Monthly Meeting
Monday, March 12th at 7PM at HRPO

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

Presentation: John Martinez will discuss Trappist-1 and the search for Alien Planets

What's In This Issue?

Like this newsletter? See past issues back to 2009 at
http://brastro.org/newsletters.html

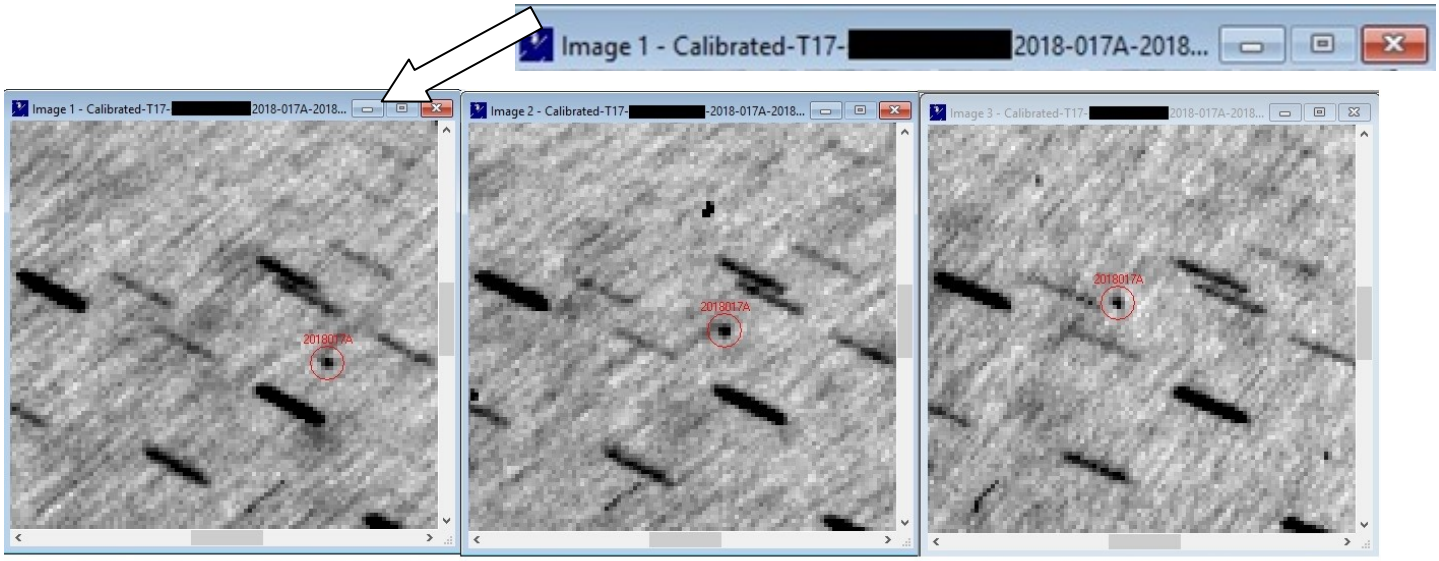
President's Message

Falcon Heavy liftoff from pad LC-39A

First off I would like to thank BRAS member Rory Bentley, for his informative talk on star clusters.

In asteroid news, nine NEO are known to have made Earth Close Approaches of less than one lunar distance in February 2018.

Huge space news includes the exciting, successful launch, on February 6, of SpaceX's Falcon Heavy rocket with a dummy payload (Elon Musk'sTesla Roadster Int'l Code: 2018-017A).
I've been tracking its location, and took the photos below one week later, on the 13th.



The FALCON HEAVY/TESLA Roadster(Int'l Code: 2018-017A) on 2018-02-13 from Siding Spring Observatory, Coonabarabran, NSW, Australia (MPC code Q62) three stacks of 15-60 second luminance BIN2 taken with iTelescope.net's (T17 TEL 0.43-m f/6.8 reflector + CCD)
By Steven M. Tilley

Tuesday, March 20, 2018, at 16:15 UTC(11:15 am CDT) will mark the Vernal Equinox and end of long nights for the Northern Hemisphere. I would like to invite you, your family and friends to our meeting at 7:00 PM on March 12. The talk will be on Trappist-1 and the search for Alien Planets given by John Martinez.

Saturday 21 April, 2018 is International Astronomy Day. We will hold our celebration at Highland Road Park Observatory from 3 pm to 11 pm, and I would like to invite you, your family and friends to come.

Saturday, June 30, 2018, is the anniversary of the 1908 Siberian Tunguska event known as International Asteroid Day "global awareness campaign where people from around the world come together to learn about asteroids, the impact hazard they may pose..." I propose BRAS takes part in this day.

Please check with Ben Toman to help with our Outreach Requests on other dates throughout the month. Remember, Outreach to our community is a big part of what we do.

Clear Skies

Steven M. Tilley

Steven M. Tilley, President

Secretary's Summary of February Meeting

- BRAS President, Steven Tilley, calls the meeting to order and gives the floor to John Nagle to announce the guest speaker of the evening.
- John introduces LSU Physics and Astronomy student, Rory Bentley.
- Rory gives a lecture on various types of star clusters.
- Steven recognizes all the new members of the club.
- Don Weinell gave a short talk about the Rockefeller trip.
- HRPO manager, Chris Kersey, asked for volunteers for upcoming events at the observatory.
- Vice President, Scott Louque, attempted to give a short presentation on his All Sky Cam. Due to technical difficulties this will be moved to the next meeting.
- Raffle held.
- Meeting adjourns.

Submitted by Krista Reed, Secretary

Interest in astronomy appears to be mushrooming these days. Have a look at these:.

"PEERING DEEPER INTO SPACE"

This **TED Radio Hour** podcast, aired February 9th,
is a very lively presentation that reveals a lot about LIGO and
what gravitational waves really are . . . how discovered . . . why important . . . . etc.

https://www.npr.org/programs/ted-radio-hour/584322415/peering-deeper-into-space

EBRP Library's **One Book One Community** book club choice for 2018, is entitled

***Hidden Figures* by Margot Lee Shetterly**

3 Oscar nominees, it's an historical account about the Space Race. The movie is available on Amazon's Prime Video for $9.99, or you can get in line to check out the disk or book from the library.

Hey, ya'll . . . Look what EBRP Library is doing to promote Astronomy to kids throughout the month of March... coming to a branch near you.

Here's the schedule:

10 a.m. Monday, March 5,
River Center Branch

3 p.m. Tuesday, March 6,
Eden Park Branch

3 p.m. Wednesday, March 7,
Bluebonnet Regional Branch

3 p.m. Thursday, March 8,
Central Branch

5 p.m. Monday, March 12,
Jones Creek Regional Branch

10 a.m. Tuesday, March 13,
Greenwell Springs Rd. Rgl. Branch

3 p.m. Tuesday, March 13,
Delmont Gardens Branch

3 p.m. Thursday, March 15,
Scotlandville Branch

3:30 p.m. Thursday, March 15,
River Center Branch

10:30 a.m. Monday, March 19,
Carver Branch

Schedule continued at top, right

EAST BATON ROUGE PARISH LIBRARY

3 p.m. Tuesday, March 20,
Baker Branch

3 p.m. Wednesday, March 21,
Pride-Chaneyville Branch

3 p.m. Thursday, March 22,
Main Library at Goodwood

3 p.m. Monday, March 26,
Fairwood Branch

2 p.m. Wednesday, March 28,
Zachary Branch

YOUR MISSION:

Children of all ages can join us to celebrate the One Book One Community selection *Hidden Figures* by Margot Lee Shetterly

The East Baton Rouge Parish Library Children's Services Department with The LASM Discovery Dome Presents

Magic Tree House: Space Mission

Registration is required for all.
To register, call the Library location directly.

Have you read to your child today?

BRAS Outreach Report

Hi, Everyone,

Wow! What a busy last couple of weeks we've had. A huge thank you to all who came out and volunteered their time in February. I hope I get everyone: John Nagle, Susan Miller, Chris Kersey, Chris Raby, Scott Louque, Scott Cadwallader, Ben Toman, Connor Matherne, Coy Wagoner, Michele Fry, Trey Anding, Steven Tilley, James Ernest, Roz Readinger. If I missed someone, please forgive me! The enthusiasm was fantastic. And if some of those names are starting to look like familiar additions to the thank you list, you are right. You should think about getting yours added, too!!

In February, we had at least 5 outreach events. 3 of them were just this past week! I'm happy to say that we had a good time at each of them.

I was actually able to attend all 3 events this past week. Look, I know that after a long day at work it is sometimes the last thing on your mind to give up your free evening to volunteer. But each one of the events this past week were SO MUCH FUN, getting outside and hanging out with my astronomy friends, promoting astronomy, teaching more people about the night sky. HaHa!) I must encourage you ALL to take the time to volunteer for some of our Outreach events. You'll have fun with club members and feel good for doing some important community service.

At the Main Library this past Saturday, for the One Book, One Community event featuring, of all things, a book on the early Space Race, we used my interactive "Light Box" to demonstrate the effects of light pollution in our community, and introduce nomenclature to both adults and children. What is "light pollution"? What is "good vs bad lighting"? What are "fully capped and shielded fixtures? (see chart on Page 9)"

Main Library, Ben demos his Light Pollution Diorama. The child flips each switch in turn to see the effect of each type of lighting on the night sky (painted on the inside of the box). The Mother looks on with new awareness, signifying indeed she would like her children to look up and see the Milky Way and thousands of stars overhead. – Photo by Michele Fry

It's never too early to discuss light pollution with young people and their parents. With education, new businesses and modern construction are beginning to adopt better outdoor practices, but the vast majority have still never heard of light pollution. We are going to make a difference here. Excitement is a-building.

Busy times ahead. We've got two events next week and Rockin' At The Swamp is a long one. I hope you'll come out and help.

Also, we have a request to provide some stargazing at the Girl Scout camp in St. Francisville on April 21st. "But that's Astronomy Day!!" you say. It is, however one of our members is going to help out with the Scouts, and we could use more help. If you are one of those volunteers who just does "off HPRO site" volunteering, please join in. (However, if you are a regular HRPO volunteer, please keep IAD as your main priority.)

Here's the line-up of Outreach Events:

Thursday, March 8th
7pm-8pm
Main Library in Denham Springs
(Short presentation and telescope viewing)

Saturday, March 10th
9am-4pm
Bluebonnet Swamp and Nature Center
Rockin' at the Swamp
(Solar observing, demos, info. 8 or more volunteers desired for this long event. Let me know a shift you'd like to do.)

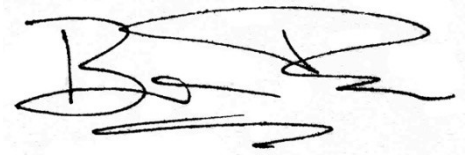
Tuesday, March 27th
7pm-9pm
Perkins Rowe
Sidewalk Astronomy
(telescopes and info. Please note the time change due to daylight savings.)

Sunday, April 8th
9:30am-5pm
Baton Rouge Zoo
Zippity Zoo Fest
(Demos and solar observing. Several people needed due to the length of event so we can do shifts. I need to know if you plan to help out. If you are not on their list of volunteers, you will NOT receive FREE entry.)

Saturday, April 21st
7:00pm-9:00pm (or close to that)
Camp Marydale in St. Francisville
(telescope observing. 75+ scouts expected.)

I told you we have a busy year shaping up! Again, please let me know ASAP if you can help out. Don't be shy. These events are great ways to learn new tidbits of astronomy yourself! No experience necessary.

Clear Skies,



Ben Toman,
Outreach Coordinator

Below are a few cool Outreach Pics for February

February Sidewalk Astronomy at Perkins Rowe. Notice they turned off the big screens for us.

Main Library Saturday for One Book, One Community, before the rain chased us indoors. Volunteers: Susan M., Trey A., Ben T., Steven T., John N., Scott C., Roz R. and Michele F.

BRAS on the Shaw Center Terrace! John N., Chris K., Chris R., Ben T. and Scott C. with our scopes

Scott Cadwallader on top of the Shaw Center Thursday, Feb 22nd

BACK

BRAS Light Pollution Committee Report

This committee meets at 5:45, same day as the 6:30 BRAS Business Meeting
(which takes place on the Wednesday before the Monthly Meeting)
Everyone is welcome to join in.

Meeting called to order by John Nagle
No new members, 6 members present
Minutes of February meeting read and approved.

Old Business:

1. Approved the revised /amplified criteria for the Good Lighting Award
2. Approved the basic information to be put on the Dark Sky Advocacy web pages
3. The individual Petition for Reduction of Light Pollution, to be on the Dark Sky Advocacy web pages, will be rewritten, and the Petition for the Reduction of Light Pollution for the public will also be rewritten, with electronic signatures being investigated – this petition to be used at all public events
4. Approval of a specific Light Meter, Sper Scientifics 840022c, and Proposal to the executive board to purchase one approved.
5. Material for training of BRAS members on Light Pollution to be written, and to include basic information on Dark Sky Advocacy web pages
6. Decided no public training on Light Pollution at this time (until material and course outline is developed)

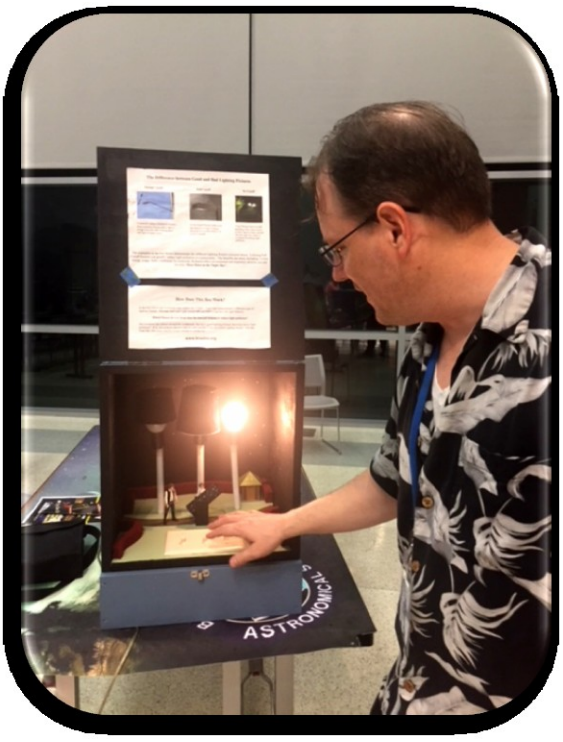
New Business:

1. Approved compiling a list of all civic associations/groups within a three mile radius of HRPO, with the intent of contacting them about outdoor lighting and light pollution
2. Approved Chris Kersey to be able to talk to groups about Light Pollution as a BRAS member, not a BREC employee
3. Agreed to bring up Light Pollution at every event that could be affected by it

Meeting Adjourned

John R. Nagle

Submitted by John Nagle, Chairman



Light Pollution Diorama

Built by BRAS member Ben Toman (pictured), we can demonstrate the 3 basic types of outdoor lighting: (Full Cutoff, Partial Cutoff, No Cutoff)

See chart, Page 9

The Progression from Bad to Best Lighting Fixtures

No Cutoff	Partial Cutoff	Full Cutoff
		
These open fixtures have no light shielding. Much of their light shines upward and is completely wasted, causing most of our light pollution.	Commonly called Cobrahead fixtures, these lamps allow light to escape from the side creating glare and "light trespass" issues.	Full Cutoff fixture, fully capped and shielded, ensures the majority of light is directed downwards where it is actually needed.

Utilizing Full Cutoff fixtures greatly reduces light pollution in any community. The benefits include: Lower energy usage, Safer conditions for motorists, Reduced ill-effects on nocturnal and migratory animals, and our favorite, *More stars visible in the Night Sky!!*

Recent Entries in the BRAS Forum

Below are selected additions to the BRAS Forum. additions to the BRAS Forum. There are also nine active polls.

The Forum has reached 5000 posts.

Falcon Heavy Demonstration Mission Wows World

Mars Now Six Arcseconds Large and Magnitude +1

Only a Few More Chances to Spot Tiangong 1

Partial Solar Eclipse in Southern Hemisphere

NanoDays Sees Biggest Success in Years

Meade Narrowband Filter for Sale

20/20 Vision Campaign

This campaign's goal was to raise the SQM measurement at HRPO's back viewing pad to 20.0 by this past November. There is talk of keeping it perpetual until the goal is reached, but the Light Pollution Committee will have to decide.

Messages from HRPO

Highland Road Park Observatory

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

2 March: "The Great Martian Apparition" As Earth speeds closer to it the Red Planet rises earlier, grows larger and shines brighter in the night. It will be seventeen years before it is this impressive again! This outline of the major milestones of this incredible Apparition climaxes with the description of the amazing July Opposition!

23 March: "Skygazing—A Pursuer's Guide" This special early lecture aimed toward students and families introduces the science hobby and outlines how print and online resources, and HRPO and BRAS, can support a lifetime of intellectual and aesthetic fulfillment.

SCIENCE ACADEMY

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

3 March: "Genetics"
10 March: "Exoplanets!"
24 March: "Layers of the Earth"
31 March: "Cadet's Choice"

ONE-TIME CALLS FOR VOLUNTEERS

***Saturday 3 March, 5:15pm to 6:45pm**. *Three or four volunteers.* **Learn Your Telescope.** Showing patrons how to set up and use their personal telescopes. Moderate difficulty. Noone has volunteered yet; this is urgent.

***Saturday 3 March, 7pm to 10pm.** *One or two volunteers.* **Evening Sky Viewing Plus.** Telescope operation, physical science demonstrations, front desk duty. Easy to moderate difficulty.

***Friday 9 March, 5:30pm to 7:30pm.** *One or two volunteers.* **The Edge of Night.** Pointing out different objects or passes as they appear or occur.

***Saturday 21 April, 3pm to 11pm.** *Fifteen volunteers.* **International Astronomy Day.** HRPO's largest public offering. Front desk duty, telescope operation, physical science demonstrations, children's ride monitoring, relaying messages, welcome table. Low to high 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.

NASA Events

Live broadcasts open to the public at HRPO.
No admission fee. Drinks and refreshments.

Thu 1 Mar, 3:30pm: GOES-S Launch
Wed 21 Mar, 11:30am: Expedition 55/56 Launch
Fri 23 Mar, 1:45pm: Expedition 55/56 Docking/Hatch Opening

GLOBE at Night: 8 to 17 March [Orion]

Instructions to participate in this project are at…
http://www.brastro.org/phpBB3/viewtopic.php?f=29&t=2760

INTERNATIONAL ASTRONOMY DAY

Saturday, 21 April from 3pm to 11pm
Twelfth Consecutive Year!
Volunteers needed! HRPO will be calling!

RAFFLE TICKETS, $5 EACH

EXPECTED EXHIBITORS…
American Institute of Aeronautics and Astronautics
Baton Rouge Amateur Radio Club
Baton Rouge Metropolitan Airport
Baton Rouge Mosquito Abatement
Baton Rouge Zoo
Bluebonnet Swamp Nature Center
Civil Air Patrol
LIGO
MARS Van
Saint Joseph's Academy

POTENTIAL RIDES…
18" Dry Slide
Spacewalk

Obstacle Course
Hamster Ball

<u>OTHER…</u>
Adventure Quest
Face Painting
Homemade Comet
Scope-on-a-Rope

Early volunteer sign-up is needed. It is extremely difficult to schedule a volunteer if that person reveals his availability with only two or three days to go. Sign-up now, please!

Observing Notes:

by John Nagle

Puppis – The Stern

Position: RA 52, Dec. -32 37

Named Stars:

Naos (Zeta Pup), "ship", "Suhail Hadar", "the roaring bright one", mag. 2.21, 08 03 35.07 -40 00 11.5, is a hot, blue supergiant star (O type) that can be seen with the naked eye. Just 2½° to the northwest is **NGC 2477**, a rich star cluster.

Tureis (Rho Pup), "little shield", mag 2.83, 08 07 32.70 -24 18 16.0, is a yellow-white giant star, classified as a **Delta Scuti** type variable star (dims 0.15 magnitude every 0.14088143 days, or every 3.35 hours).

Asmidiske (Xi Pup), "gunwale", mag. 3.34, 07 49 17.66 -24 51 35.2, is a yellow supergiant star. Just 1.6° to the northwest is **M 93**, and **NGC 2467** is about 1.7° to the south-southeast.

Deep Sky:

M 46 (NGC 2437), Mel 75, mag. 6.1, 07 41.8 -14 49, 26' in size, is an open cluster of over 150 stars; detached, no concentration of stars; moderate range in brightness; very bright, very large; mag. of brightest star is 8.7. A planetary nebula (**NGC 2438**, mag. 11) lies in front of the cluster, some 7' north of the center of **M 46**. **M 47** lies about 1½° to the west.

M 47, (NGC 2422), Mel 68, H38-8, mag. 4.4, 07 36.6 -14 30, 30' in size, is an open cluster of about 50 stars; detached, no concentration of stars; moderate range in brightness; bright, very large; mag. of brightest star is 5.7. Located 1.3° west of **M 46**, and about 40' to the north and slightly east – connected by a string of five 8th magnitude stars – is the small cluster **NGC 2423**(mag. 6.7).

M 93 (NGC 2447), mag. 6.2, 07 44.6 -23 52, 21' in size, is an open cluster of about 80 stars; not well detached from the surrounding star field; large; small range in brightness; mag. of brightest star is 8.2. Located 9° south of **M 46**. Central mass is distinctly triangular, or wedge shaped. About 3° to the southeast is **NGC 2467**.

Cr 135, mag. 2.1, 07 17.0 -36 50, 50' in size, is an open cluster; not well detached; magnitude of brightest star is 2.7 – **Pi Pup**, an orange supergiant star, and its traditional name is **Ahadi** – "having much promise".

NGC 2451, mag. 2.8, 07 46 04 -37 59 55, 48' in size, is an open cluster of about 40 stars; detached, weak concentration of stars; moderate range in brightness; extremely large; mag. of brightest star is 3.6. This cluster is in fact two clusters, **NGC 2451A** at a distance of 197 parsecs, and **NGC 2451B** at a distance of 358 parsecs.

NGC 2477, Caldwell 71, Dunlop 535, mag. 5.8, 07 52.3 -38 33, 26' in size, is an open cluster of about 300 stars; detached, strong concentration of stars; large range in brightness; very large, bright; mag. of brightest star is 9.8. Located about 2½° west-northwest from **Zeta Puppis**.

NGC 2546, mag. 6.3, 08 12.4 -37 38, 40' in size, is an open cluster of about 40 stars; detached, no concentration of stars; moderate range in brightness; mag. of brightest star is 8.2; bright, large.

NGC 2527 , H30-8, mag. 6.5, 08 05.3 -28 10, 21' in size, is an open cluster of about 50 stars; detached, no concentration of stars; small range in brightness; mag. of brightest star is 8.6; very large.

NGC 2539, H28-7, Mel 70, Best 85, mag. 6.5, 08 10.7 -12 50, 21' in size, is an open cluster of 50+ stars; detached, weak concentration of stars; mag. of brightest star is 9.2; very large. Loose cluster of stars. Triple star **19 Puppis**, 5th magnitude, is on the southeast corner of the cluster. Located 7.3° east-northeast of **M 46.**

NGC 24 23, H28-7, Mel 70, mag. 6.7, 07 37.1 -13 52, 19' in size, is an open cluster of about 4o stars; not well detached from the surrounding star field; moderate range in brightness; very large; mag. of brightest star is 9.0. Located 0.6° north of **M 47**.

NGC 2439, Mel 74, mag. 6.9, 07 40.8 -31 39, 10' in size, is an open cluster of about 80 stars; detached, weak concentration of stars; large range in brightness; bright, pretty large; mag. of brightest star is 8.9.

Bo 5, mag. 7.0, 07 31 44 -17 06 31, is an open cluster of 12 stars.

Mel 71, Cr 155, mag.7.1, 07 37.5 -12 04, 8' in size, is an open cluster of about 80 stars; detached, weak concentration of stars; small range in brightness; mag. of brightest star is 10.2.

NGC 2467, H22-4, Bennett 37a, "Skull and Crossbones Nebula", mag. 7.1p, 07 52.6 -26 23, 15' in size, is an open cluster and bright nebula of about 50 stars; strong concentration of stars; pretty bright, very large, and round; involved in a small (7'x6' in size), pretty bright emission nebula, with faint streamers. Located 1.7° southeast of **Xi Puppis**.

Mel 71, Cr 155, mag. 7.1, 07 37.5 -12 04, is an open cluster of about 80 stars; detached, weak concentration of stars; small range in brightness; mag. of brightest star is 10.2.

Ru 44, mag. 7.2, 07 59 45 -28 38 09, 5' in size, is an open cluster of about 40 stars; detached, no concentration of stars; mag. of brightest star is 9.4.

Bo 4, mag. 7.3, 07 31 50 -16 59 31, is an open cluster of about 30 stars.

NGC 2482 , H10-7, "Starfish Cluster", mag. 7.3, 07 54.9 -24 18, 12' in size, is an open cluster of about 50 stars; detached, no concentration of stars; small range in brightness; large; mag. of brightest star is 10.0.

vdB 98, mag.7.3, 07 36.4 -25 20, 10' in size, is a bright reflection nebula lit by a mag. 7.3 star.

NGC 2396, H36-8, mag. 7.4p, 07 28.1 -11 44, 10' in size, is an open cluster of about 30 stars; detached, no concentration of stars; large brightness range; brightest star is mag. 11 photo.

NGC 2567 , H64-7, Mel 86, mag. 7.4, 08 18.6 -30 38, 10' in size, is an open cluster of about 40 stars; detached, no concentration of stars; moderate range in brightness; mag. of brightest star is 10.1; pretty large.

Mel 66, Cr 147, mag. 7.8, 07 26.3 -47 44, 10' in size, is an open cluster of about 200 stars; detached, slight concentration of stars; small brightness range; mag. of brightest star is 11.4.

Ru 55, mag. 7.8, 08 12.3 -32 36, 16' in size, is an open cluster of about 12 stars; not well detached; moderate brightness range; mag. of brightest star is 8.6; possibly this is an asterism.

NGC 2414, H37-8, mag. 7.9, 07 33.3 -15 27, 4' in size, is an open cluster of about 35 stars; detached, strong concentration of stars; moderately rich in bright and faint stars; mag. of brightest star is 8.2.

NGC 2489, H23-7, Mel 79, Bennett 38, mag. 7.9, 07 56.2 -30 04, 7' in size, is an open cluster of about 45 stars; detached, weak concentration of stars; moderate brightness range; pretty large; mag. of brightest star is 11.1. Located 5.4° south-southeast of **Xi Puppis**.

Tr 7, Cr 146, Lund 340, mag. 7.9, 07 27.3 -23 58, 5' in size, is an open cluster of about 30 stars; detached, weak concentration of stars; large brightness range; mag. of brightest star is 9.1; involved in nebulosity.

NGC 2421 , H67-7, Mel 67, mag. 8.3, 07 36.3 -20 37, 10' in size, is an open cluster of about 70 stars; detached, strong concentration of stars toward the center; moderate range in brightness; mag. of brightest star is 10.5.

ESO 311-14, mag. 8.4, 07 50 02 -42 45 11, 6'x6' in size, is an open cluster.

Ru 32, mag. 8.4, 07 45.0 -25 31, 6' in size, is an open cluster of about 30 stars; detached, no concentration of stars; moderate brightness range; mag. of brightest star is 9.6; involved in nebulosity.

Tr 9, Cr 168, Lund 407, Harvard 2, mag. 8.7, 07 56 27 -25 56 13, 5'x5' in size, is an open cluster of about 20 stars.

Ru 59, mag. 9.0, 08 19 49 -34 30 34, is an open cluster of about 20 stars.

Ru 46, mag. 9.1, 08 02 55 -19 31 13, is an open cluster of about 15 stars.
Haf 18, mag. 9.3, 07 54 04 -25 57 01, is an open cluster of about 25 stars.
NGC 2298, Mel 53, Bennett 37, mag. 9.3, 06 49.0 -36 00, 5' in size, is a globular cluster; bright, pretty large; irregularly round. **NGC 2298** may exceed 10 billion years of age. Located 3.3° south of **Kappa Canis Majoris**.
NGC 2509, H1-8, Mel 81, mag. 9.3, 08 00 47.8 -19 03 02, 8' in size, is an open cluster of about 40 stars.
Haf 15, mag. 9.4, 07 46 07 -32 49 51, is an open cluster of about 35 stars.
NGC 2440, H64-4, Pk 234+02.1, Best 84, sometimes called the "Insect Nebula", mag. 9.4, 07 41.9 -18 12, 16" in size, is a planetary nebula; quite bright; not well defined (almost stellar); photo mag. 10.8; central star mag. 17.7 (**HD 62166**), possibly the hottest white dwarf star known (surface temperature is 200,000K). **NGC 2440** is located 3.4° south of **M 46.**
Ru 34, Berkley 38, mag. 9.5, 07 46 42 -20 25 52, is an open cluster of about 35 stars.
NGC 2479, H58-7, mag. 9.6, 7.0' in size, is an open cluster of about 40 stars.
Ru 36, mag. 9.6, 07 49 16 -26 20 55, is an open cluster of about 30 stars.
Ru 47, mag. 9.6, 08 03 02 -31 09 13, is an open cluster of about 20 stars.
Ru 49, mag. 9.6, 08 03 52 -26 50 14, is an open cluster of about 10 stars.
Bo 6, mag. 9.9, 07 32 49 -19 28 32, is an open cluster of about 40 stars.
vdB 97, mag. 9.9, 07 32.6 -16 54, 2' in size, is a bright reflection nebula with a 9.9 magnitude star involved in the eastern edge of a small, round nebulus patch.
Haf 16, mag. 10.0, 07 51 04 -25 29 57, is an open cluster.
Pup A, 08 24 46 -43 03 32, is a supernova remnant.
The above is a sample of Deep Sky objects to magnitude 10. Not listed are the following: 31 Collinder (Cr); 13 NGC; 7 Sa (Sandquist Dark Nebula); 1 Lo (Longmore Planetary Nebula); 1 Mel (Melotte); 1 ESO; 1 Haf (Haffner Open Cluster); 8 LDN (Lynd's Dark Nebula); 1 Be ((Bernes Dark Nebula); 3 Sh (Sharpless Bright Nebula); 1 Mayer (Open Cluster); 3 CG (Case Galaxies); 2 Wa (Open Clusters); 2 Str (Clusters and galaxies); 2 vdBH (Bright Nebulae); 3 vdB-Ha (Open Clusters); 1 PKS (Parkes Radio Source); 1 IRAS (Infra-red Source); 1 FSR (Froebrich); and 1 RCW (Bright Nebula).
Deep Sky objects beyond magnitude 10: 24 NGC; 6 Minkowski Emission Nebulae; 4 Collinder; 6 IC; 2 Abell; 1 Pismis; 3 Cz (Cznernick);6 MCG; 7 Al; 36 Ru (Ruprecht); 46 ESO; 3 Allen, 10 Haf (Haffner); 6 Kar (Karachentsev Dwarf Galaxies); and 4 Hu (Humanson Planetary Nebulae).

Other Stars:

Pi Pup, mag. 2.71, 07 17 08.56 -37 05 51.0, is a double star consisting of an orange super-giant star with a magnitude 6.86 companion star.
Tau Pup, mag. 2.94, 06 49 56.14 -50 36 51.8, is a spectroscopic binary system. The primary component is an orange giant star. The two stars orbit each other with a period of 1,066.0 days, or 2.9 years.
Sigma Pup, mag. 3.25, 07 29 13.88 -43 18 06.8, is a spectroscopic binary star. It is a close eclipsing binary system, a Beta Lyrae type variable star with a period of 130.5 days. The two stars have an orbital period of 257.8 days.
Omicron Pup, mag. 4.40, 07 48 05.17 -25 56 13.8, is a multiple star system. The primary component is a blue super-giant star.
HD 60532, mag.4.46, 07 34 03.18 -22 17 45.8, is a yellow-white star halfway between the main sequence and the sub-giant evolutionary stage. Two planets were discovered in September of 2008. The inner planet has 3.15 Jupiter masses and an orbital period of 201.83 days (at 0.759 AU from the star), and the outer planet has 7.46 times Jupiter's mass with an orbital period of 607.6 days (1.58 AU from the star).
Kappa^1 Pup,"Markab", mag. 4.50, 07 38 49.88 -26 48 14.0, is in a multiple star system.
Kappa^2 Pup, mag. 4.62, 07 38 49.80 -26 48 13.0, is a component of the **Kappa Pup** system.

HD 41742, mag. 5.95, 08 18 23.78 -12 37 47.2, is a component of the quadruple **HD 41742/41700** star system.
HD 69830, mag. 5.95, 08 18 23.78 -12 37 47.2, on May 17, 2006, three **Neptune**-mass planets, the first multi-planetary system without any **Jupiter**-like or **Saturn**-like planets, were discovered around the orange dwarf star, which also hosts an asteroid belt between the middle and outer planet. The inner planet has at least 10.48 **Earth** masses, and an orbital period of 8.667 days. The middle planet has at least 12.07 **Earth** masses, with an orbital period of 31.56 days. The outer planet has 18.43 **Earth** masses, and its orbital period is 197 days. The outer planet is believed to be within the star's habitable zone, where liquid water would remain stable.
HD 41700, mag. 6.35, 06 04 28.51 -45 02 13.9, is a component of the **HD 41742/41700** star system.
HD 70642, mag. 7.18, 08 21 28.14 -39 42 19.5, has one planet in orbit.
HD 50499, mag. 7.22, 06 52 02 -33 54 56, has one confirmed planet in orbit, and one unconfirmed planet in orbit.
HD 48265, mag. 8.07, 06 40 01.73 -48 32 31.0, has one planet in orbit.
NGC 2423-3, mag. 9.45, 07 37 09 -13 54 24, is a red giant star, and a member of the **NGC 2423** open star cluster. It has a mass of 2.4 times that of the **Sun**. A planet was discovered orbiting this star in July of 2007. The planet, with a mass of at least 10.6 times that of **Jupiter**, orbits the star every 714.3 days (1.956 years). It may be a brown dwarf star instead of a planet, but this has not been confirmed as only the minimum mass is known.
Stars beyond magnitude 10: 22 h (John Herschel); 9 β (Burnham); 5 Σ (F.G.W. Struve); and 30 more objects.

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

March 1st - The **Moon** passes 0.9° north of **Regulus** at 12 midnight CST,
Dawn: The almost full **Moon** leads the planets **Jupiter, Mars**, and **Saturn** across the sky in a celestial arc bracketed by the **Moon** in the west, and **Saturn** in the southeast,
Full Moon occurs at 6:51 PM CST.
March 3rd- Dusk: **Venus** and **Mercury** are separated by just 1° as they sink toward the horizon in the west during twilight.
March 4th- **Neptune** is in conjunction with the **Sun** at 8 AM CST.
March 5th- **Mercury** passes 1.4° north of **Venus** at 12 noon CST.
March 7th- The waning gibbous **Moon** and **Jupiter** rise together in the east less than 4° apart shortly before midnight,
The **Moon** passes 4° north of **Jupiter** at 1 AM CST.
March 9th- **Jupiter** is stationary at 4 AM CST,
Last Quarter Moon occurs at 5:20 AM CST,
The **Moon** passes 4° north of **Mars** at 7 PM CST.
March 10th **Mercury** is at perihelion
The **Moon** passes 2° north of **Saturn** at 8 PM CST.
March 11th **Daylight Savings Time** starts at 2 AM CST
The **Moon** is at apogee (251,455 miles from **Earth**) at 4:14 CDT.
March 15th **Mercury** is at greatest eastern elongation (18) at 10 AM CDT.
March 17th **New Moon** occurs at 8:12 AM CDT,
Mercury passes 4° north of **Venus** at 8 PM CDT.
March 18th The **Moon** passes 8° south of **Mercury** at 1 PM CDT,
The **Moon** passes 4° south of **Venus** at 2 PM CDT.
March 19th The **Moon** passes 5° south of **Uranus** at 11 AM CDT.

March 20th **Spring** begins in the **Northern Hemisphere** with the **Vernal Equinox** occurring at 11:15 AM CDT
Dwarf planet **Ceres** is stationary at 4 PM CDT.

March 22nd **Mercury** is stationary at 12 noon CDT
Evening: A waxing crescent **Moon** is less than 1° from **Aldebaran**, occulting the star for northwest **North America** and swaths of **Europe**, including the **United kingdom, Ireland**, and **Nordic** countries.
The **Moon** passes 0.9° north of **Aldebaran** at 6 PM CDT.

March 24th **First Quarter Moon** occurs at 10:35 AM CDT.

March 26th The **Moon** is at perigee (229,352 miles from **Earth**) at 12:17 PM CDET.

March 28th The **Moon** passes 1° north of **Regulus** at 9 AM CDT,
Venus passes 0.07° north of **Uranus** in the evening twilight.

March 29th Morning: Find **Mars** above the **Teapot** in **Sagittarius**; from there, scan some 2° to the left to spot **Saturn**. **M 22,** sparkling with more than 80,000 stars, will be about 1½° below the pair of planets – approximately equidistant from both.

March 31st **Full Moon** occurs at 7:37 AM CDT – This is a "**Blue Moon**" (2nd **Full Moon** in a month), the 2nd time in 3 months!

Planets:

Mercury – On March 1st, **Mercury** appears 1.8° below **Venus** (hanging 5° above the western horizon), one half-hour after sunset, and on March 3rd, they are slightly more than 1° apart, with **Mercury** to the right of **Venus**. Both planets set less than an hour after the **Sun. Mercury** will glow at magnitude -1.3, and will have an 87% lit phase. **Mercury** will pass 1.4° due north (to the upper right) of **Venus** on March 5th. On the 10th, 30 minutes after sunset, **Venus** will stand 7° above the western horizon, with **Mercury** appearing 3° higher. **Mercury** will now show a disk of 6.5' across, with a 64% illumination. The planet reaches greatest eastern elongation (18°) on the 15th, at 12° high in the southwest 30 minutes after sunset. **Mercury** will show a dimmer disk (mag. -0.4), with a diameter of 7.3", and a phase of just under half-lit. The planet will start sinking lower with each passing day, passing 4° due north of **Venus** on the 17th, and on the 18th, a crescent **Moon** stands 4° to **Venus'** left and **Mercury** will appear 4° to **Venus'** upper right, with the two planets standing 10° high after sunset. On the 20th, **Mercury**'s magnitude will be +0.9, and by the 23rd, the planet will be at 2nd magnitude. **Mercury** will be in an inferior conjunction with the **Sun** on April 1st.

Venus – On March 1st, **Venus** will hang 5° above the western horizon, at magnitude -3.9, a half-hour after sunset, with **Mercury** 1.8° to its lower left. On the 3rd, the two planets are 1.1° apart, with **Venus** showing a 10" diameter disk, and appearing nearly full. For the next two weeks, **Venus** and **Mercury** keep appearing higher, with **Mercury** moving even farther to **Venus'** upper right. On the 18th, 3½° separate the two planets, with **Mercury** to the upper right of **Venus,** and a crescent **Moon** also 3½° to the upper left of **Venus**. The trio stands 10° above the horizon 30 minutes after sunset. On the 28th, **Venus** and **Uranus** are in conjunction (4' apart), their closest since 2003. **Venus** stays at magnitude -3.9 all month, and rises higher every day. By the end of the month, **Venus** will set 1½ hour after sunset.

Mars – As March opens, **Mars** rises above the southeast horizon around 2 AM local time, beginning what will be its finest appearance in 15 years. **Mars** will shine at magnitude +0.8. **Mars** begins the month among the background stars of **Ophiuchus**, some 12° east-northeast of **Antares** in neighboring **Scorpius**. Moving steadily eastward, **Mars** crosses into **Sagittarius** on the 12th. The planet will pass midway between the **Lagoon Nebula (M 8)** and the **Trifid Nebula (M 20)** on the morning of the 19th. The trio climbs 20° above the horizon by 5:30 AM local daylight time, just before twilight. **Mars** meets up with the 7th magnitude globular cluster **M 28** on the 28th, appearing 1.3° north of the cluster. **Mars** ends the month just 0.9° west-northwest of 4th magnitude globular cluster **M 22,** shining at magnitude 0.3, some 60% brighter than it started March with. During March, **Mars** brightens from magnitude 0.8 to 0.3, and its apparent diameter grows from 6.7" to 8.4". On the 31st, **Mars** will be within 1.7° of **Saturn**, just to the upper left of **Lambda Sagittarii** – the star at the top of the **Teapot.**

Jupiter – Jupiter rises shortly before midnight, against the backdrop stars of **Libra**, shining at magnitude -2.2 in early March, and at magnitude -2.4 by month's end. **Jupiter** halts its eastward movement and begins retrograde motion on March 9th. During March, the planet's equatorial diameter grows from 39" to 43". All four of **Jupiter**'s brightest moons will be on one side of the planet on the 1st, 11th, 24th, and 25th, with the best views on the 11th and 25th.
Saturn – Saturn, at magnitude +0.6, rises in **Sagittarius**, remaining about 2° north of **M 22** all month. The rings span 37", and tilt 26° to our line-of-sight this month. **Saturn's** disk grows slightly from 16" to 16½" during the month. By month's end, **Mars** and **Saturn** are less than 2° apart, just to the upper left of **Lambda Sagittarii**, the star at the top of the **Teapot** asterism. **Mars** and **Saturn** have a close conjunction on April 2nd.
Uranus – Uranus has an extremely close conjunction (4' slightly above and to the right) with **Venus** on the evening of March 28th. **Uranus** glows at 6th magnitude. In early March, the planet stands 25° high in the west once twilight fades to darkness. Look for it 2.3° due west of 4th magnitude **Omicron Pis**cium in the southeastern corner of **Pisces**.
Neptune – Neptune is in conjunction with the **Sun** on March 4th, and will not be visible all month. On March 31st, **Neptune** will rise about an hour before the **Sun**, and will likely be lost in twilight. **Neptune** will return to view in April.
Pluto – Pluto will be found at RA 19 29.2, Dec. -21 30 on March 15th, west of the "**Teaspoon**" of the "**Teapot**" asterism in **Sagittarius.**
Sun – The **Sun** reaches the March vernal equinox at 11:15 PM CDT on March 20th, signaling the beginning of **Spring** in the **Northern Hemisphere**, and **Autumn** in the **Southern Hemisphere**.
Moon – The first **Full Moon** of March is at 6:51 PM CST on the 1st, and the second **Full Moon** of the month (a "**Blue Moon**") occurs at 7:37 AM CDT on the 31st. On the morning of March 7th, the waning gibbous **Moon** is 3° to 4° to the upper left of **Jupiter.** The waning crescent **Moon** forms a long, flat triangle with **Saturn** and **Mars** at dawn on March 10th, and is to the left of **Saturn** the next morning. A very thin waxing **Moon, Venus**, and **Mercury** form a gentle arc about 5° long, low in the west, about 30 minutes after sunset on the 18th. A waxing lunar crescent will shine just above **Aldebaran** on the evening of march 22nd.

Asteroids **– Asteroid/Minor Planet Ceres** resides in **Cancer**, which stands high in the east at nightfall and passes nearly overhead around 10PM local time in mid-March. Even though **Ceres** dims from magnitude 7.4 to 8.0 this month, binoculars can still see it. **Ceres** lies about two binocular fields north of the **Beehive Cluster (M 44).** On March 1st, **Ceres** will be about 1° (my estimation) east and slightly south of **Sigma¹ Cancri**, on the 21st about 2° east-southeast of **Sigma¹ Cancri**, and on the 31st about 2° southeast of **Sigma¹ Cancri.**

Asteroid occultation: Very early on the morning of March 14th, the faint asteroid **51 Nemausa** will occult an 11.5 magnitude star in **Sextans**. The star will appear to dim to magnitude 10.2 (**Nemausa's** magnitude) for up to 15.7 seconds, for viewers in the **Northeast**, within a minute or two of 11:43 PM CDT on the 13th. On the morning of March 26th, the very faint asteroid **88 Thisbe** will occult a 12th magnitude star in **Sagittarius.** Only viewers in the **American** west will be able to see this occultation within a minute or so of 3:59 AM CDT, lasting at most 7.7 seconds.

Comets **–** Comet **PANSTARRS (C/2016 R2),** a first time visitor from the **Oort Cloud**, should remain at 10th or 11th magnitude for several months. The comet lies high in the west after darkness falls in March. You can find it between the constellations **Perseus** and **Auriga**. The comet will slide less than 5° southeast of the **California Nebula (NGC 1499)** in mid March. A 4-inch or larger telescope will reveal the comet, but to see the subtle detail, you must increase power to 150x or so. Look for a my estimates, almost 2° west of **Zeta Persei** on March 5th; on the 13th it will be about ½ the distance between the March 5th position and the star **54 Persei;** on the 17th it will be just over 1° east-southeast of **54 Persei;** and on the 21st, about 1° northeast of **54 Persei.**

Meteor Showers **–** there are no major meteor showers occurring during March. There are three meteor streams associated with **Puppis**: The **Alpha Puppids** occur only occasionally between the 2nd and 6th of

December, at a rate of up to six per hour; The **Pi Puppids** is a variable shower that does not occur every year, but when they do, the maximum rate is four per hour, between April 18th and April25th; The **Zeta Puppids** is a weak shower whose maximum rate of three per hour occurs in mid-November.

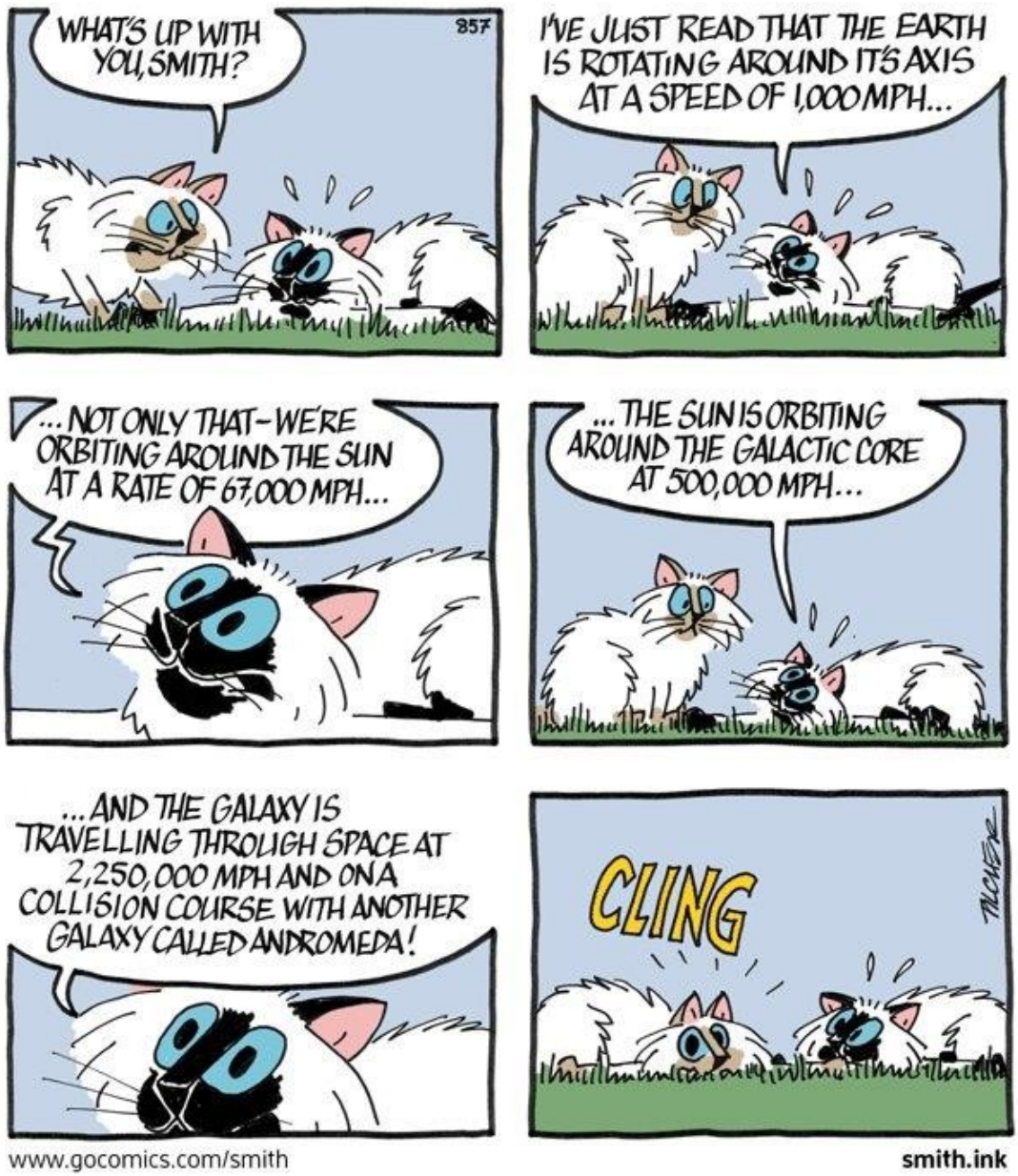
When to View the Planets:

Evening Sky
Mercury (west)
Venus (west)
Uranus (west)

Midnight
Jupiter (southeast)

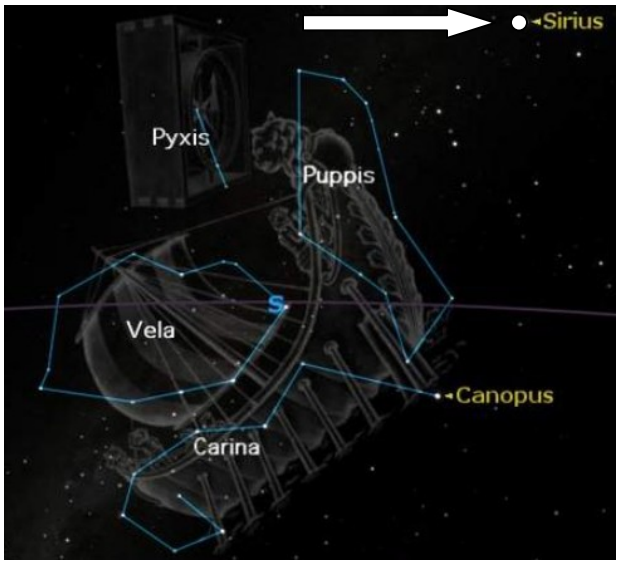
Morning Sky
Mars (south)
Jupiter (south)
Saturn (southeast)
Neptune (east)

DARK SKY VIEWING - PRIMARY ON MARCH 17TH, SECONDARY ON MARCH 24TH



Mythology:

Puppis – The Stern (Poop)



Let Serius be your guide in finding "the Poop."

The largest of three sections into which the ancient constellation of Argo Navis, the ship of the Argonauts, which was divided by Nicolas Louis de Lacaille in his catalogue of the southern stars published in 1763. Puppis represents the stern, or poop, of the ship.

Puppis has no stars labeled Alpha or Beta, because when Argo Navis was divided up by Lacaille, the original Greek letter designations of the stars in Argo were retained; Alpha and Beta ended up in the sub-division of Carina. The brightest star in Puppis is in fact the second magnitude Zeta Puppis, called Naos from the Greek word for "Ship".