Monthly Meeting January 13th at 7PM at HRPO

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

Presentation: "A year in review and a planning and strategy session".

What's In This Issue?

Messages from the HRPO

Friday Night Lecture Series
Science Academy
Solar Viewing
Stem Expansion
Plus Night
Adult Astronomy Courses: Learn Your Sky, Learn Your Telescope, Learn Your Binoculars

Observing Notes: Orion – The Hunter & Mythology

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President's Message

From our incoming President, Scott Cadwallader:

Greetings one and all and welcome to the start of the New Year! We have some exciting things planned for the coming year, and, hopefully, this newsletter will get us going on the right foot. Inside, you'll find several opportunities to reach out to the community and share the wonders of the night sky, even from our heavily light- polluted neck of the woods. In recent years, most of our activities have seemed to coalesce around our outreach events, so that, plus club meetings, have been our goto in terms of getting to know our fellow club members and our group learning activities. Particularly useful in this respect is what we do to assist BREC in running our observatory—Chris Kersey has details here and can help get you credentialled for that. Off campus outreaches just require a stout heart, a brave face, or a willingness to spend time with fellow enthusiasts talking about celestial subjects—just talk to Ben about those opportunities.

We do realize that outreach isn't for everybody, so we've got some BRAS only activities coming up.

- ✓ Our first MOON (Members Only Observing Night) was on November 29th, and our second one is set sometime in February (tba). At this point, the goal is to have at least one group view per season.
- ✓ For those more of a dark sky mindset, we'll try to set up some of those field trips too, the first of which is our Annual trip to Rockefeller Wildlife Refuge on January 24-25, of which I'm sure we can get Don to say a few words at our next meeting. Those who have been there say it's an awesome weekend.
- ✓ There is also talk of trying to revive our Spring Star Party in some fashion, but this is still just chatter.
- ✓ And our Astrophotography group has a new tentative outing scheduled at the home of Chris Deselles set for sometime in March, before it gets "too blasted hot out" and while the Sun still sets at a decent hour.

Coy and I are bouncing around some other ideas, and open to hearing yours. So get in touch with one of us and we'll see if we can make it happen. Your first real chance to do this will be at the business meeting next week where we'll try to set the agenda for the coming year, and then at the monthly meeting coming up in a couple of weeks. Both are open to all members. In the meantime, huddle up with a good star chart and your favorite optic and see if you can't find something incredible to see up there.

Upcoming BRAS Meeting Schedule:
Monthly Business Meeting: 7 p.m., Wednesday, January 8; HRPO
Light Pollution Committee Meeting: 6:15 Wednesday, January8th (before the business meeting)
Monthly Member Meeting: 7:00 Monday, January13th; HRPO
ALCon Planning Meeting: 3:00 January 18, 2020; Coffee Call, 3132 College Dr F,BR, LA 70808,

Submitted by Scott Cadwallader, President 2020

Secretary's Summary of December Meeting

- President, Steven Tilley, calls the meeting to order at 7:05 PM.
- Steven welcomes everyone to the annual Holiday potluck. Members then enjoy a meal.
- **AWARDS**:
  - Outreach Rookie awards to Russell Poche and James Ernest, presented by Steven.
  - Member of the Year award presented to Merrill Hess
  - Current BRAS officers Trey Anding, Thomas Halligan, and Krista Reed each receive BRAS coffee mugs for their service.
  - Craig Brendan receives the "Asking for a mug the most" Award.
  - 2 Astronomical League awards presented by John Nagle: Scott Cadwallader received Binocular Messier and Krista Reed received Lunar 1.
- Merill showed the club the incorporation document Wally procured for the club.
- Merill, John, and Craig held elections for 2020 officers. They opened the floor for more nominations. None were made.
- 2020 officers will be:
  - Scott Cadwallader - President
  - Coy Wagoner - Vice President
  - Thomas Halligan - Secretary
  - Trey Anding - Treasurer
- Steven presented the new officers with BRAS coffee mugs.
- Chris Kersey discussed the changes implemented for the volunteer hours at HRPO.
- Merrill went over the benefits of volunteering at HRPO.
- Chris K thanked BRAS for their contribution to the Cooperative Endeavor Agreement. He addressed the changes being implemented due to the St. George incorporation.
- He also gave updates on the status of the two domes.
- Steven asked everyone to help with ALCon 2022 planning.
- Outreach chair, Ben Toman, gave awards for those who participated in BRAS outreach events throughout 2019. He also explained the partnership with NASA's NightSky Network.
- Merrill encourages more MOON NIGHTS (members only observing nights. The next one is in February.
- Don Weinell stated the dates for Rockefeller will be January 24-25, 2020.
- Raffle held.
- Meeting adjourns at 8:45 PM.

Submitted by Krista Reed, Secretary

2020 Officers:

President: Scott Cadwallader
Vice-President: Coy Wagoner
Secretary: Thomas Halligan
Treasurer: Trey Anding

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

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

Krista Reed and Scott Cadwallader presented with A.L. Observing Certificates, by Observing Chairman, John Nagle

BRAS Outreach Report

Hi Everyone,

Happy New Year! It's time to welcome back the Roaring Twenties! Looking back on this past year, we had 20 events logged to the Night Sky Network. (They only require 4, so we're well ahead of the curve!) We had several that had to be cancelled due to weather, so hopefully 2020 will bring some better luck with it.

As I mentioned at our last meeting, we have a bunch of new toolkits to use from the NSN and I'd like to get a group of people together to start learning how to use/utilize them in our events. Sundays are usually pretty open for most people (and at the HRPO), so we'll be trying to line one up soon. Be on the lookout for an invite!

We have a couple of things coming up so far, and there are sure to be more. Please consider volunteering for one (or more) of these events. If you've never done one before, I think you'll be surprised at how much fun they can be and also how much you can learn yourself. I rarely go away from one of our events without two or three new pieces of information.

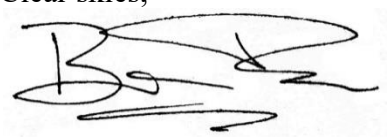
Take a look below and see where you'd like to help out. Let me know ASAP so I can start up a list for each event. I hope to hear from some of you that have never tried before!

Upcoming Events

Tuesday, January 7th
6:30pm-8:30pm
Sidewalk Astronomy at Perkins Rowe

Saturday, March 7th
9am-4pm
Rockin' At The Swamp
Bluebonnet Swamp and Nature Center
(several people needed for shifts throughout the day)

Clear skies,



Outreach Chairperson

Happy New Year!

Sidewalk Astronomy Crew at Perkins Row – December 3, 2019

Ben (MR NICE) gave awards to those who participated in BRAS outreach events throughout 2019,
Back Row L to R: Trey, Steven, Thomas, James, Roz, Susan, Russell, Scott, Chris R., Annette, Coy, Jim, John,
Front Row: Merrill, Krista, Chris, Ben (Mr. NICE), Craig.
The harp, played by Rebecca Northrop, provided lovely Christmas Music at our Banquet.

BRAS FORUM NOTICE:

The BRAS Forum has a Members Only section, where we post notices or have discussions pertaining to members or the club that the general public can't see. To join, sign up for the forum (if you haven't already), then send an email to **fred at eatel dot net** with your forum username and email address, and ask to be added. In your User Control Panel, you can set your preferences to receive email notification anytime a post is made.
Thanks, Frederick Barnett, Webmaster

NEWSLETTER EDITOR'S NOTICE:

Our Night Visions newsletter has a nation-wide audience potential through links to our website at Night Sky Network and the Astronomical League. Michele Fry, Editor

BRAS Light Pollution Committee Report

This committee meets at 6:15, same day as the 7:00 BRAS Business Meeting
(normally on Wednesday before the Monthly Meeting)
Everyone is welcome to join in..

Meeting called to order by Scott Cadwallader, Chairperson John Nagle not able to attend meeting
November minutes were published in December newsletter

Old Business:

Post mortem of the failure of completing the new Light Pollution diorama. Discussed and listed what things were done wrong and suggesting ways that we could improve. The project has been remanded to John Nagle for completion on an indeterminate time scale.

New Business:

Discussed suggestions for the coming year:

A. Establishing as policy that future plans from the committee should be concrete and attainable.
B. Codifying our ideas concerning environmental sustainability into the new CEA with BREC and LSU.
C. Contacting of various entities that share in our goals of restoring a natural night sky in an effort to help boost our lobbying abilities.

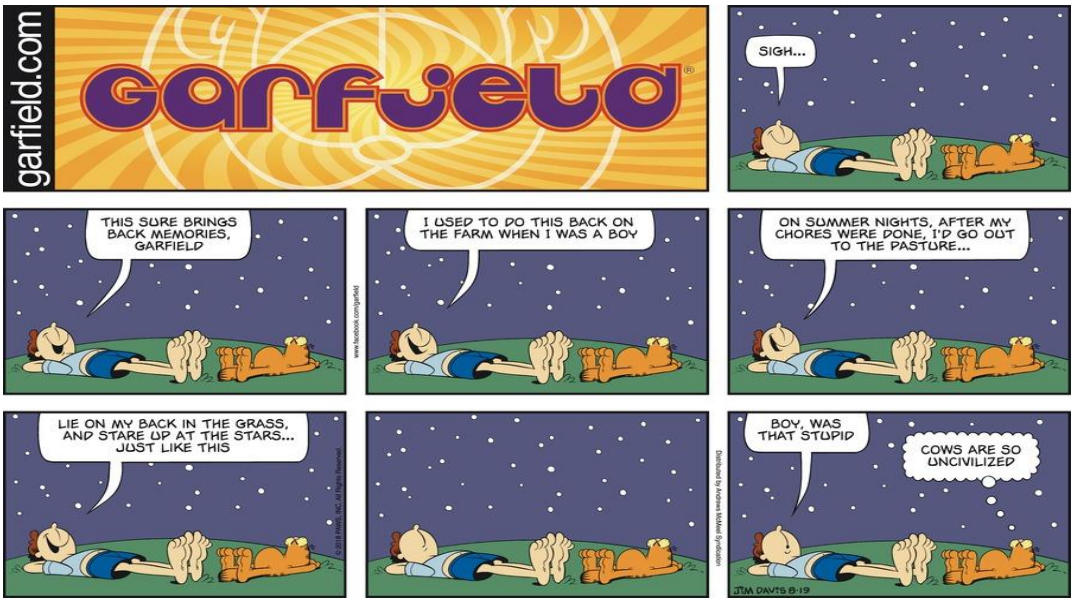
Minutes of this meeting read and approved
Meeting adjourned.

Submitted by Scott Cadwallader

Globe At Night

The target for the Globe At Night program is Orion from January 16th through the 25th.
If you would like to participate in this citizen science program, you can find instructions at
https://www.globeatnight.org

P.S. There is an app called “Loss of the Night” that can be used for information and for reporting your observations



Members/Community Corner

Here's where we feature articles and photos about BRAS members' astronomy-related accomplishments and adventures outside of BRAS activities (as if there were any spare time for such things!), and/or other astronomical happenings in our neck of the Universe. Send your contributions to Michele at newsletter@brastro.org

A WEDDING!

Congratulations to BRAS member and 2020 VP Coy Wagoner on his wedding to Lindsey which took place on December 28th, at The Venue in St. Amant, La. Here's a snapshot of the cake cutting, and another with 4 BRAS members who were able to attend.

The ceremony had all the essentials of a perfect wedding:

- ✓ The bride was gorgeous
- ✓ The groom was handsome,
- ✓ the ceremony was touching,
- ✓ the food was great,
- ✓ family and friends were there,
- ✓ and there was music and dancing!

Which only goes to show, astronomy geeks ARE attractive to women . . . . . and I've heard they make wonderful husbands. (writeup by Michele Fry, wife of one of 'em.)

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Flying "Rocks" and "Dirty Snowballs":

Asteroid and Comet News

January 2020

Volume 2. Issue 1.

JPL Close Approach Data from Nov 25, 2019 to Dec 23, 2019 Distance Nominal < 1 Lunar Distance

Object	Close-Approach (CA) Date	CA Distance Nominal LD (au)	H (mag)	Estimated Diameter
(2019 WJ4)	2019-Nov-30	0.85 (0.00219)	28.4	5.5 m - 12 m
(2019 YB)	2019-Dec-18	0.44 (0.00113)	29.7	3.1 m - 7.0 m
(2019 YS)	2019-Dec-18	0.17 (0.00044)	31.5	1.3 m - 3.0 m
(2019 YU2)	2019-Dec-23	0.26 (0.00066)	27.4	8.9 m - 20 m

As of 2019-12-27 there is

853,561 discovered asteroids (MPC)(https://www.minorplanetcenter.net/)
[542,163 have been numbered]
21,770 discovered Near-Earth Objects (MPC) (https://www.minorplanetcenter.net/)
4,129 discovered Comets (MPC)(https://www.minorplanetcenter.net/)
968 objects listed on JPL's Sentry: Earth Impact Monitoring(JPL) (https://cneos.jpl.nasa.gov/sentry/)
2,403 objects have been removed from Sentry(JPL) (https://cneos.jpl.nasa.gov/sentry/removed.html)

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

The following objects were removed from NASA JPL's Sentry: Earth Impact Monitoring list from 2019-12-03 to 2019-12-26

Object Designation	Removed (UTC)
2019 YW2	2019-12-26 14:01:39
2019 XK	2019-12-25 14:31:14
2019 YK1	2019-12-23 14:38:51
2019 VG6	2019-12-21 15:06:28
2019 YE	2019-12-21 15:06:28
2019 XK3	2019-12-19 13:29:58
2010 CA55	2019-12-18 21:02:12
2019 XA3	2019-12-16 14:58:47
2019 XB3	2019-12-15 15:26:47
2019 WW4	2019-12-14 15:32:08
2019 WZ6	2019-12-13 20:19:40
2019 XR1	2019-12-13 19:59:10
2019 XO	2019-12-13 13:30:36

2019 SL7	2019-12-12 23:58:23
2019 WC5	2019-12-07 14:03:19
2019 WF3	2019-12-07 14:00:18
2019 XE1	2019-12-06 14:21:58
2019 WF1	2019-12-03 13:26:23

Useful Links:

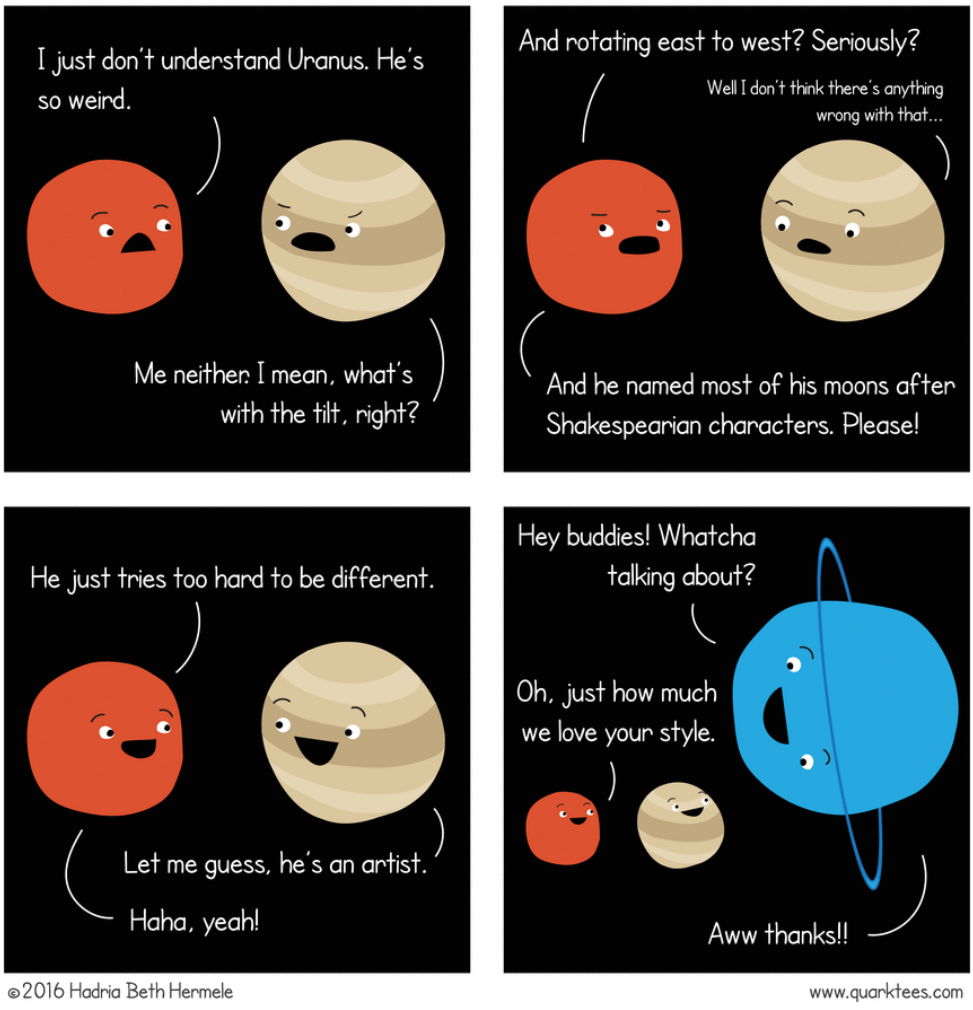
Guide to Minor Body Astrometry (https://www.minorplanetcenter.net/iau/info/Astrometry.html)
How Are Minor Planets Named? (https://www.minorplanetcenter.net/iau/info/HowNamed.html)
New- And Old-Style Minor Planet Designations (https://www.minorplanetcenter.net/iau/info/OldDesDoc.html)

The Tracking News

(http://www.hohmanntransfer.com/news.htm)

Accessible NEAs

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



Messages from HRPO

Highland Road Park Observatory

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

3 January: "2019—The Space Year in Review" Europa's plumes and Mars' lakes confirmed…a visitor from another stellar system…strong evidence for an exomoon…a possible signal from the first stars in the Universe. 2019 was an incredible twelve months of discovery and hope. The top headlines of the previous year compose this annual presentation.

10 January: "Wonders of the Winter Sky" BREC Education Curator Amy Brouillette will take the audience on a fascinating tour of Baton Rouge's *winter season*. She'll highlight the celestial gems and events that will sparkle throughout the *next three months*—gems visitors will be able to see live if they continue to visit HRPO!

17 January: "Earth to Moon to Mars" A remembering of Apollo naturally leads to a survey of the incredible Artemis mission to return human beings to the Moon—as a stepping stone to Mars!

24 January: "The Saga of Daylight Time" From intriguing beginnings this bizarre policy has been with us throughout our entire lives. Now we are asked serious questions. What does Daylight Time do for modern society? Is Daylight Time no longer needed? We'll hear from members of the Baton Rouge Astronomical Society—and you.

31 January: "Comet after Comet" There are predictions for no fewer than three comets to brighten to magnitude eight during calendar year 2020. Will they be visible from Baton Rouge? Which telescopes will be necessary, and how will HRPO provide viewing times?

SCIENCE ACADEMY

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

4 January: "Power in the House I" The first of this three-session series has Cadets focus on how the motion of water can be transformed into energy for families and businesses!

11 January: "Winter Day" Okay, Cadets—the seasonal offering is here for the first time in 2020! Circuit board construction; an overview of the constellation Cancer; introductions to the constellations Hydra and Pyxis; and a review of the space news from 2018.

18 January: "Earth Orbit Trips II/Electrical Behavior II" The continuation of this Historic Standalone gives Cadets more static electricity challenges and practice determining the altitude and azimuth of an orbiting object. (Enrollment in Part I is not necessary.)

Solar Viewing

Saturday 18 January from 12pm to 2pm.
For all ages. No admission fee. 20OGS Tour at 1pm.
(Solar Viewers, $2 each. Add-on Activity: $2.50.)

The hobby of astronomy immediately brings to mind thoughts of darkened backyards and dimly-lit nighttime activities at HRPO. But patrons also have the option of visiting during daylight hours to see our parent star.
Weather permitting, once monthly HRPO personnel offers three views of the Sun…
12pm to 12:30pm - *indirect projection onto white viewing surface //* Patrons get a sense of the speed of Earthð's rotation as they see the Sun's image slide on or off the projection device. [Learning Technologies Sunspotter]
12:15pm to 1:15pm - *safely-filtered optical light sent through standard telescope //* This option allows patrons to spy sunspots both small and large. [Orion 10" Skyquest Dobsonian Reflector]
12:30pm to 2:00pm - *hydrogen-alpha light //* Flares and prominences are seen easily in this wavelength. [Coronado Solar Max II 90mm]

STEM Expansion

"Science, Technology, Engineering, Math"
Saturday 25 January from 3:30pm to 7:30pm
For ages twelve to sixteen. $15/$18 per kid.

This program offers advanced topics, topic extensions and all-new games and activities to an older crowd. Certificates will be earned, and a section of archived experiments, some not seen in over fifteen years (and some *never* performed on site) take place.

Plus Night

Saturday 11 January from 12pm to 2pm.
For all ages. No admission fee.

During Plus nights sky viewing starts a half-hour earlier and extra features are available to the public…
*The well-known marshmallow roast commences at the campfire ring behind the building, lasting at least one hour and ending no later than 9:30pm. (The campfire, like the sky viewing, is weather-dependent.)
*Four to eight of HRPO's collection of over fifty physical science demonstrations will be on hand to perplex and amaze. Which demos will it be?
*An unaided eye sky tour takes place, showing the public major features of the sky for that

month. The tour takes place at 8pm during Standard Time, and at 9pm during Daylight Time.
*Filters are inserted into the viewing mechanisms, to show patrons "hidden" details of the Moon, Mars and Jupiter (when they are available).
*Reveal your age, and be shown any "birth stars" in the sky at that time.

Adult Astronomy Courses

Saturday in January from 3:30pm to 7:30pm
For ages eighteen and older.
$15 per in-parish registrant; $18 per out-of-parish registrant.

4 January, Learn Your Telescope (must have three households by 1 Jan)

This class is a hands-on introduction to the operations of your personal telescope. We'll even take it outside for some practice with the waxing gibbous Moon, weather permitting. Also included will be an overview of all major sky events for the next twelve months. Up to four household members over the age of eight are encouraged to attend, though the registrant for this course must be over eighteen. Please bring all parts and accessories belonging to the telescope, including the instruction manual. *This one-day course focuses specifically on telescopic views of the Baton Rouge sky.*

Limit ten households. Limit one telescope per household.

Topics that will be covered include…

- how to set up your telescope
- how to care for your telescope
- major telescopic features in the Baton Rouge sky, and how to find them
- how to darken the sky from your home
- upcoming telescopic events
- actual practice aiming and focusing on celestial objects (weather permitting)

This session will take place as long as there are three households registered by the deadline of Wednesday 1 January.

18 January: Learn Your Sky (must have 10 people by Jan 15)

This class is an introduction to the unaided-eye Baton Rouge sky. We'll even go outside for some practice, weather permitting. Also included will be an overview of all major sky events for the next twelve months. *This one-day course focuses specifically on the unaided-eye Baton Rouge sky.* **Limit thirty registrants. All registrants must be over eighteen; children are not allowed.**

Topics that will be covered include…

- major stars and constellations in Baton Rouge
- major lunar features and how to find them
- basic skygazing terminology
- how to distinguish planets from stars
- what meteors, conjunctions and "visible passes" are, and how to see them
- major unaided-eye features of our Milky Way Galaxy

- solar viewing safety, and how to view the Sun⊙ without store-bought equipment
- how to darken the sky from your home
- upcoming unaided-eye events
- benefits of belonging to an astronomy club
- actual practice identifying stars, asterisms and constellations (weather permitting)

NOTE: This session will take place as long as there are ten people registered by Wednesday 15 January.

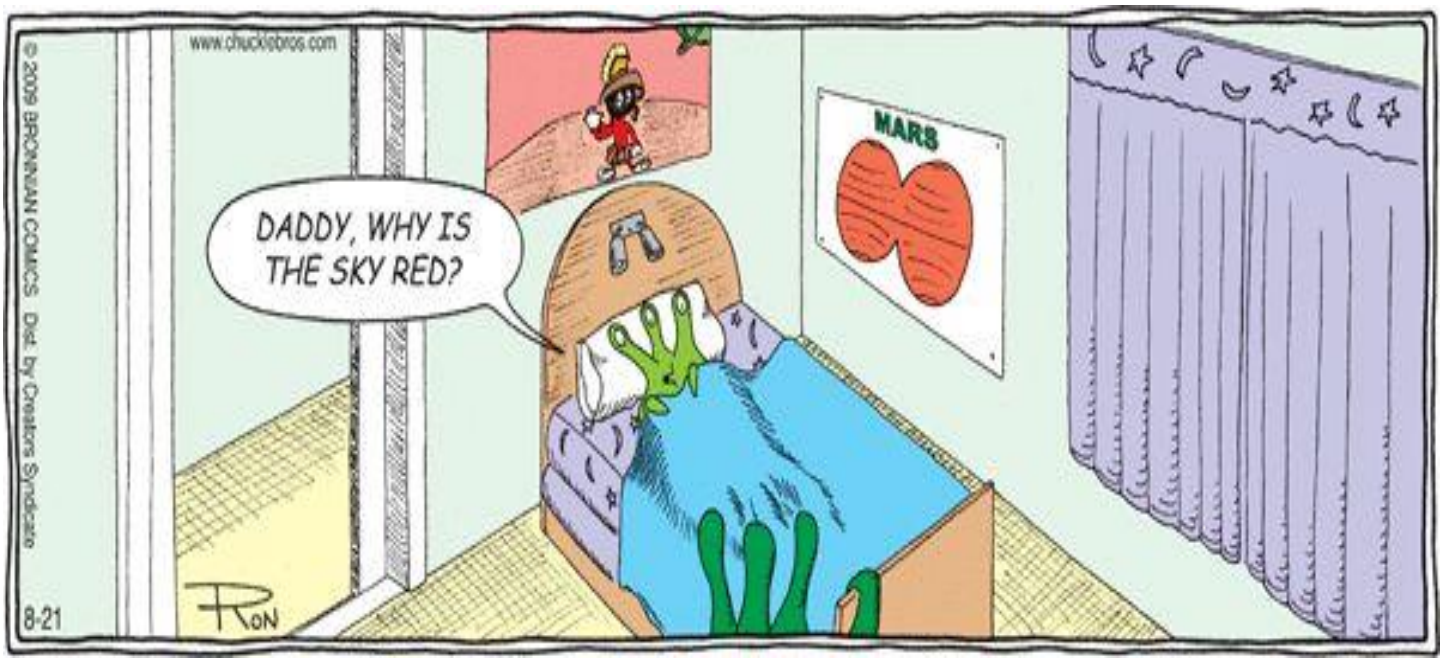
1 February: Learn Your Binocular (must have six households by 29 Jan)

This class is a hands-on introduction to the operations of your personal binocular. We'll even take it outside for some practice, weather permitting. Also included will be an overview of all major sky events for the next twelve months. Up to four household members over the age of eight are encouraged to attend, though the registrant for this course must be over eighteen. Please bring all parts and accessories belonging to the binocular, including the instruction manual. *This one-day course focuses specifically on binocular views of the Baton Rouge sky.* **Limit twenty households. Limit one binocular per household.**

Topics that will be covered include…

- how to operate your binocular
- how to care for your binocular
- major binocular features in the Baton Rouge sky, and how to find them
- how to darken the sky from your home
- upcoming binocular events
- actual practice aiming and focusing on celestial objects (weather permitting)

This session will take place as long as there are six households registered by the deadline of Wednesday 29 January.



Observing Notes: December

by John Nagle

Orion – the Hunter

Position: RA 12.76, Dec. +21.83°

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

Named Stars:

Betelgeuse (Alpha Ori), "Beit Alqueze" – a corrupted form of the original Arabic "Ibz al Jauzah", "the Armpit of the Central One", "Al; Mankib" – "The Shoulder", mag. +0.42, 05 53 10.29 +07 24 25.3, is a red supergiant variable star with a period of 2110 days and a diameter of 0.043 to 0.056 arc seconds. It is the 9th brightest star (on average) in the night sky. It is a weak radio source, part of the **Winter Triangle** asterism (with **Sirius** and **Procyon**), and also part of the **Winter Hexagram** asterism (with **Rigel**, **Aldebaran**, **Capella**, **Pollux**, and **Castor**). Located on the right shoulder of **Orion**. Also known as **HD 39801**, **HIP 27989**, and **58 Orionis**.

Rigel (Beta Ori), "Algebar", "Elgebar", from the Arabic "Rijl Jauzah al Yusrä" – "The Left Leg of the Jauzah (Giant)", mag. +0.18, 05 14 32.27 -08 12 05.9, is the 7th brightest star in the night sky and is part of a triple star system. It is a spectroscopic binary (a period of 9.860 days) and has a small blue companion star at a separation of 9". **Rigel** illuminates the "**Witchhead Nebula**" that is 2.5˚ to the northwest in the **Eridanus** constellation. Also known as **HD 34085**, **HIP 24436**, **Σ 668**, and **19 Orionis**.

Bellatrix (Gamma Ori), from the Arabic "Al Najīd", "The Conqueror", "The Female Warrior", "The Amazon Star", mag. 1.64, 05 25 07.8 +06 20 59.0, is a blue-white giant eruptive variable star located on the left shoulder of **Orion**. Also known as **HD 35468**, **HIP 25336**, and **24 Orionis**.

Mintaka (Delta Ori), from the Arabic "Al Mintakah"- "the Belt", is a triple star system. **Delta Orionis A** and **B** , a binary star, and a companion star, **Delta Orionis C**. **Delta A** – mag. 2.25, 05 32 00.4 -00 17 56.7 is a large blue giant variable eclipsing star; **Delta B** – mag. 13.7, is a white star at a separation of 32.8' and a period of 5.63 days; and **Delta C** – mag. 6.85, 05 32 00.50 -00 17 04, with a separation of 52" from **Delta AB**. **Delta Orionis A** is also known as **HD 36486**, **HIP 25930**, and **34 Orionis**; **Delta Orionis C** is also known as **HD 36485**, **HIP 25930**, and **34 Orionis**. **Delta Orionis AB** is also known as **ADS 4134**, and the **Delta** system is also known as **Σ 114**.

Alnilam (Epsilon Ori), from the Arabic "Al Niṯhām" – "The String of Pearls", mag. 1.69, 05 36 12.81 -01 12 06.9, is a blue supergiant star in the middle of **Orion's Belt**, surrounded by the reflection nebulae **NGC 1990**. Also known as **HD 37128**, **HIP 26311**, and **46 Orionis**.

Alnitak (Zeta Ori), from the Arabic "Al Nitāk", "The Girdle", is the eastern star of **Orion's Belt** and is a triple star system. The primary, **Zeta Orionis A**, is a close binary and a blue supergiant star at mag. 1.88, 05 40 45.52 -01 56 33.3. The secondary star, **Zeta Orionis B**, mag. 3.70, 05 40 45.6 -01 56 34, is a blue dwarf star with a separation of 2.6", having an orbital period of 1509 years. The bright emission nebulae, **IC 434,** is directly south and extends over 1˚ to the southwest – midway on its eastern edge is the **Horsehead Nebulae** (**B33**). Just to the southwest of **Zeta Orionis** is **Sigma Orionis**

– a multiple star system composed of 5 stars. **NGC 2024** is 15' to the east and slightly north of **Zeta Orionis**. **Zeta Orionis A** is also known as **HD 37742**, **HIP 26727**, and **50 Orionis**. **Zeta Orionis B** is also known as **HD 37743**, **HIP 26727**, and **50 Orionis**. The whole system is also known as **ADS 4263**.

Saiph (Eta Ori), or "Algiebba" is from the Arabic "Saif al Jabbār", "The Sword of the Giant", is an eclipsing binary with a companion**.** Both of the binary stars are blue stars. Primary star is mag. 3.35, 05 24 28.62 -02 23 49.7, the secondary star is magnitude 5.0, with a separation of 1.4" or 400 au, and a period of 7.989 days. The third star is 11th magnitude at a separation of 50" from the binary. Also known as **HD 35411**, **HIP 25281**, **28 Orionis**, and **Dawes 5**.

Trapezium (Theta Ori), is made up of the 8 stars of the **Theta¹ Orionis** system. The **Theta² Orionis** system is not part of the **Trapezium**.

Theta¹A Orionis, mag. 6.73, 05 35 15.82 -05 23 14.3, is an eclipsing binary with a period of 65.432 days. Also known as **HD 37020**, **HIP 26220**, and **41 Orionis**.

Theta¹B Orionis, mag. 7.90, 05 35 16.1 -05 23 07, is an eclipsing binary with a period of 6.471 days, and an **AB** separation of 8.8". Also known as **HD 37021**, and **41 Orionis**.

Theta¹C Orionis, mag. 5.13, 05 35 16.47 -05 23 22.9, is one of the most luminous stars known with the highest surface temperature of any known naked eye star – 45,000K.The separation of **AC** is 12.8". Also known as **HD 37022**, **HIP 26221**, and **41 Orionis**.

Theta¹D Orionis, mag. 6.71, 05 35 17.2 -05 23 15.7, has an **AD** separation of 21.5". Also known as **HD 37023**, **HIP 26224**, and **41 Orionis**.

Theta¹E Orionis, mag. 11.4, 05 35 15.77 -05 23 10.02, **AE** separation of 4.1" – located due north of **A**. Also known as **41 Orionis**.

Theta¹F Orionis, mag. 11.5, 4" from **C**. **CF** separation is 4".

Theta¹G Orionis, mag. 13.68, 05 35 16.72 -05 23 16.6, has a proto-planetary disk. Also known as **LV2 Orionis** and **41 Orionis**.

Theta¹H Orionis is a 16th magnitude, faint double star with a separation of 1.3" from **G.**

Not part of the **Trapezium**, but part of the **Theta Orionis** system:

Theta²A Orionis, mag. 4.98, 05 35 22.9 -05 24 57.8, is a spectroscopic binary star. Also known as **HD 37041**, **HIP 26235**, and **43 Orionis**.

Theta²B Orionis, mag. 6.38, 05 35 26.4 -05 25 00.7, has an **AB** separation of 52.5" and an orbital period of 21.0315 days. Separated from **Theta¹ Orionis** by only 135'. Also known as **HD 37042**, and **43 Orionis**.

Theta²C Orionis, mag. 8.1, has an **AC** separation of 128.7".

Hatysa (Iota Ori), "Nā'ir al Saif", "The Bright One in the Sword", marks the southern tip of **Orion's Sword**, and is a quadruple star system. The primary, mag. 2.75, 05 35 25.98 -05 54 35.6, is a blue giant star and a spectroscopic binary with a period of 929 days, and a strong X-ray source. The secondary is a pale blue star, at 7.3 magnitude, with a separation of 11.3" from the primary. The tertiary is a red star at 11th magnitude, with a separation of 50" from the primary star. The **Orion Nebulae** is 0.5˚ to the north. Also known as **HD 37043**, **HIP 26241**, **ADS 4193**, and **44 Orionis**.

Saiph (Kappa Ori), "Saif al Jabbar"- "The Sword of the Giant", from the Arabic "Rijl Jauzahal Yamnā"- "The Right Leg of the Jauzah", mag. 2.07, 05 47 45.39 -09 40 10.6, is a blue supergiant star with most of its light emitted in the ultraviolet region. Located at **Orion**'s right foot. Also known as **HD 38771**, **HIP 27366**, and **53 Orionis**.

Meissa (Lambda Ori), from the Arabic "Al Maisān"- "The Shining One", also "Ras al Jauzah"- "The Head of the Jauzah", originally called "Heka"- from "Al Hakah"- "The White Spot", is a double star. The primary, **Meissa A**, mag. 3.47, 05 35 08.28 +09 56 03.0, is a blue giant star. **Meissa B**, mag. 5.61, 05 35 08.5 +09 56 06, is a hot blue-white dwarf star. The two stars have a separation of 4.4" or about 2400 au. These stars are located at the apex of **Orion**'s head, and form a triangle with **Phi¹ Orionis** and **Phi² Orionis**. There are two more stars, both at magnitude 11.1, with **AC** separation of 28.6", and an **AD** separation of 78.3". **Meissa A** is also known as **HD 36861**, **HIP 26207**, and **39 Orionis**. **Meissa B** is also known as **HD 36862**, **HIP 26207**, and **39 Orionis**.

Tabit (Pi³ Ori), from the Arabic "Al-Tabit"- "The Endurer", also called "Hassaleh", mag. 3.19, 04

49 50.14 +06 57 40.5, is a yellow-white dwarf star, part of the **Pi Orionis** system of 6 stars that are a relatively loose group of stars that constitute **Orion's Shield** (or **Lion Skin** in some drawings). Other members of the **Pi Orionis** system are as follows:
Pi³ Orionis is also known as **HD 30652**, **HIP 22449**, and **1 Orionis**.
Pi¹ Orionis, mag. 4.64, 04 54 53.7 +10 09 04.1, is a white dwarf star. Also known as **HD 31295**, **HIP 22845** and **7 Orionis**.
Pi² Orionis, mag. 4.35, 04 50 36.72 +08 54 00, is a white dwarf star. Also known as **HD 30739**, **HIP 22509** and 2 Orionis.
Pi⁴ Orionis, mag. 3.68, 04 51 12.37 +05 36 18.4, is a spectroscopic binary, composed of a giant and a sub-giant star. Also known as HD 30836, **HIP 22549**, and **30 Orionis**.
Pi⁵ Orionis, mag. 3.71, 04 54 15.1 +02 26 26.4, is a blue-white giant star. Also known as **HD 31237**, **HIP 22797** and **8 Orionis**.
Pi⁶ Orionis, mag. 4.47, 04 58 32.9 +01 42 50.5, is an orange giant star. Also known as **HD 36512**, **HIP 23123** and **10 Orionis**.
Yuh Tsing (Tau Ori), "The Golden Well", mag. 3.59, 05 17 36.4 -06 50 39.8(also known as **HD 34503**, **HIP 24674**, and **20 Orionis**) is a 4 star system. Primary is **Tau Orionis A**, and **Tau Orionis B** – mag. 13.6, separation of 35.2' (also called **ADS 3877**), **Tau Orionis C** – mag. 11.9, separation of 3.7' (also known as **β188**), and **Tau Orionis D** – mag. 11.8, separation of 36.0' (also known as **h2259**).
Thabit (Upsilon Ori), mag. 4.62, 05 31 55.86 -07 18 05.5. Also known as **HD 36512**, **HIP 25923**, and **36 Orionis**.

Deep Sky:

M42 (NGC 1976), mag. 4.0, 05 35 17.3 -05 23 28, 65'x65' in size, also called **The Orion Nebula**, **The Great Orion Nebula**, **The Fish Mouth Nebula**, **Kleinmann-Low Nebula**, **The Theta¹ Orionis Cluster**, **Orion A**, **Becklin-Neugebauer Object**, and **The Trapezium**. **M42** is located in the middle of the **Sword of Orion**, and is the first nebula to be successfully photographed (by Henry Draper in 1880). The **Trapezium** is several hundred stars around and including **Theta¹ Orionis**, and is also known as **3C145**, **4C05.21**, **PKS 532.05**, OCL 528, **OCL 528.0**, **Lund 188**, **Mrk 14**, **CGCG 0532-0543**, **Ced 55d**, **Sh2-281**, **LBN 974**, **ADS 4186**, and **STF 748**. Just 0.5˚ to the north is the star **42 Orionis**, which is surrounded by **NGC 1977**, and another 25' to the north of this is **NGC 1981**. **NGC 1973**, **1975,** and **1977** are all part of the same reflection nebula. **M42** is part of the **Orion Molecular Cloud Cluster**. More than 150 proto-planetary disks have been found here. A dark lane separates **M42** from **M43**, forming a feature generally nicknamed "**The Fish's Mouth**" with bright regions on both sides called "**The Wings**". At the end of **The Fish's Mouth** is the **Trapezium Cluster**. The wing extension to the south is called "**The Sword**", the bright nebulosity below the Trapezium is called "**The Thrust**", and the fainter western wing extension is called "**The Sail**".
M43 (NGC 1982), mag. 9.0, 05 35.8 -05 23, 20'x15' in size, is a detached part of the **Orion Nebula**, and is a small, 8th magnitude star surrounded by the nebulosity of the **Orion Nebula** (**M42**). It extends 8 light years and is illuminated by a 6.9 magnitude star. Located about 7' north of the **Trapezium**. Also known as **DeMairan's Nebula**.
M78 (NGC 2068), mag. 8.0, 05 46.8 +00 30, 8'x6' in size, is a bright, large, wispy, fan shaped reflection nebula extending 3 light years. Contains 2 10th magnitude stars separated by about 53", and also contains 45 **T Tauri** type variable stars. Located about 2.3˚ northeast of **Zeta Orionis** (**Alnitak**). **NGC 2064** (11'x2') is 15' to the southwest, **NGC 2067** (7'x3') is 4' to the northwest, and **NGC 2071** (4'x3') is 20' to the north-northeast. Also known as **[LDEG91]3**.
Cr 70, mag. 0.4, 05 36 38 -01 04 17, 150' in size, 125 stars in a 3˚ long line running northwest to southeast. Also known as **Orion's Belt Stars**, **Lund 189**, **OCL 503**, **OCL 503.0**, **CGCG 0533-011**, and **Mrk 13**.
NGC 1980, mag. 2.5, 05 35.4 -05 55, 14'x14' in size, 37 stars. Also known as **OCL 529**, **OCL 529.0**,

H5-31, **Cr 72**, **Lund 189**, **CGCG 0532-059**, **LBN 977**, and the **Iota Orionis Cluster**.
Cr 69, mag. 2.8, 05 35 28.8 +09 56 28, 70' in size, 45 stars, detached, weak concentration of stars; large brightness range; involved in nebulosity. It covers about 1˚, and is only about 5 million years old. **Sh2-264** surrounds it. Located as **Orion's Head**. Also known as the **Lambda Orionis Cluster**, **Lund 185**, **OCL 479**, **OCL 479.0**, **Mrk 12**, **CGCG 0052+099**, **Orion Cluster**, **Aunt Margaret's Mirror**, and the **North Orion Bubble Nebula**.
NGC 1981, mag. 4.2, 05 35.2 -04 28, 25'x25' in size, 50 stars, detached, no concentration of stars; moderate range in brightness; very bright, large; magnitude of brightest star is 6.3; involved in nebulosity. Includes **Struve 750**. Located 1˚ north of the **Great Orion Nebula**, in the **Orion OB1** group. Also known as **OCL 525**, **Cr 73**, **Lund 187**, and **CGCG 0532-044**.
vdB 49, mag. 4.5, 05 39.2 +04 07, 6' in size, is illuminated by **Omega Orionis**. Also known as **LBN 894**.
Barnard's Loop, mag. 5.0, 05 37 28.1 -03 57 55, 600'x40' in size, is an emission nebula that is extremely large (10˚ in diameter and extending 320 light years), and very faint. It is a crescent of nebulosity extending northwest to south-southeast, enclosing both the **Belt** and **Sword of Orion**. Part of the **Orion Molecular Cloud**. Also known as **Sh2-276**.
Sh2-264, mag. 5.0, 05 35 12.3 +09 56 00, 390'x60' in size, is a 6.5˚ wide emission nebula of 25 light year extent, surrounding **Cr 69**.
vdB 38, mag. 5.77, 05 21.4 +08 25, 30'x25' in size, has a magnitude 5.8 star involved in the northeast edge. Located north-northeast of **Gamma Orionis**. Also known as **Ced 44**.
NGC 1788, mag. 5.8, 05 06.9 -03 21, 7'x5' in size, is a large, bright patch of nebulosity with its brightest star at 10th magnitude. Flanked by **LDN 1616**. Also known as **LBN 916**, **H5-32**, **IRAS 05044-0325** and the **Cosmic Bat Nebula**.
NGC 2169, mag. 5.9, 06 08.4 +13 58, 7' in size, 30 stars forming a figure of "37", detached, strong concentration of stars; large range in brightness; small; magnitude of brightest star is 6.9; consists of two distinct parts. Located 0.9˚ west-southwest of **Xi Orionis** in the **Ced 78** nebula. Also known as "**The 37 Cluster**", **H8-24**, **Be 83**, **OCI 481**, **Cr 38**, **Lund 206**, **OCL 481.0**, **CGCG 0605+139**, **LE Cluster**, **Sorority Cluster**, and the Sigma Nu Cluster.
H5-118, is a binary star with magnitudes of 6.2 and 9.8, 05 34.1 -01 02, separation of 27.5'. Also known as **ADS 4159**.
NGC 1662, mag. 6.4, 04 48.4 +10 56, 20' in size, 59 stars, detached, strong concentration of stars; poor cluster with moderate range of brightness; magnitude of brightest star is 8.3. Located 1.8˚ west-northwest of **Pi^{1} Orionis**, on top of **Orion's Shield**. Contains multiple star **h684**. Also known as **OCL 470**, **H7-1**, **Cr55**, **Lund 141**, and **CGCG 0445+108**.
NGC 2174, mag. 6.8, 06 09.4 +20 30, 40'x40' in size, is an extremely faint, very large and mottled patch of nebulosity surrounding a 7th star. It is an **HII Region** associated with **NGC 2175** (**Cr 84**). Also known as **Ced 67a**, **LBN 854**, **Sh2-252**, and the **Monkey Head Nebula** with **IC 2159**.
NGC 2175, mag. 6.8, 06 09.6 +20 29, 18'x18' in size, 60 stars, not well detached; large range in brightness; magnitude of brightest star is 7.6; involved in an extremely faint, large (39'x30') emission nebula (**NGC 2174**). Located northeast of **NGC 1973**, and is part of the **Gemini OBII Association**. Also known as **OCL 476**, **W13**, **Sh2-252** (with **NGC 2174**), **Cr 84**, **LBN 854**, **LBN 190.10+00.58** (a nebula around **Cr 84**), **[KCW94]189.876+0.516**, and **SIM 0606+20.1**.
NGC 1973, mag. 7.0, 05 35.1 -04 44, 5'x3' in size, is a bright, diffused nebula connected to **NGC 1975** (**The Running Man Nebula**). Located immediately to the north of **NGC 1977**. Also known as **Ced 55b**.
NGC 1975, mag. 7.0, 05 35.3 -04 41, 10'x5' in size, has a bright double star involved, connected to **NGC 1973**. Also known as **The Running Man Nebula** and **Ced 55c**.
NGC 1977, mag. 7.0, 05 35.5 -04 52, 40'x26' in size, is an open cluster of a sparse grouping of stars in a faint, large patch of nebulosity. Also known as **H5-30**, **OCL 525**, **Lund 159**, **CGCG 0537-048**, **Ced 55e**, **Sh2-279**, **Mermaid's Purse**, **Ced 55f**, and the southernmost part of **The Running Man Nebula**.

vdB 48, mag. 7.46, 05 30 -00 11.
NGC 2023, mag. 7.8, 05 41.6 -02 16, 10'x10' in size, is a reflection nebula with a bright star in a patch of nebulosity – one of the largest reflection nebulas in the sky at 4 light year in width. One of the brightest sources of fluorescent molecular hydrogen. Involved with the **Horsehead Nebula** (**B33**). Also known as **H4-24**, **LBN 953**, **[LDEG91]1**, **BD-02 1345**, **HD 37903**, and **HIP 26816.**
NGC 2071, mag. 8.0, 05 47.1 +00 18, 7'x5' in size, small, very faint and fuzzy. Located 15' north-northeast of **M78** (**NGC 2068**). In a group of galaxies with **NGC 2064**, **2067**, and **M78**. Also known as **H4-36**, **LBN 938**, and **[LDEG91]4**.
IC 435, mag. 8.2, 05 43.0 -02 19, 4'x3' in size, is a faint nebulosity surrounding an 8.3 magnitude star (**HD 38087**, **HIP 26939**, **BD-027350**). Located west-southwest of **Zeta Orionis**.
vdB 37, mag. 8.2, 05 18.1 +13 26, has an 8.2 magnitude star involved in the southeast portion. Also known as **LBN 850**.
H7-24, mag. 8.4, 05 53 46 +00 24 36, 11' in size. Also known as **NGC 2112**.
NGC 2194, mag. 8.5, 06 13.8 +12 48, 10' in size, 194 stars, is detached, no concentration of stars; small range in brightness; large; magnitude of brightest star is 12.1. Also known as H6-5, **OCL 485**, **Cr 87**, **Lund 221**, **Mel 43**, **Raab 33**, **IRAS 06108+1248** (½˚ northwest of **73 Orionis**), and **CGCG 0611+128**.
Be 85, mag. 8.7, 06 12 07.1 +05 27 31, 4' in size, 10 stars. Also known as **NGC 2186**.
vdB 35, mag. 8.7, 05 15 +13 01.
NGC 2186, mag. 8.7, 06 12.1 +05 28.4, 4' in size, 30 stars. Also known as **H7-25**, **OCL 498**, **Lund 209** and **CGCG 0609+054**.
Bas 11B, mag. 8.9, 05 58.2 +21 58, 9' in size, 70 stars. Also known as **Lund 1209**, **OCL 469**, and **CGCG 0555+219**.
Ced 55o, mag. 9.0, 05 41 38.3 -02 15 31, 10'x8' in size. Also known as **NGC 2023**.
H1-3, mag. 9.0, 05 35.6 -05 16, 20' in size. Also known as **M43** (**NGC 1982**).
NGC 1663, mag. 9.0, 04 49.6 +13 09, 9' in size, 30 stars. Also known as H8-7, **OCL 461**, **Lund 142**, and **CGCG 0415+130**.
NGC 1999, mag. 9.0, 05 36.4 -06 43, 2'x2' in size, located 1˚ south of the **Orion Nebula**. Also known as **H4-33**, **LBN 979**, **Keyhole Nebula**, and **V380 Orionis**.
NGC 2180, mag. 9.0, 06 09.6 +04 43, 10' in size, 55 stars, is an 8th magnitude star surrounded by faint stars forming a hook around the brighter star. The hook is about 8.5' long and 4.5' wide. Also known as **H8-6**. *Note*: **RNGC** says that this object is non-existant.
vdB 40, mag. 9.0, 05 26 +06 35.
vdB 43, mag. 9.0, 05 32 +06 03.
NGC 2112, mag. 9.1, 05 53.8 +00 25, 18' in size, 50+ stars, located within **Sh2-276**. Also known as **H7-24**, **OCL 509**, **Cr 76**, **Lund 1112**, **OCL 509.0**, and **CGCG 0551+003**.
H5-167, mag. 9.4, is a double star with **Eta Orionis**, separation of 11.5'. Also known as **ADS 5400**.
NGC 2141, mag. 9.4, 06 02.9 +10 27, 10' in size, 365 stars, located less than 1˚ north-northwest of **Mu Orionis**. Also known as **OCL 487**, **Cr 79**, **Lund 203**, and **CGCG 0600+104**.
vdB 54, mag. 9.5, 05 42 -06 15.
vdB 62, mag. 9.5, 05 54 +01 40, 15', located on the southwest edge of **LDN 1622**.
Beyond magnitude 10, but of some interest:
NGC 2022, mag. 11.7, 05 42.1 +09 05, 7' in size, is pretty bright, very small, and round. Photo magnitude of 12.4. Magnitude of central star is 14.9. The **RNGC** says it is non-existant. Also known as The **Collarbone Nebula**, **PK 196-10.1**, and **PNG 196.8-109**.
J 320, mag. 12.0, 05 05.6 +10 42, 7' in size, is a smooth disk involved in a larger, fainter halo of nebulosity. Photo magnitude is 12.9. Magnitude of center star is 14.4. Also known as **PK 190-17.1**.
Sh2-245 is a faint pair of stars next to the 5.3 magnitude **HD 25261**, located 3˚ below **Nu Tauri**. Also known as **The Fishhook Nebula**.
B33, 05 40 52 -02 28, 6'x4' in size, is a dark mass on a nebulous strip extending from 1˚ south of **Zeta Orionis**, seen in silhouette against **IC 434**. Involved with **B225** to the southwest. Home of the

Horsehead Nebula, a difficult object to detect visually. Use of a **H-beta** filter is very helpful.
IC 423, 05 33.4 -00 37, 6'x4' in size, is a very faint, comet shaped nebula, possibly a planetary nebula. Located between **Delta** and **Epsilon Orionis**, 28' southeast of **Delta Orionis**. Also known as **The Tear Drop Nebula**, **LBN 913**, and **Ced 52**.
IC 434, 05 41.0 -02 24, 60'x9' in size, is a large, faint nebula, possibly excited by **Zeta Orionis**, and the glow of the nebula silhouettes the **Horsehead Nebula** (**B33**).
NGC 2024, 05 40.7 -02 37, 30'x30' in size, is a bright, very large, and irregular emission nebula divided by a dark lane extending north-south. Illuminated by **Zeta Orionis**. Also known as **Ced 55p**, **[LDEG91]2**, the **Lambda Orion Ring**, **Lip's Nebula**, **One Piece Nebula**, **Sh2-277**, the **Flame Nebula**, the **Tank Trap Nebula**, and **The Ghost of Alnitak Nebula**.
NGC 2064, 05 46.3 +00 00, 12'x12' in size, is a small, relatively bright patch of nebulosity extending north-south. Located 3˚ southwest of **M78**, in a group of galaxies (**NGC 2071**, **M78**, **NGC 2064**). Also known as **V1647**, **McNeil's Nebula**, and **LBN 1627**.
Sh2-261, 06 08 56.6 +15 48 07, is roundish; very mottled; the southern part is brightest. Also known as **LBN 886**, and **Lower's Nebula**.
Asterisms:
Orion's Shield, or Lion Skin – composed of the stars **Omicron² Orionis**, all 6 of the **Pi Orionis**, and **11 Orionis**. Also known as **Al Kamm** – **The Sleeve Of the Garment In Which They Dress the Giant**.
Orion's Club – composed of the stars **Mu**, **Nu**, **Xi**, and both Chi Orionis. **Mu** and **Xi Orionis** is the handle, and the **Chi Orionis** stars are the end of the club.
Orion's Head – composed of the stars **Lambda**, **Phi¹**, and **Phi² Orionis**.
Orion's Belt – is composed of three stars from west to east; **Mintaka** (**Delta Orionis**); **Alnilam** (**Epsilon Orionis**); and **Alnitak** (**Zeta Orionis**). ***Note***: The **Belt** points southeast to **Sirius** (**in Canis Major**), and northwest towards the **Hyades** and **Aldebaran** in **Taurus**.
The North Arrow – the head of the arrow is formed by the belt stars and **Eta Orionis**. The lower end, tail of the arrow, is formed by **M42** and **M43**. The arrow ***always*** points north. The arrow is used as a navigational aid.
Orion's Sword – is composed of the following (running north to south): **NGC 1981**, **1975**, **1973**, **1977**, **M42**, **M43**, **NGC 1980**, **Iota Orionis**, and the star **Σ747**.
Other Deep Space Objects:
The Orion Nebula Complex – is composed of **M42**, **M43**, and **The Running Man Nebula** (**NGC 1973**, **1975**, and **1977**).
The Orion OB1 Association – is composed of **Orion's Belt** and the stars to the belt's northwest; **Orion's Sword**; and the **Orion Nebula**.
The Orion Molecular Cloud Complex – is composed of the following objects: The **Running Man Nebula** (**NGC 1973**, **1975**, and **1977**); the **Orion Nebula** (**M42**); **M43**; **IC 434** (containing the **Horsehead Nebula** – **B33**); **Barnard's Loop**; **M78**; the **Orion Molecular Cloud 1** (with the **Becklin-Neugebauer Object** and the **Kleinmann-Low Nebula**); the **Orion Molecular Cloud 2** (located about 12' to the northeast of the **Trapezium**); the **Flame Nebula** (**NGC 2024**); and part of the **Orion OB1 Association**.
Becklin-Neugebauer Object – 05 35 14.113 -05 22 22.73, is thought to be an intermediate-mass proto star located within the **Kleinmann-Low Nebula**. Also known as **V2254 Orionis**.
Kleinmann-Low Nebula – 05 35 14.16 -05 22 21.5, is located in the heart of the **Orion Nebula**. Also known as **Orion KL Nebula**. In the **OMC1 Complex**.
Note: deep space binocular objects include **Delta Theta¹ Orionis System (**the **Trapezium)**, **Delta Theta² Orionis System**, **Cr70** (the belt stars), **M42** (**NGC 1976**), **M43** (**NGC 1982**), **M76** (**NGC 2068**), **NGC 1662**, **1980**, **1981**, **2024**, **2112**, **2169**, **2175**, and **2194**.
Other deep sky objects in Orion: 41 **NGC**; 62 **UGC**; 1 **UGCA**; 24 **IC**; 16 **OCL**; 12 **Lund**; 75 **MCG**; 36 **Herschel**; 4 **Holm**; 4 **Mrk**; 7 **IRAS**; 4 **NPM1G**; 1 **Mel**; 1 **Raa**b; 1 **Elosser**; 1 **PP**; 1 **DG**; 1 **SL**; 9 **vdB**; 12 **Cr**, 8 **Be**; 2 **Cz**, 3 **Dawes**; 5 **FSR**; 2 **Bas**; 4 **Str**; 4 **[LDEG91];** 56 **LDN**; 37 **Ced**;

4 **Radio Galaxies**; 2 **Quasars**; 1 **WeDe**; 1 **Alessi**; 1 **Frr**; 2 **SK**; 1 **ASCC**; 8 **HH**; 5 **A**; 2 **AG**; 1 **Knott**; 1 **Eng**; 1 **Dias**; 1 **Stone**; 1 **Persson**; 1 **Te**; 2 **Elo**; 1 **Pi**; 1 **Sh**; 1 **Hei**; 3 **AGC**; 3 **Magakian**; 2 **Kro**; 2 **Skiff**; 26 **Sh2**; 1 **Haro**; 1 **Wein**; 3 **Teutsch**; 3 **VV**, 1 **Ring Galaxy**; 1 **Galaxy Trio**; 39 **CGCG**; **18 PGC**; 9 **PNG**; 6 **PK**; 10 **LBN**; 10 **B**; 5 **Abell**; 5 **HCG**; 2 **Arp**; 8 **[DB01]**; 1 **[EC95]**; 1 **[PKL98]**; 3 **Do**; 1 **DoDz**; and 5 **J**, for a total of 643 more objects.

Other Stars:

Sigma Ori is a 5 star system consisting of a spectroscopic binary star (**Sigma Orionis AB**), and 3 other stars (**Sigma Orionis C**, **D**, and **E**). Primary (**A**), is a binary, mag. 3.77, 05 38 44.77 -02 36 00.2, a blue dwarf star, with the companion star (**B**), a dwarf star in a 150 year orbit at a separation of 0.25"; **Sigma Orionis C**, mag. 8.79, 05 38 44.12 -02 36 06.3, is a dwarf star with a separation of 11.2" from the primary, is located 1˚ south of **Zeta Orionis**; **Sigma Orionis D**, mag. 6.62, 05 38 45.62 -02 35 58.9, is a dwarf star with a separation of 12.9" from the primary; and **Sigma Orionis E,** mag. 6.61, 05 38 47.19 02 35 40.5, is a dwarf star at a separation of 42" from the primary, has an 8th magnitude companion at a separation of 30", and a faint 3rd star (**Σ 761**) at a separation of 35". This star is a prototype helium-rich star. Also known as: **48 Orionis** (all 5 stars), **AB** and **D** – **HD 37468**,
AB- HIP 26549, and **E** – **V1030** and **HD 37479**.
Psi² Ori, mag. 4.59, 05 26 50.23 +03 05 44.4, is an ellipsoidal variable and possible eclipsing binary star. Also known as **HD 35715**, **HIP 25473**, and **30 Orionis**.
HD 37756, mag. 4.95, 05 40 50.72 -01 07 43.6, is a suspected eclipsing binary star. Also known as **HIP 26736**.
HD 38529, mag. 5.94, 05 46 34.96 +01 10 06.7, is a binary star – has a planet and a brown dwarf star in orbit, and an unconfirmed planet in orbit. Also known as **HIP 27253**.
HD 38858, mag. 5.97, 05 48 34.90 -04 05 38.7, has one planet in orbit and is a suspected variable star. Also known as **HIP 27435**.
V1377 Ori, mag. 6.40, 05 35 35.90 -03 15 10.2, is a slowly pulsating B star. Also known as **HD 37055**, and **HIP 26263**.
V1369 Ori, mag. 6.49, 05 21 19.31 +04 00 43.1, is a Be star. Also known as **HD 34959**, and **HIP 25011**.
HD 37017, mag. 6.56, 05 35 21.87 -04 29 39.02, is an eclipsing binary and variable star. Also known as **V1046**, and **HIP 26233**.
HD 43317, mag. 6.62, 06 15 47.01 +04 17 01.1, is a slowly pulsating B star. Also known as **HIP 29739**.
HD 42618, mag. 6.84, 06 12 01.0 +06 46 59, has one planet in orbit. Also known as **HIP 29432**.
HD 31253, mag. 7.13, 04 54 44 +12 21 08, has one planet in orbit. Also known as **HIP 22826**.
HD 34445, mag. 7.31, 05 17 40.98 +07 21 12.0, has six planets in orbit – b, c, d, e, f, and g. Also known as **HIP 24681**.
HD 36629, mag. 7.65, 05 32 57.08 -04 34 59.3, has a sub-dwarf companion, and is a suspected variable star. Also known as **HIP 26000**.
HD 37903, mag. 7.83, 05 41 38.39 -02 15 32.5, illuminates **NGC 2023 (**one of the largest reflection nebulas in the sky), a suspected variable star. Also known as **HIP 26816**.
HD 38801, mag. 8.26, 05 47 59.18 -08 19 39.7, has one planet in orbit. Also known as **HIP 27384**.
HD 39392, mag. 8.38, 054 53 19.0 +22 04 20, has one planet in orbit. Also known as **HIP27826**.
HD 37605, mag. 8.69, 05 40 01.73 +06 03 38.1, has two planets in orbit. Also known as **HIP 26664**.
HD 290327, mag. 8.96, 05 23 21.58 -02 16 39.4, has one planet in orbit. Also known as **HIP 25191**.
FU Ori, mag. 9.60, 05 45 22.36 +09 04 12.4, is a yellowish star almost in the center of **B35**. Located about 3˚ northwest of **Betelgeuse** (**Alpha Orionis**) and 0.8˚ east of **NGC 2027**.
Gliese 221, mag. 9.69, 05 53 00.28 -05 59 41.4, has two planets in orbit. Also known as **HIP 27803**.
BD +03 740, mag. 9.81, 05 01 16.62 +04 06 37.0, is a metal poor star. Also known as **HIP 23344**.
Stars of interest beyond magnitude 10:

WASP-82, mag. 10.1, 04 50 39 +01 47 00.7, has a transiting planet.
V380 Ori, mag. 10.7, 05 36 25.43 -06 52 57.7, is a quadruple star. Also known as **HIP 26327**.
LkHα 208, mag. 11.3, 06 07 49.54 +18 39 26.5, is associated with a bipolar nebula.
G 99-47, mag. 13.68, 05 56 25.47 +05 21 48.6, is a variable white dwarf star. Also known as **V1201**.
G 99-37, mag. 14.60, 05 51 19.48 -00 10 21.3, is a strongly magnetized white dwarf star.
4U 0614+091, mag. 18.5, 06 17 07.3 +09 08 13, is a low-mass X-ray binary star producing relativistic jets. Also known as **V1055**.
2MASS J05352184-0546085, 05 35 21.84 -05 46 08.6, is a variable star with a brown dwarf star companion.
Orion Source 1, 05 35 14.51 -05 22 30.4, is a protostellar binary star.
Reipurth 50, 05 40 27.45 -07 27 30.1, is a suspected **FU Orionis** star.
S Ori 70, 05 38 10.10 -02 26 26.0, is a possible rouge planet.
WISE J0521+1025, 05 21 26.30 +10 25 28.5, is a brown dwarf star.
Other stars in Orion: 58 **Σ;** 2 **Σl;** 10 **OΣ**; 10 **OΣΣ**; 15 **β**; 3 **S**; 3 **h**; 2 **Hu**; 5 **Ho**; 1 **Wnc**; and **64 V** for a total of 164 more objects.

Sky Happenings:January, 2020

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

Jan. 1st - Asteroid **Vesta** is stationary at 3 PM CST,
The **Moon** is at apogee (251,394 miles or 404,580 km from **Earth**) at 7:30 PM CST.
Jan. 2nd - **First Quarter Moon** occurs at 10:45 PM CST.
Jan. 3rd/4th All night: The short lived **Quadrantids** meteor shower peaks for **North America** around 2 AM CST. The first-quarter **Moon** sets by 1:30 AM local time and will not interfere with the best viewing opportunities that will start around 2 AM local time.
Jan. 4th - The **Moon** passes 5˚ south of **Uranus** at 12 PM Noon CST.
Jan. 5th - **Earth** is at perihelion (91.4 million miles or 147,091,144 km from the **Sun**) at 2 AM CST**.**
Jan. 7th - Dusk: The waxing gibbous **Moon** is between the horns of **Taurus**, only about 3˚ to the left of **Aldebaran**.
Jan. 8th - Dusk: The fattening **Moon**, still in **Taurus**, is less than 1˚ from **Zeta Tauri** (for viewers in eastern **North America**).
Jan. 9th - The **Moon** is 1.5˚ south of **M35** around 7 AM CST.
Jan. 10th - **Mercury** is in superior conjunction at 9 AM CST,
Full Moon occurs at 1:21 PM CST, and a penumbral lunar eclipse is visible across most of **Europe**, **Africa**, and **Asia**.
Jan. 11th - **Uranus** is stationary at 1 AM CST,
The **Moon** is 1˚ north of the **Beehive** at 6 PM CST.
Jan. 13th - **Pluto** is in conjunction with the **Sun** at 7 AM CST,
Saturn is in conjunction with the **Sun** at 9 AM CST,
Dwarf planet **Ceres** is in conjunction with the **Sun** at 12 Noon CST,
The **Moon** is at perigee (227,396 miles or 365,958 km from **Earth**) at 2:21 PM CST.
Jan. 15th - Asteroid **Davida** is at opposition at 1 AM CST.
Jan. 16th - **Mars** passes 5˚ north of **Antares** at 10 PM CST.
Jan. 17th - **Last Quarter Moon** occurs at 6:58 AM CST.
Jan. 20th - Dawn: The waning crescent **Moon**, **Mars**, and **Antares** form a pretty triangle along the border between **Ophiuchus** and **Scorpius** before sunrise,
The **Moon** passes 2˚ north of **Mars** at 1 PM CST.
Jan. 21st - Asteroid **Astraea** is at opposition at 1 AM CST.
Jan. 22nd - Dawn: A very thin lunar crescent rises in the southeast with **Jupiter** trailing it by around 6˚ - catch the pair before the **Sun** drowns out their light,
The **Moon** passes 0.4˚ south of **Jupiter** at 9 PM CST.

Jan. 24th - **New Moon** occurs at 3:42 PM CST.
Jan. 27th - **Venus** passes 0.08˚ south of **Neptune** at 1 PM CST,
Evening: **Venus** is 6˚ from the thin lunar crescent in **Aquarius**. **Neptune** will be less than ¼˚ from **Venus**.
Jan. 28th - The **Moon** passes 4˚ south of **Neptune** at 12 AM midnight CST,
The **Moon** passes 4˚ south of **Venus** at 1 AM CST.
Jan. 29th - The **Moon** is at apogee (251,899 miles or 405,393 km from **Earth**) at 3:27 PM CST.
Jan. 31st - The **Moon** passes 5˚ south of **Uranus** at 9 PM CST.

Planets:

Mercury – **Mercury** goes through superior conjunction with the **Sun** on January 10th. The first opportunity to see it comes on the 25th. With a clear sky and an unobstructed west-southwest horizon, search for a wafer-thin crescent **Moon** hanging 3˚ high 30 minutes after the **Sun** sets. Then hunt for the magnitude -1.1 **Mercury** 2˚ to the **Moon**'s right. There will be only about a 10 minute window to catch them before they sink out of sight. **Mercury** will gain nearly 1˚ in altitude each passing day. On the 31st, the planet, at magnitude -1.0, will stand 6˚ high ½ hour after sundown, and will set 70 minutes after the **Sun**.
Venus – **Venus**, on January 1st, will shine brilliantly (magnitude -4.0) above the southwest horizon 16˚ high an hour after sunset. A six day old **Moon** appears high above it in the south. The interval between sunset and **Venus**-set increases from 2¾ hours to almost 3½ hours during January, with a gibbous phase that shrinks from 82% to 74% lit, and a disk that enlarges from 13" to 15" during the month. The planet lies among the background stars of central **Capricornus**, tracking past **Delta Capricorni** (**Deneb Algedi**) before entering **Aquarius** on January 11th. The planet will near the eastern edge of **Aquarius** late in the month where it will have a remarkable encounter with **Neptune** on the nights of the 26th and 27th. As darkness falls on the 26th, use binoculars or a telescope at low power, and target **Venus**. Note the 4th magnitude star **Phi Aquarii** 1.4˚ Above the planet. **Neptune** will lie ⅔ the way from **Venus** to **Phi Aquarii**. **Neptune**'s disk is just 2.2" wide at a magnitude of 7.9. There will be a slightly brighter star that stands 0.5˚ to the right of **Neptune** – don't confuse them. On the 27th, **Neptune** passes 5' to the north of **Venus**, the closest approach between the two planets since January of 1984. The conjunction will occur at 1 PM CST, and by nightfall across **North America** a few hours later, **Neptune** will lie 12' west of **Venus** while **Phi Aquarii** will stand nearly equal distant to **Venus**' east-northeast. A slender crescent **Moon** appears 7˚ below the two planets. This will be the best evening apparition of **Venus** for **Northern Hemisphere** observers since 2012.
Mars – **Mars** rises about three hours before the **Sun** in January, and has an interesting path through **Scorpius** and **Ophiuchus** during the month. **Mars** begins the month (at magnitude 1.6) some 4˚ to 5˚ to the upper right of **Beta Scorpii** (**Graffias**). On the mornings of the 17th and 18th, the planet (now at magnitude 1.5) will pass less than 5˚ northwest of **Antares** (magnitude 1.1), a red supergiant star. As dawn starts to break about 90 minutes before sunrise, the planet will stand 15˚ above the southeast horizon. On January 20th, a waning crescent **Moon** appears above the planet and **Antares**, but a telescope will reveal a featureless **Mars** with a disk less than 5" in diameter and 95% lit.
Jupiter – **Jupiter** was in superior conjunction on December 27th, and is only a few degrees from the **Sun**, lost in the solar glare as January of 2020 begins. Not until the 2nd week of January does the planet become visible to the naked eye before sunrise. An hour before sunrise on the 22nd, a slim crescent **Moon** will appear 7˚ to the planet's upper right. The planet shines at magnitude -1.9. The visibility of the planet improves through the end of the month, when it will climb 7˚ high in the southeast 45 minutes before the **Sun** rises.
Saturn – **Saturn** is in conjunction with the **Sun** on January 13th, just 2 hours after **Pluto**, and 3 hours before the minor planet **Ceres**. The ringed planet re-emerges before dawn by January 31st, but just barely. It will be just 3˚ high in the southeast, at magnitude 0.6, 30 minutes before sunrise.
Uranus – **Uranus** ride high in the southern sky during the early evening hours, among the background stars of **Aries**, 12˚ due south of the 2nd magnitude star **Alpha Arietis** (**Hamal**). The magnitude 5.8 planet will glow brightly enough to see easily through binoculars if you know where to look. Start by finding **Hamal** and the magnitude 3.8 star **Alpha Piscium (Alrescha)**, which lies 21˚ south of **Hamal**. Estimate the

midpoint between the two and drop 1˚ south of this spot to find **Uranus**. There are four 6th and 7th magnitude stars that form a slightly crooked line that extends 4˚ north to south. The planet lies just west of the line during the first three weeks of January. The planet's eastward motion will make it a fifth member of the line by the month's close. Only **Uranus** will show a disk, which spans 3.6", and glows blue-green. The planet will set by 2 AM local time in early January, and by midnight late in the month. The planet will stay in southern **Aries** throughout 2020.

Neptune – Neptune lies among the stars of northeastern Aquarius all through 2020. The planet will have an encounter with **Venus** on the evenings of January 26th and 27th. See the description of the conjunction in the description of **Venus** above.

Pluto – Pluto is in conjunction with the **Sun** on January 13th, and is not visible all month.

Earth – Earth arrives at perihelion, a minimum of 0.9832 au from the **Sun**, at 2 AM CST on the 5th of January.

Moon – The **Moon** is waxing gibbous, and 3˚ to 4˚ to the left or upper left of **Aldebaran** at nightfall on January 7th. The **Moon**, on the 10th, rises only a few degrees to the lower right of **Pollux** at nightfall. On the morning of the 20th, the waning lunar crescent forms a compact pattern with **Mars** and **Antares**. At nightfall on the 27th, the waxing lunar crescent is some 6˚ below **Venus**, and on the next night about the same distance to the upper left of **Venus**.

Favorable Librations: **Baillaud Crater** on Jan.1st; **Schluter Crater** on the 10th; **Hausen Crater** on the 13th; and **Cabeus Crater** on the 14th.

Greatest north declination on the 10th (+23.2˚), greatest south declination on the 23rd (-23.2˚).

Libration in Longitude: East limb most exposed on the 21st (+5.4˚)
West limb most exposed on the 8th (-5.7˚)

Latitude: North limb most exposed on the 3rd (+6.9˚) and on the 30th (+6.8˚)
South limb most exposed on the 16th (-6.8⅔)

Asteroids **–** Asteroid **Vesta**, magnitude 7.5, rides high in January's early evening sky, against the backdrop of **Cetus**, in the Whale's tail. You should have little trouble picking it out. To start, find the 1st magnitude orange star **Aldebaran** in **Taurus.** Then follow the point of the V-shaped **Hyades** star cluster westward (to the right0 about 3 binocular fields, to the 2.5 magnitude star **Alpha Ceti**. Then shift north 5˚ or so to reach the anchor stars **Lambda** and **Mu Ceti**. On January 12th, **Vesta** will be at 02 47.13 +0959.3; on the 22nd – at 02 51.08 +10 55.6; and on the 1st of February – at 02 57.31 +11 58.2. ***By my estimates***, **Vesta**'s positions are as follows: On January 1st – **Vesta** will be about 1˚ south and a little east of **Mu Ceti**; On the 6th – about 0.6˚ south-southeast of **Mu Ceti**; on the 11th – about 0.6˚ east of **Mu Ceti**; on the 16th - 1˚ east-northeast of **Mu Ceti**, just over the border into **Aries**; on the 21st – about 1.7˚ northeast of **Mu Ceti**, or just over 2˚ southeast of **38 Arietis**; on the 26th - 2½˚ northeast of **Mu Ceti**, or just over 2˚ southeast of **38 Arietis**; and on the 31st – just over 3˚ north and a little west of **Lambda Ceti**, or 3½ east and a little south of **38 Arietis**.

Asteroid **5 Astraea**, in **Cancer**, starts the month at magnitude 9.5, and will brighten to magnitude 8.9 when it reaches opposition on January 21st, and will then fade to magnitude 9.3 by month's end. **Astraea** will be, on the 12th, at 08 15.45 +15 34.5; on the 22nd – at 08 06.54 +16 34.4; and on February 1st – at 07 57.57 +17 38.4. **Astraea**'s position, ***by my estimates***, are as follows: On January 1st – about 4˚ southeast of **Zeta Cancri**; on the 12th – just over 2˚ south-southeast of **Zeta Cancri**; on the 21st – about 1½˚ southwest of **Zeta Cancri**; and on the 30th – just over 3˚ west of **Zeta Cancri**, or about ½˚ west of **3 Cancri**.

Asteroid **511 Davida**, starts January at magnitude 9.9, but brightens to magnitude 9.5 when it reaches opposition on the 15th in **Gemini**, and fades to magnitude 10 by the month's end. **Davida**'s position, ***by my estimates***, are as follows: On January 1st – about 4½˚ southeast of **Kappa Geminorum**; On the 8th – about 2½˚ southeast of **Kappa Geminorum**; on the 14th – just under 1˚ east-southeast of **Kappa Geminorum**; on the 17th – about ¼˚ east of **Kappa Geminorum**; on the 20th – about 0.6˚ north-northwest of **Kappa Geminorum**; on the 23rd – about 1.3˚ northeast of **Kappa Geminorum**; and on February 1st – about 4˚ northwest of **Kappa Geminorum**, or about 1.2˚ southwest of **Upsilon Geminorum**.

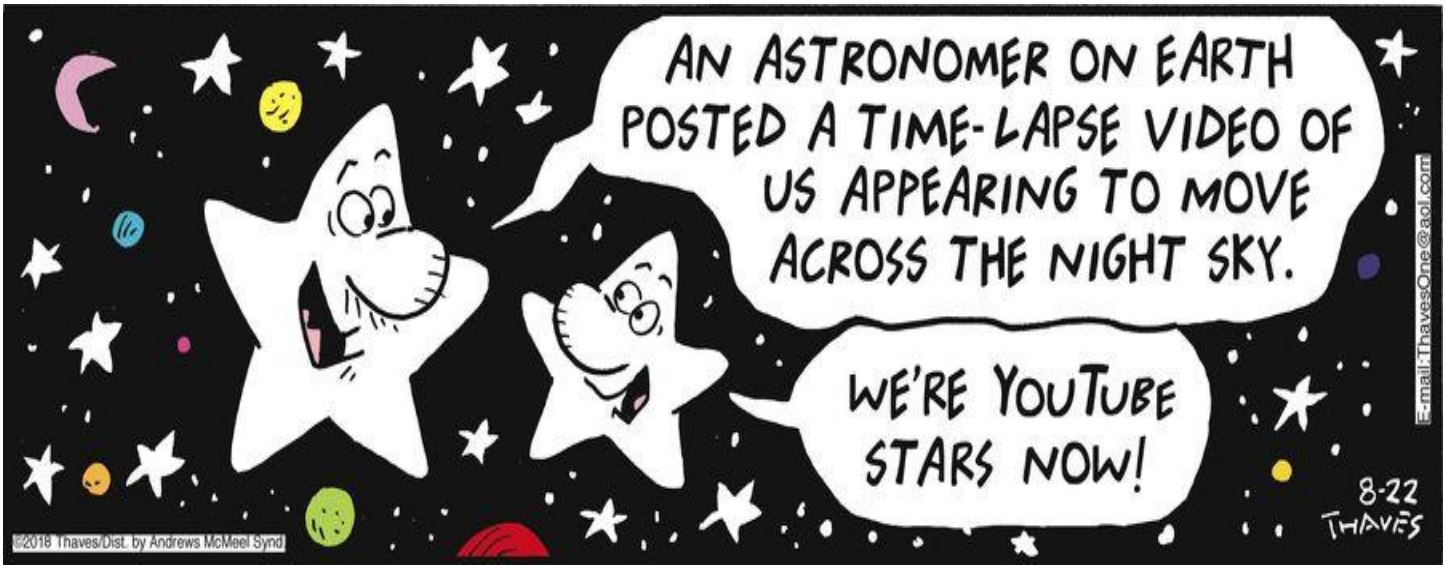
Comets **–** Comet **PANSTARRS (C/2017 T2)** should reach 9th magnitude during January as it crosses the star fields along the border between **Cassiopeia** and **Perseus**. On January 1st, the comet should be about 3˚ northeast of **Gamma Persei**. On the 13th, the comet will lie 1˚ north of the 4th magnitude star **Eta Persei**. The next two weeks has the comet some 4˚ south of the **Heart and Soul Nebula** (**IC 1805** and **IC 1848** respectively). On the 26th and 27th, the comet will be less than 1˚ north of the **Double Cluster**. The comet's positions, ***by my estimates***, are as follows: On January 1st – about 4½˚ east of **Eta Persei**; on the 6th – just over 2.2˚ east of **Eta Persei**; on the 11th – about ¾˚ south and a little west of **Eta Persei**; on the 16th – just under 2˚ west and a little north of **Eta Persei**; on the 21st – just over 3˚ west-northwest of **Eta Persei**, or about 1˚ east of the **Double Cluster**; on the 26th – about 4½˚ northwest of **Eta Persei**; and on the 31st – about 5.2˚ northwest of **Eta Persei**.

Meteor Showers **–** The **Quadrantids** meteor shower, active from December 28th through January 12th, can produce up to 120 meteors per hour, but also has a sharp maximum, with meteor numbers remaining above half the peak level for only four hours. The **Quadrantids** will peak before dawn on January 4th with the slightly gibbous **Moon** setting around 1 AM local time. The meteors appear to radiate from northern **Boötes** – a region that climbs highest just before dawn. Look east-northeast at about 4 AM local time on the morning of January 4th.

When to View the Planets:

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

DARK SKY VIEWING - PRIMARY ON JANUARY 25TH, SECONDARY ON JANUARY 18TH



Mythology:

Orion – The Hunter

According to myth, Orion was the son of Poseidon, the sea god, and Euryale, daughter of King Minos of Crete. Poseidon gave Orion the power to walk on water. Homer, in the Odyssey, describes Orion as a giant hunter, armed with an unbreakable club of solid bronze. In the sky, the hunter's dogs (the constellations Canis Major and Canis Minor) follow at his heels, in pursuit of the hare (the constellation Lepus). On the island of Chios, Orion wooed Merope, daughter of the king, Oenopion, apparently without much success, for one night, while fortified with wine, he tried to ravish her. In punishment, Oenopion put out Orion's eyes and banished him from the island.

Orion headed north to the island of Lemnos, where Hephaestus (the lame blacksmith/artificer of the Gods, who was married to Venus, the goddess of Love) had his forge. Hephaestus took pity on the blind Orion and offered one of his assistants, Cedalion, to act as his eyes. Hoisting the youth on his shoulders, Orion headed east toward the sunrise, which an oracle had told him would restore his sight. As the Sun's healing rays fell on his sightless eyes at dawn, Orion's vision was miraculously restored.

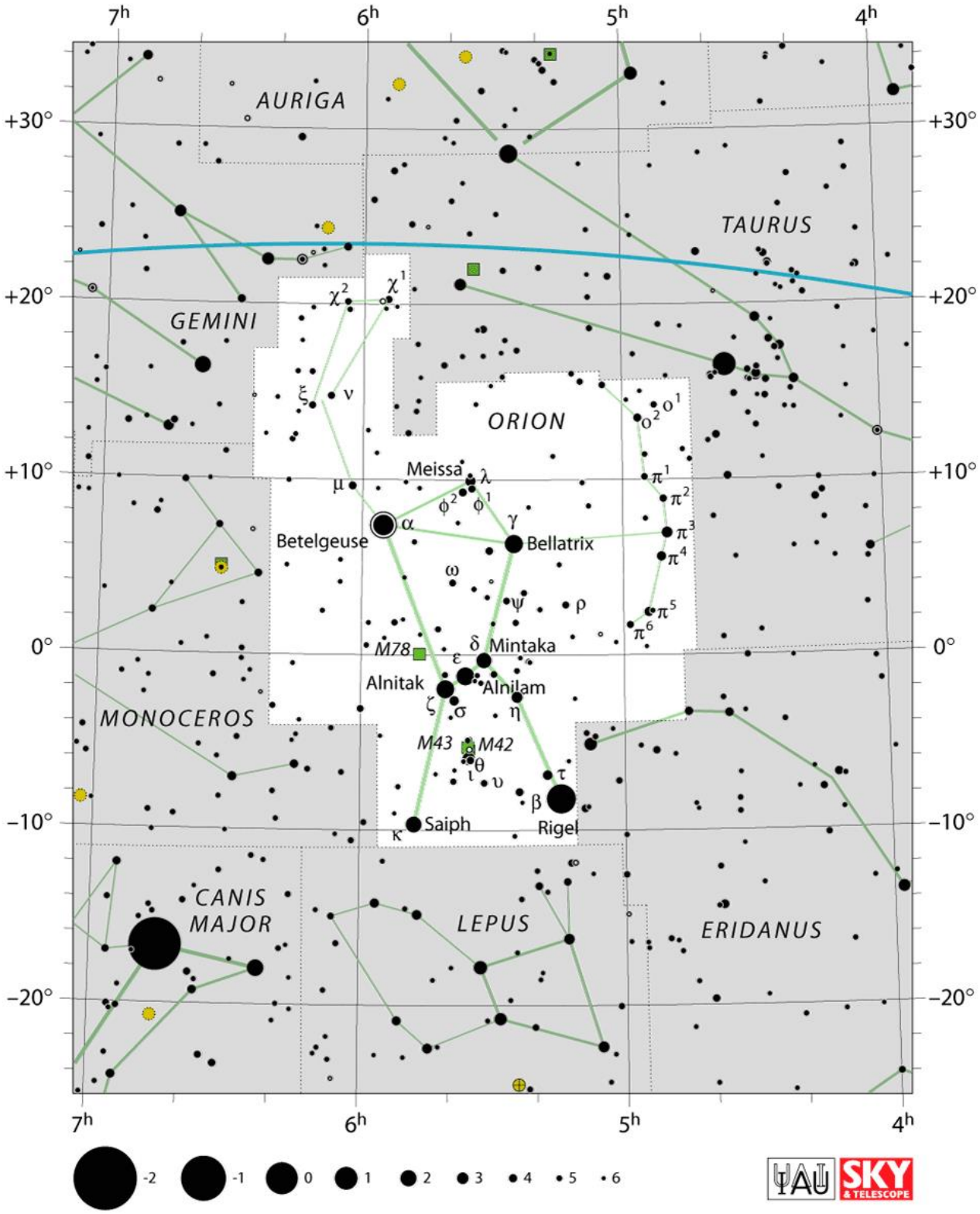
Orion is linked in a stellar myth with the Pleiades star cluster in Taurus. The Pleiades were seven sisters, daughters of Atlas and Pleione. As the story is told, Orion fell in love with the Pleiades and pursued them with amorous intent. But, according to Hyginus, it was actually the mother Pleione he was after. Zeus snatched the group (mother, father, daughters) and planted them among the stars, where Orion still pursues them across the sky each night.

There is a strange and persistent story about the birth of Orion, designed to account for the early version of his name, Urion. According to the story, there lived in Thebes an old farmer named Hyrieus. One day he offered hospitality to three passing strangers, who happened to be Zeus, Neptune, and Hermes. After they had eaten, the visitors asked Hyrieus if he had any wishes. The old man confessed that he would like to have liked a son, and the three gods promised to fulfill his wish. Standing together around the hide of the ox they had just consumed, the gods urinated on it and told Hyrieus to bury the hide. From it in due course was born the boy whom Hyrieus named Urion after the mode of his conception.

Stories of the death of Orion are numerous and conflicting. Astronomical mythographers such as Aratus, Eratesthenes, and Hyginus were agreed that a scorpion was involved. In one version, told by Eratesthenes and Hyginus, Orion boasted that he was the greatest of hunters. He declared to Artemis, the goddess of hunting, and Leto, her mother, that he could kill any beast on Earth. The Earth shuddered indignantly and from a crack in the ground emerged a scorpion which stung the presumptuous giant to death. Aratus, though, says that Orion attempted to ravish the virgin Artemis, and it was she who caused the Earth to open, bringing forth the scorpion. Ovid has still another account; he says that Orion was killed trying to save Leto from the scorpion.

A very different story, also recounted by Hyginus, is that Artemis loved Orion and was seriously considering giving up her vows of chastity to marry him. As the greatest male and female hunters they would have made a formidable couple. But Apollo, twin brother to Artemis, was against the match. One day, while Orion was swimming, Apollo challenged Artemis to demonstrate her skill at archery by hitting a small black object that he pointed out bobbing among the waves. Artemis pierced it with one shot – and was horrified to find that she had killed Orion. Grieving, she placed him among the constellations.

In both of the scorpion versions, the outcome was Orion and the scorpion (the constellation Scorpius) were placed on opposite sides of the sky, so that as Scorpius rises in the east, Orion flees below the western horizon. "Wretched Orion still fears being wounded by the poisonous sting of the scorpion," noted Germanicus Ceaser.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AURIGA
TAURUS
GEMINI
ORION
MONOCEROS
CANIS MAJOR
LEPUS
ERIDANUS
Meissa
Betelgeuse
Bellatrix
Mintaka
Alnitak
Alnilam
M78
M43
M42
Saiph
Rigel
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SKY & TELESCOPE

The End