason: **Jupiter**'s gravity recently nudged the stream of debris from the **Perseid**s parent comet, **109 P/Swift-Tuttle**, closer to **Earth**'s orbit. Whether the prediction for increased activity pans out or not, the view should be spectacular as the shower's radiant climbs high in the sky before dawn.

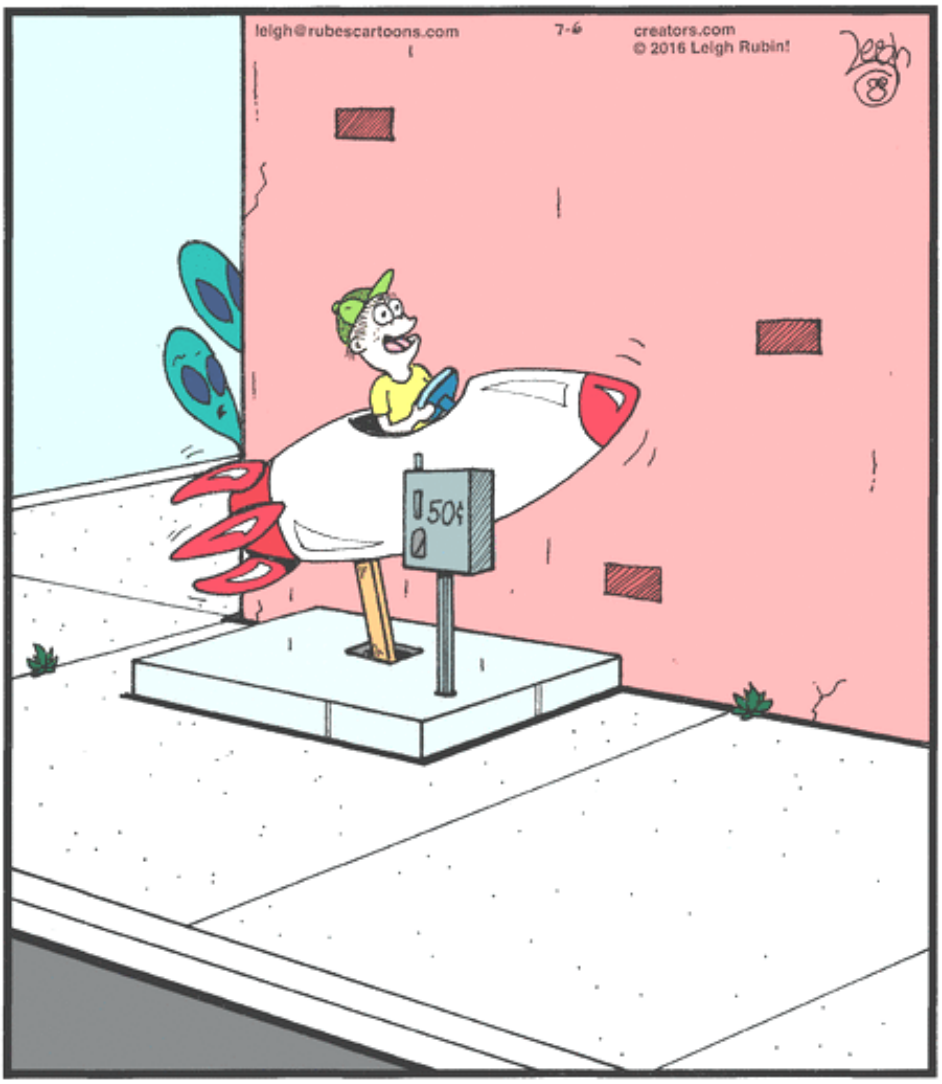
When to View the Planets:

Evening Sky
Mercury (west)
Venus (west)
Mars (south)
Jupiter (west)
Saturn (south)
Neptune (east)

Midnight
Mars (southwest)
Saturn (southwest)
Uranus (east)
Neptune (southeast)

Morning Sky
Uranus (south)
Neptune (southwest)

DARK SKY VIEWING - PRIMARY ON AUGUST 6TH, SECONDARY ON AUGUST 27TH



"I think it's safe to say that reports of their highly advanced space program may have been wildly exaggerated."

Mythology:

Scutum – The Shield

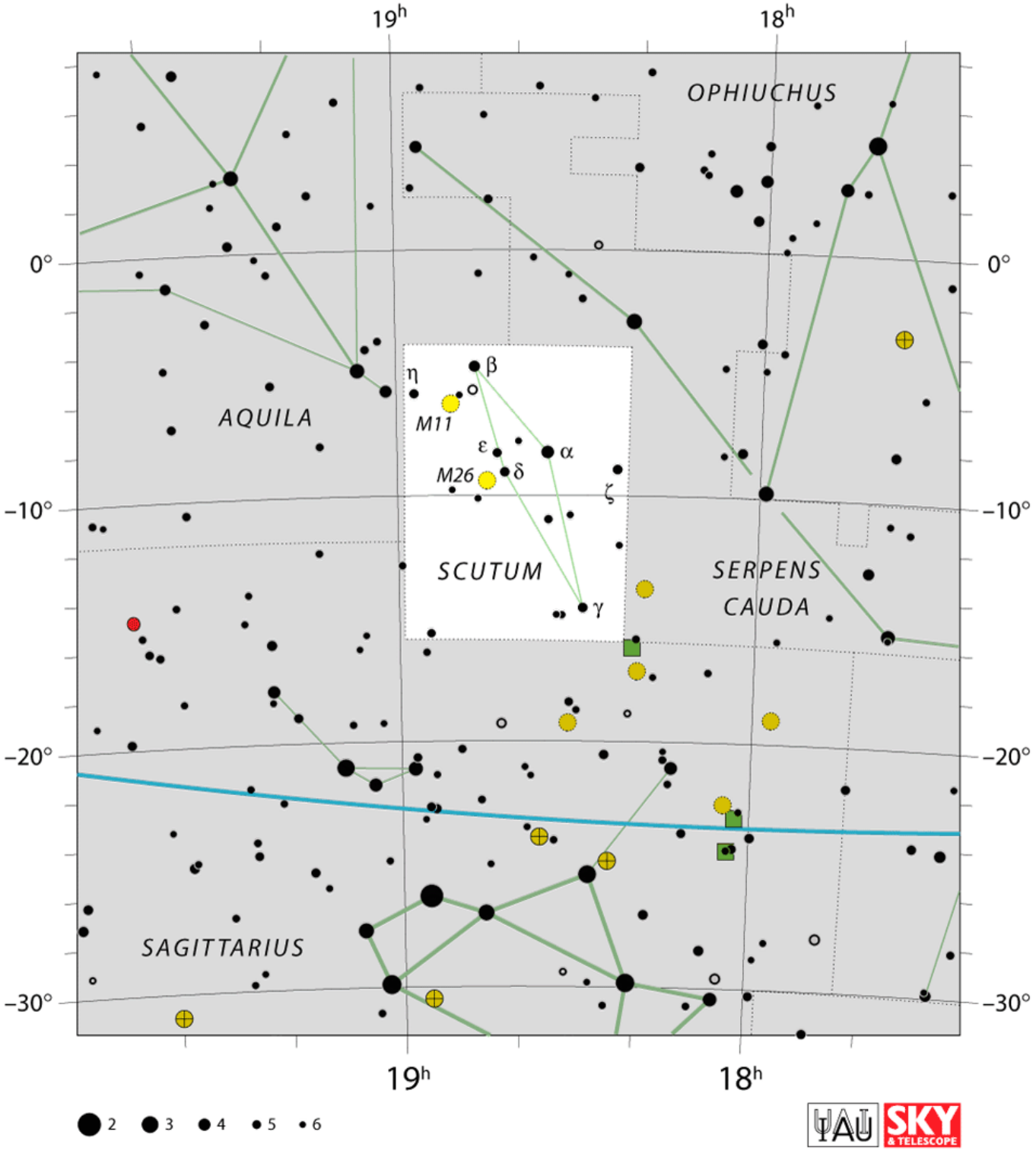
The fifth-smallest constellation in the sky, introduced by the Polish astronomer **Johannes Hevelius** in 1684 under the title "***Scutum Sobiescianum***", or **Sobiesci's Shield**, named in honor of **King John III Sobiesci of Poland**. It is the only constellation introduced for political reasons that is still in use.

Scutum lies in a bright area of the **Milky Way** and is distinctive despite its small size. The brightest stars of **Scutum** are only of 4th magnitude, and none were named, but the constellation contains a celebrated cluster of stars called "**The Wild Duck Cluster" (M 11, NGC 6694)**, because of its fan shape resembles a flight of ducks.

Jan Sobiesci (1629-1696) was the eldest son of the castellan of **Crakaw, Jakob Sobiesci**. He was a brilliant military leader and by 1665 had become the field commander of the Polish army. The main threat to **Poland** at this time (indeed to all of central **Europe**) came from the **Turks**. While **Sobiesci** attempted to repulse the **Turks,** the Polish king's envoys ceded all of the **Ukraine** to **Turkey**. Meanwhile, **Sobiesci** won victory after victory. In November of 1673, the Polish King died. **Sobiesci** left the front lines and presented himself as a candidate for the throne back in Warsaw (the kingship was an elected position). In May of 1674, he became **King John (or Jan) III**.

Sobiesci returned to his former job as army commander, and after nearly ten years struggle, he was able to sign the **Treaty of Warsaw** with **Leopold I.** Following this treaty, **Sobiesci** further safeguarded **Europe** from the **Turks**. Personally leading the Polish cavalry, on 12 September 1683, he broke the Turkish siege of **Vienna**, and liberated **Hungary** in the bargain.

Seven years later (in 1690) **Hevelius** commemorated these events with the inclusion of "***Scutum Sobiescianum"*** in the heavens.


19h
18h
OPHIUCHUS
0°
AQUILA
η
β
M11
ε
α
M26
δ
ζ
SCUTUM
SERPENS
CAUDA
γ
−10°
−20°
−30°
SAGITTARIUS
19h
18h
2
3
4
5
6
IAU
SKY
& TELESCOPE

The End

back