

San Diego Astronomy Association

Celebrating Over 50 Years of Astronomical Outreach



January 2021

<https://www.sdaa.org/>

A Non-Profit Educational Association
P.O. Box 23215, San Diego, CA 92193-3215

SDAA Update

In keeping with state and local mandates in regards to social distancing, the **SDAA has cancelled all public outreach and club events** for the foreseeable future. These include our regularly scheduled monthly meetings at Mission Trails Regional Park.

Look for updates on the Lipp telescope.

Since TDS is private space there is no reason to lock down the facility but there are actions you can take to help keep the site safe for all of us. If you plan to visit and use the facility, please bring along some disinfectant wipes or disinfectant spray cleaner. When you finish using the restrooms or the warming room, please wipe down the areas that you touched in order to help prevent the spread of any viruses. As much as we love sharing the views of the night sky, try to maintain the recommended 6-foot social distance guideline.

Next SDAA Business Meeting

January 12th at 7:00pm
10070 Willow Creek Rd
San Diego, CA 92131
Via Zoom

Next Program Meeting

TBD
Live Stream

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San Diego Astronomy Association
Incorporated in California in 1963

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Annual SDAA Banquet

Due to the ongoing Covid-19 crisis, the annual SDAA banquet is going to be held virtually, most likely on February 6th or 13th. Since it's our main fundraiser of the year, we're working hard to make it great. Our guest speaker will be Blaine Baggett and the topic is set to be "The Search for Life Elsewhere in the Solar System." Mr. Baggett is an award-winning producer of documentaries and has won two Emmys. The auction and raffle will be held online and we already have some great items lined up. We will be sending out more details as we have them available, but look for an update in early 2021!



[Link to SDAA Merchandise Store](#)

<https://sdaa28.wildapricot.org/SDAA-Store>

Newsletter Deadline

The deadline to submit articles
for publication is the
15th of each month.

[Link to Outreach Calendar](#)

https://calendar.google.com/calendar/embed?src=g-calendar@sdaa.org&ctz=America/Los_



San Diego Astronomy Association

San Diego Astronomy Association Board of Directors Meeting

December 8, 2020 – Unapproved and subject to revision

1. Call to Order

The meeting was held via Zoom and was called to order at 7:08pm with the following board members in attendance: Dave Wood, President; Steve Hallman, Vice President; Melany Biendara, Treasurer; Gene Burch, Recording Secretary; Alicia Linder, Corresponding Secretary; Dave Decker, Director; Hiro Hakozaiki, Director; Mike Chasin, Director; Pat Boyce, Director, Webmaster; Jeff Stevens.

2. Priority / Member Business

None

3. Approval of Last Meeting Minutes

The November meeting minutes approved.

4. Treasurers & Membership Report

The treasurer's report was approved. Mel said we're under budget for the grading project and we received \$600 in donations to help defray the cost. She asked for mileage reimbursement for the volunteers who made so many trips out there and the board approved. Had to suspend Sky & Telescope subscriptions because of problems at S&T with no end in sight. Student membership dropped and she and Pat are going to audit the student members. Going to check on having the septic tank serviced.

5. Standard Reports

a. Site Maintenance Report:

- Jim T and Dean J rented a skip loader and completed the gravel spreading.
- Dug angled, evenly-spaced trenches along the road on the north side of the observatories and installed 10-foot pressure treated 4X4s to direct water flow to the fence line. This is in accordance with county engineers for erosion control. This area of TDS sees the most damage during the rainy season, and is the source for a lot of the water that makes it down to the west part of the property.
- More work was done to the damaged electrical feed supplying the observatory at the top of the hill. That feeder wasn't on the drawing supplied to the county for the permit for the new electrical drop, so the permit may have to be amended. A trench was dug from the affected observatory to the fence line to accommodate the new run, and we hope to have that filled in next weekend. As a temporary measure, that observatory was wired into the feed for the observatory next to it, but this can't be a long-term solution.

Continued TDS Upgrades and Projects

- Lipp repairs (good time to start since it's not being used?)
- Water tank is probably leaking (poison oak is growing on the downhill side and only grows near creeks/streams). Inspect, refill, install fill line tube + refill nozzle?
- Women's bathroom toilet is running; Are replacement parts in the men's room cabinet?
- Private pad electrical boxes in need of repairs? (Steve mentioned this at last month's meeting but I haven't verified)
- Septic inspection/maintenance (last payment for anything septic was 2013)
- Northwest chain link fence - ground has eroded exposing several inches of the cement bases for several posts. I found a backpack with canned food and water near a section large enough for a person to crawl under this weekend

b. Observatory/Loaner Scope Report:

Observatory: Remains in excellent condition. Roof is much smoother since Brian installed the roof rails. Have all COVID-19 supplies on hand. Waiting for better conditions to run the "soft" opening. Will not be in December and am doubtful January will be any better.

Loaner Scopes:

These have been incredibly active. Lots of new members getting into the hobby and using our scopes to get an idea for their first scope purchase.



San Diego Astronomy Association

- c. Private Pad Report:
We currently have 3 unleased pads (including the pad that I consider to be unleaseable, pad 36) and 7 people on the waiting list, 2 of whom are looking to upgrade.
- d. Program Meetings Report:
18 Nov 2020 Speaker / Topic:
- Speaker: Ryan Rubenzahl - Caltech
- Presentation: "Measuring the Speed of Stars More Precisely Than Your Car's Speedometer"
- Attendees: 42
Current Program Meeting Petty Cash as of 6 Aug 2020 = \$524
Expenses Since Previous Report - None
Steve solicited nominations for the upcoming open board positions and received none. The Nominating committee recommendations of Dave Wood for president, Steve Hallman for Vice President and Alicia Linder for Corresponding Secretary were accepted.
- e. AISIG Report:
Mike Chasin presented – "Remote Observatory Operations"
- f. Newsletter Report:
Current issue looks good – nothing new to report.
- g. Website Report:
Webmaster report – We have the new website complete to the point that we would like to have other Board members review and comment. Hiro will send instructions on how to access the site. Most of the content from the old site has been transferred to the new site, except that the private sites are not in, and many of the documents have not yet been linked. That can be done later, even after the site is public.
- I have a few requests:
- I could use a few more pictures for SDAA events. In particular I would like to get one good picture for each of the major events that we sponsor on the events page.
 - The pictures of the private sites were taken in 2006. If any of the pictures from the old site are no longer representative of the current state, I would like to get replacement pictures.
 - If any Board or committee members would like to replace their picture on the Contacts page, please send me a new picture. The older pictures of Board and Committee members were all 60x60 pixels.
- And a few notes:
- The new site cannot yet use https, so you may get some security warnings on the site. When we change to the real SDAA domain, we will use https.
 - I have been looking for a good PDF plugin for displaying the newsletters. I have tried 3, but all give horrible security warnings. They may work after we get https working, but I won't be able to find out until the site is live. A small version of the current issue is embedded on the home page and the previous 12 months are embedded on the newsletter page. They allow you to see the document, scroll and save, but do not let you expand them to readable size. The drop-down on the Newsletter page will open any of the newsletters (last 12 months are currently installed).
 - The slider on the home page now has pictures from the AISIG Flickr site. I think it looks very good, but if anyone has pictures they either do or do not want to see included in it, let me know.
- h. Social Media:
People are visiting our YouTube channel and we currently have 83 subscribers. The November monthly meeting, along with the presentations by Ryan Rubenzahl were posted. 319 people have viewed the live stream from Oak Oasis Park.
- i. Outreach Report:
During November we completed two of the virtual outreach events discussed last month. Our first virtual event hosted by OakOasis County Park was completed on November 14. The presentation followed and imaged some of the discoveries of Charles Messier with comments from Stephen James O'Meara's book on the subject. The event was live streamed to the SDAA YouTube channel and is available at: <https://www.youtube.com/watch?v=mdm4WhgH4S0>



San Diego Astronomy Association

Our second virtual outreach event was conducted in partnership with the website, Timeanddate.com. They have hosted several livestream events posted on their website, on Facebook Live, and on their YouTube channel. The request made through the Astronomical League was forwarded to me, and we agreed to assist their astronomer, Graham Jones. The event was a penumbral lunar eclipse during the early morning hours of Nov 30. Gary Hawkins and I provided continual live stream views of the Moon for a 3 hour period. Graham Jones et al provided commentary and additional content. Initially, we intended to use the facilities at OakOasis to provide the video stream. Unfortunately, the latest COVID restrictions required the park to cancel all such non-essential activities. Therefore Gary and I provided the stream views from our own homes. The program was streamed to their YouTube channel and is available at: <https://www.youtube.com/watch?v=NjREh2WE2c>

Timeanddate.com has a very large following and initial metrics showed connections to the live stream as follows:

YouTube Livestream: More than 38,000 viewers

Facebook Livestream: More than 15,000 viewers

Gary Hawkins also recorded his video stream and has produced an edited version, about 5 minutes long. His very professional video is available on his own YouTube site at: <https://youtu.be/G8ouTXypHLA>

Our plan to host an event at the Borrego Springs Library has been delayed until the first of the year, date to be determined. Tactical challenges during the holiday season and the current COVID situation are to be blamed.

- j. TARO Report:
TARO Ops are still suspended pending replacement battery pack arrival. These battery packs have been on back-order due to the pandemic.
- k. Cruzen Report: Gene/Ed are working on an observatory operations manual.
- l. Merchandise Report: Two sales last month.
- m. Astronomical League Report:
A request sent to the Astronomical League by astronomers at Timeanddate.com for assistance in videoing the Lunar eclipse was subsequently forwarded to the SDAA. We contacted Timeanddate.com and eventually assisted with their project on Nov 29/30. The livestream was posted on the Timeanddate.com YouTube site, and is available at: https://youtu.be/_NjREh2WE2c
- n. JSF Report: No Report – JSF canceled until 2021.

6. Old Business:

- a. Site Grading – Grading is essentially complete, but we may need a little gravel spread by hand. Some of the private pad outlets need new covers, will ask for volunteers to help out with this and some other minor maintenance issues.
- b. Observatory/Warming room – New lights have been purchased, and we have a plan to install a wall heater on a timer as a safer way to provide heat in the warming room.
- c. Downing Observatory Donation update – still working on the transition and how the observatory will be used by SDAA
- d. Banquet/Fund Raising activities – we’re going to hold a Zoom meeting with several volunteers who have offered to help organize the banquet.
- e. Dave W is going to start an email chain to identify all of our digital assets so we can begin the process of starting an IT committee, selecting an IT committee chairperson and determining their duties and responsibilities.

7. New Business:

- a. No new business

8. **Adjournment:** The meeting was adjourned at 9:30pm.



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SDAA Dark Sky Observing Site

Regular visitors to the Tierra del Sol observing site know the elements have been taking a toll on our facilities. Pathways were dangerously rutted; the warming room roof pooled water for weeks after each rain.

With a combined effort of the general membership, the Board, and contractors, we have had the public pad and observatory areas graded and applied gravel to redirect runoff and make it safer to walk and drive on the site. This work also helps protect the area around the Lipp observatory and warming room from erosion. The warming room had a drain and sealant applied on the roof to waterproof it and a series of interior upgrades are planned to make it more comfortable and less garage-like. There is also an ongoing effort to upgrade electrical power and distribute load across the site more evenly.

A big THANK YOU to everyone involved in making these efforts a success. As you can imagine, we are limited in contractors willing to work on relatively small jobs in this remote area. Your board of directors and volunteer members worked hard to keep costs low and get these projects over the finish line. Thank you to everyone involved who called/met with contractors, shoveled, raked, wrangled heavy equipment, and pitched in to cover some of the costs.

Our annual banquet is the primary fund-raising source that we draw from to provide this place to explore the skies. We make every effort to use your donations prudently and ask for your continued generosity in volunteerism and funding. We could not do this without your support.



San Diego Astronomy Association

Explorer Seminar – January 6+

Do exoplanet observations and learn photometry. In this seminar, you will learn how to observe and measure exoplanets, discover the many fields of variable star research, gain experience for taking American Association of Variable Star Observers (AAVSO) Choice courses, and get into the JPL/NASA Exoplanet Watch program. Boyce-Astro will provide you opportunities to start your own exoplanet or variable star observation projects including the telescope time, computing tools, and support for publication.

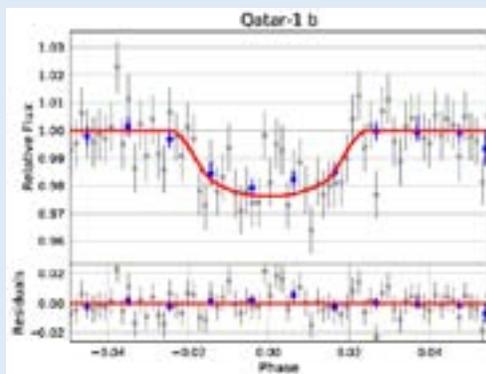


This seminar is Free for members of the SDAA.

BOYCE-ASTRO ONLINE SEMINARS			
January / February 2021			
EXPLORER™ Program - An Introduction to Photometry and Exoplanets Seminar			
MODULE	DATE	CLASS TOPIC	ASSIGNMENT FOR NEXT CLASS
1	1/6/2021	Seminar Orientation and Photometry Overview Variable star types and exoplanet characteristics	Videos about photometry and exoplanet research Harvard/Smithsonian CfA - Intro to their DIY Exoplanets Pick a MicroObservatory DIY Exoplanet target
2	1/13/2021	Factors to consider in photometric observations The transit method and what it tells us	Videos on photometric measurements and light curves Do your DIY exoplanet photometry and light curve
3	1/20/2021	Modeling the exoplanet parameters and environment Exoplanet databases and resources	Model your exoplanet to estimate its parameters Submit your DIY exoplanet observation to the CfA
4	1/27/2021	NASA/JPL Exoplanet Watch and TESS programs EXOTIC and AU software	Do a new exoplanet light curve using JPL's EXOTIC (a recent unreported observation will be provided)
5	2/3/2021	Troubleshooting your data reduction How to report your observation results to AAVSO	Draft your AAVSO observation report (from Module 4)
6	2/10/2021	How to find targets your own exoplanet observations Variable star observations and the AAVSO Forums	Submit your AAVSO/Exoplanet Watch report

ALL CLASSES ARE HELD ON WEDNESDAY NIGHT AT 8:00 TO 9:30 PM ON ZOOM (435 509 0885)
Weather and time permitting, students may stay after 9:30 for a virtual star party following class.

Post-seminar opportunities		
Do LCD or BARO exoplanet observations		Post observations to the AAVSO/Exoplanet Watch Program
Do an AdvancedSTARS™ project in variable stars		Publish or do a poster from your exoplanet or variable star research
Do the AAVSO Exoplanet Observers course		Join our TESS SGL exoplanet observation team



Prerequisites: Students must have completed the DoubleSTARS™ seminar or an accredited astronomy course. Experience in observational astronomy may be considered in lieu of the education requirement. Students who have not completed DoubleSTARS™ must complete the IntroSTARS™ self-paced online course. Takes 1 to 2 weeks. Go to <http://boyce-astro.org/introstars-your-step-1/> to sign up and do on your own schedule.

Registration: Go to <http://boyce-astro.org/explorerer-signup/>

FREE ONLINE - STARTS JANUARY 6

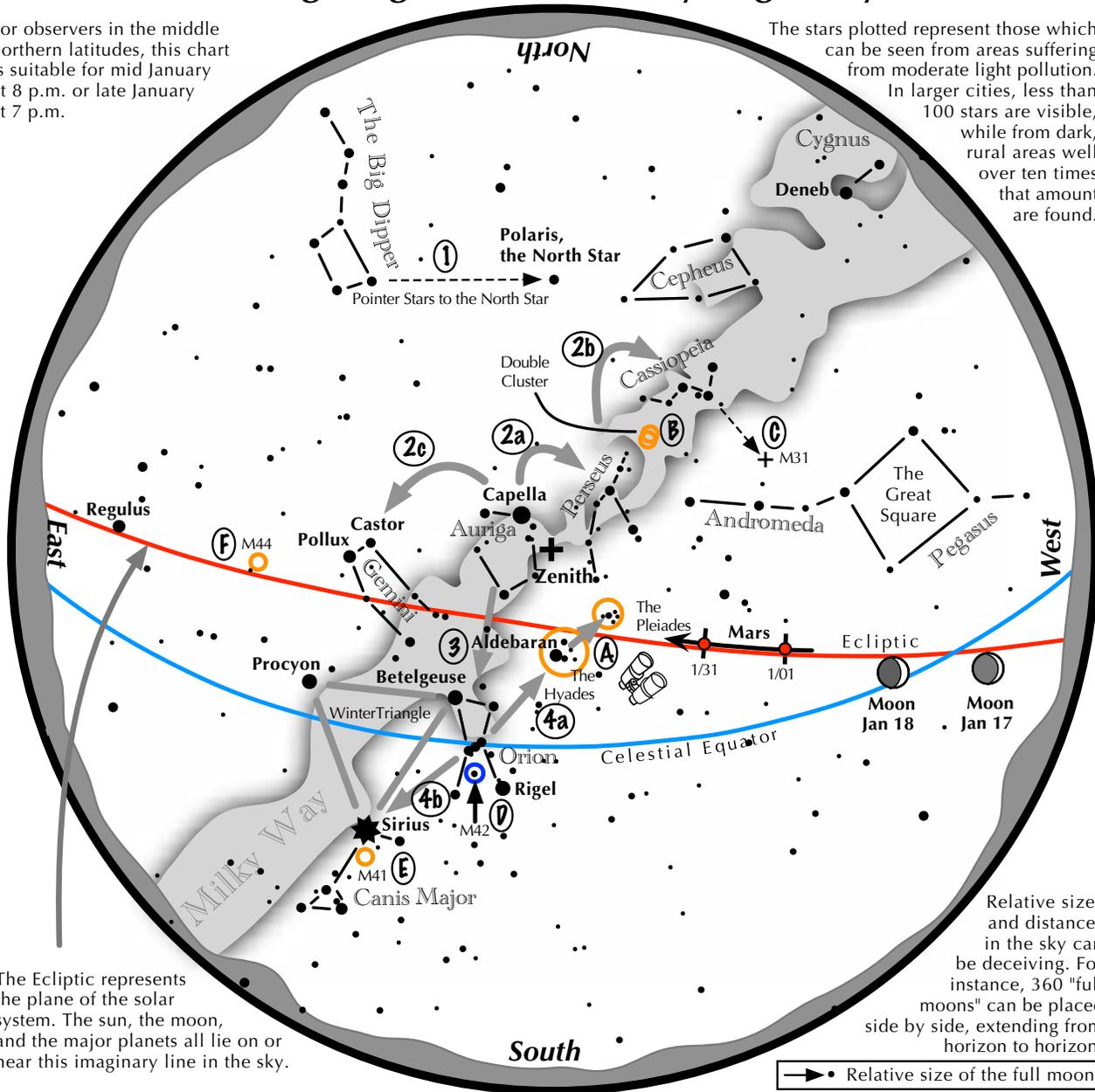


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Navigating the mid January Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid January at 8 p.m. or late January at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the winter night sky: Simply start with what you know or with what you can easily find.

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Persues, then to the "W" of Cassiopeia. Next Jump southeastward from Capella to the twin stars Castor and Pollux of Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt Stars, its bright red star Betelgeuse, and its bright blue-white star, Rigel.
- 4 Use Orion's three Belt stars to point to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel to the southeast from the Belt stars to the brightest star in the night sky, Sirius.

Binocular Highlights

- A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
- B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
- C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
- D: M42 in Orion is a star forming nebula. E: Look south of Sirius for the star cluster M41. F: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.



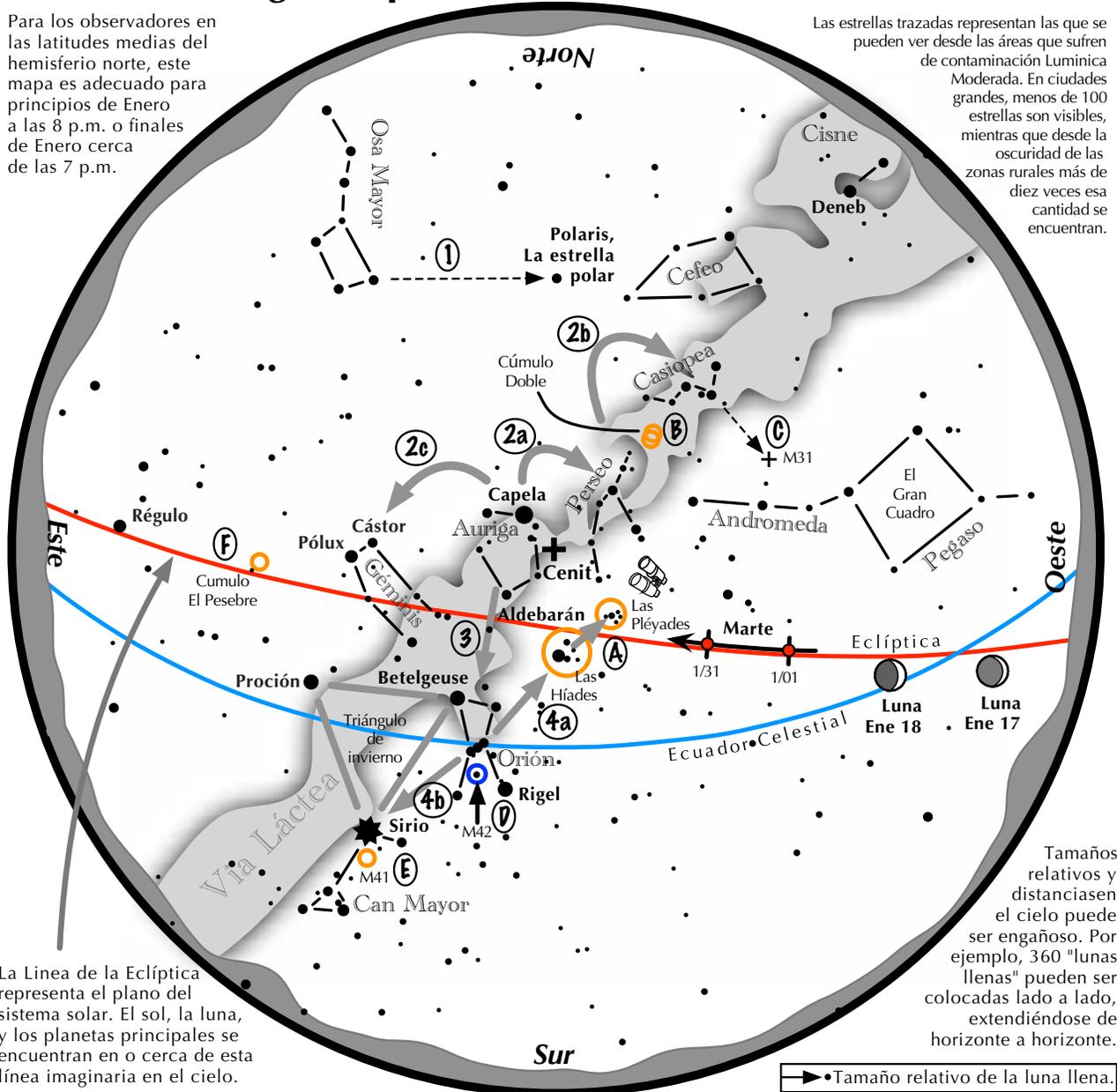


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Navegando por el cielo nocturno de Enero

Para los observadores en las latitudes medias del hemisferio norte, este mapa es adecuado para principios de Enero a las 8 p.m. o finales de Enero cerca de las 7 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Línea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distancias en el cielo pueden ser engañosos. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

→ • Tamaño relativo de la luna llena.

Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

- 1 Sobre el horizonte noreste se alza la Osa Mayor. Dibuja una línea desde sus dos estrellas finales hasta la estrella polar.
- 2 Desde Capela, salte hacia el noroeste a lo largo de la Vía Láctea hacia Perseo, luego hacia la "W" de Casiopea. Siguiendo salte hacia el sureste desde Capela a las estrellas gemelas de Cástor y Pólux en Géminis.
- 3 Directamente al sur de Capela se encuentra la constelación de Orión con sus tres estrellas del Cinturón de Orión, su brillante estrella roja Betelgeuse y su brillante estrella azul-blanca Rigel.
- 4 Usa las tres estrellas del Cinturón de Orión para apuntar al noroeste hacia la estrella roja Aldebarán y el cúmulo estelar Híades, y luego hacia el cúmulo estelar de las Pléyades. Viaja hacia el sudeste desde las estrellas del cinturón hasta la estrella más brillante en el cielo nocturno, Sirio.

Puntos destacados con binoculares

A: Examina las estrellas de las Pléyades y las Híades. **B:** Entre la "W" de Casiopea y Perseo se encuentra el Doble Cúmulo. **C:** Las tres estrellas más occidentales de la "W" de Casiopea apuntan hacia el sur hasta M31, la Galaxia de Andrómeda, un óvalo "borroso." **D:** M42 en Orión es una nebulosa formadora de estrellas. **E:** Mire al sur de Sirio para el cúmulo estelar M41. **F:** M44, un cúmulo de estrellas apenas perceptible a simple vista, se encuentra al sureste de Pollux

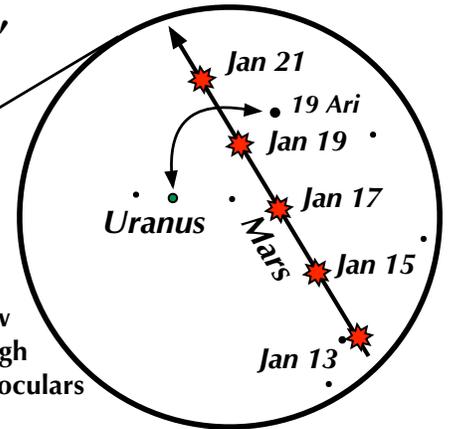




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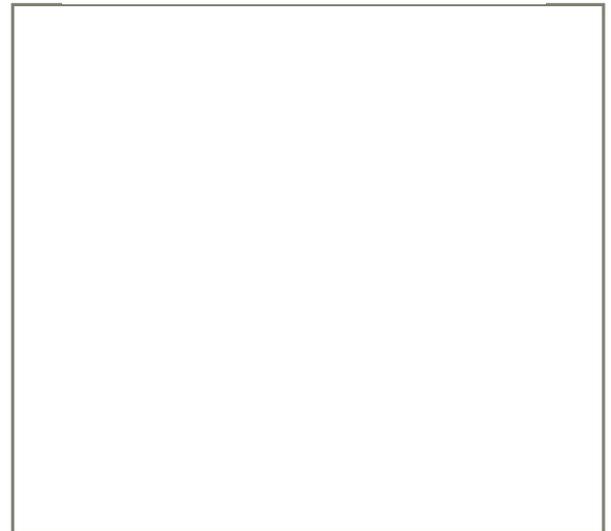
If you can observe only one celestial event this month, consider this one:

Have you ever seen the dimmest of the six visible planets?
Here is your chance to spot Uranus in binoculars.



View through 10x50 binoculars

Mars meets Uranus



Southwest,
2 hours after sunset



San Diego Astronomy Association

SDAA Contacts

Club Officers and Directors

President	Dave Wood	President@sdaa.org	(858) 735-8808
Vice President	Steve Hallman	VicePresident@sdaa.org	(858) 371-9706
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Committees

Site Maintenance	Bill Quackenbush	TDS@sdaa.org	(858) 395-1007
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Governing Documents	TBD		
TDS Network	Dave Wood	TDSNet@sdaa.org	(858) 735-8808
Amateur Telescope Making	-Vacant-		
ALCOR (Astronomical League Correspondent)	Dave Decker	ALCOR@sdaa.org	(619) 972-1003

SDAA Editorial Staff

Editor - Andrea Kuhl

newsletter@sdaa.org

Assistant Editor: Craig Ewing

Have a great new piece of gear? Read an astronomy-related book that you think others should know about? How about a photograph of an SDAA Member in action? Or are you simply tired of seeing these Boxes in the Newsletter rather than something, well, interesting?

Join the campaign to rid the Newsletter of little boxes by sharing them with the membership. In return for your efforts, you will get your very own byline or photograph credit in addition to the undying gratitude of the Newsletter Editor. Just send your article or picture to Newsletter@SDAA.Org.



San Diego Astronomy Association

Reduced Price - 10" Meade LX200 Classic EMC



Reduced price of **\$900** for Contributing Members only.

Cloudy Nights & Astromart pricing will be **\$1,200** plus shipping.

How about an exceptional 10" SCT at an absurdly low price. Comparable scopes have been advertised on Astromart for \$1,500 to \$1,600. Stepping up to a 10" primary is 56% increase in light gathering capabilities over the traditional 8" SCT.

Left off from the original advertisement is the rig includes a white light 10" solar filter and a tripod table for easy placement. This is smoking good deal for someone in the market for a large SCT.

This one is very clean. I have not seen a Meade tripod this free of corrosion – original shipping box for storage. Optics are clean with the exception of some corrector plate surface dust. Model includes the "Smart Drive." JMI case included. 2" visual back and Bob's Knobs. A nice right angle finder is included – don't recall if it is correct image but at least it is half way there. A few starter eyepieces are in the case also. We ran the hand controller and as expected, it seems to be fully functioning. If that is not enough to entice you to pull the trigger, the package includes a very nice Meade 10" wedge.

Selling "as is." We don't think you will be disappointed. Respond quickly.

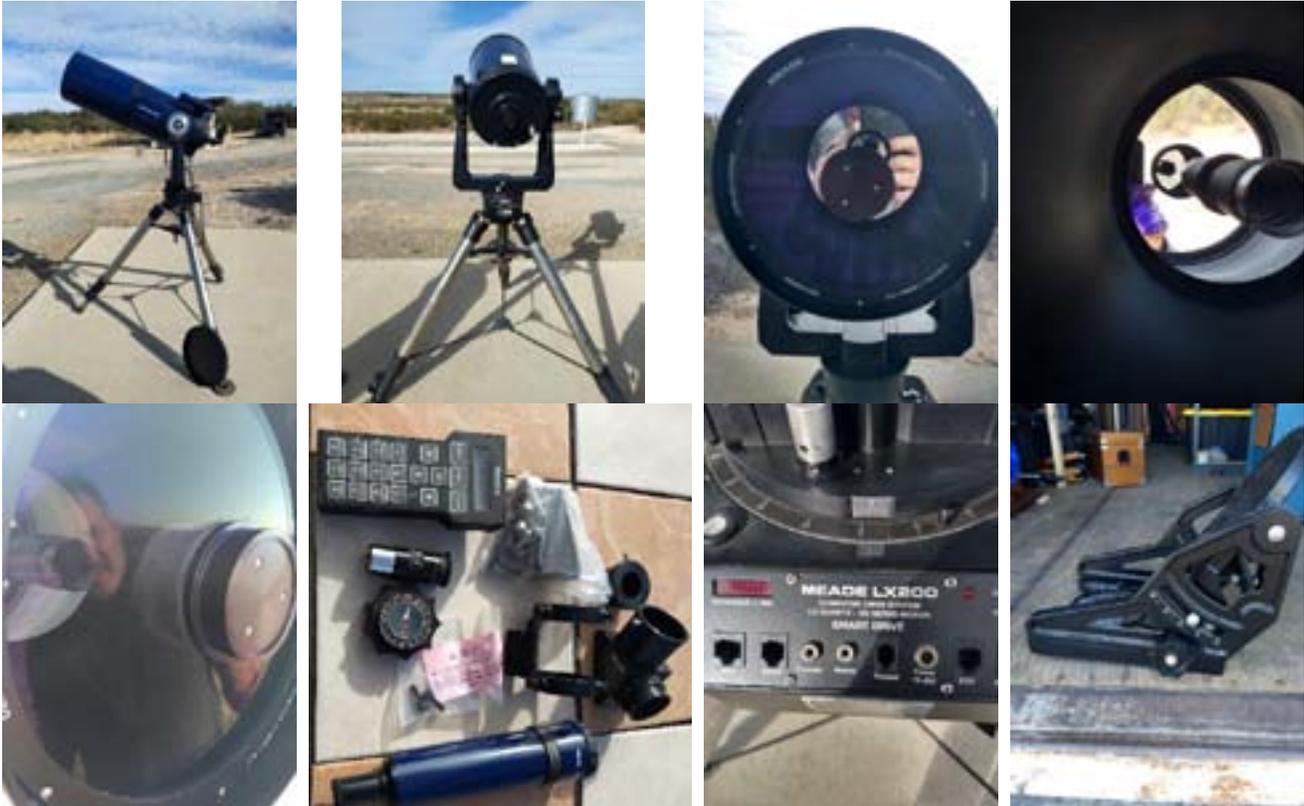
The bottom-line is; here is an extraordinary value for a visual scope with astrophotography capabilities. Please feel free to call me with any questions.

David Wood
858.735.8808



San Diego Astronomy Association

Meade 12" LX200 Classic EMC w/Smart Drive



Presale price of **\$1,200** for Contributing Members only.
Cloudy Nights & Astromart pricing will be **\$1,500** plus shipping.

That's right; a 12" SCT for the price of an entry level 8" SCT. Be blown away by the 225% light gathering increase from an 8" scope. Be appreciative of the steady views delivered by a solid mount versus the one-armed mounts that seem so popular today. Yes the interface is dated but the 64,000 plus object database is more than observer could hope to visit. Alignment and site selection are easy. Lack of GPS is easily overcome with a smart phone. No denying it – this scope is big! If you have aperture fever and limited budget, this scope is for you. And yes it has UHC coatings.

Scope comes with original shipping cartons. Optics are clean with a bit of dust on the corrector plate. The mirror looks perfect and clean. Focus is smooth. A heavy duty wedge and metal dew shield are included. The finder's cross hair is intact and the 2" diagonal includes a 1.25" insert. All of the above are in showroom condition.

The included Giant Field Tripod has a slight patina – typical of Meade and discernable in the photos. An interior leg extension has a small dent and only extends an inch or so. The tripod has plenty of height and comfort will not be compromised. For usage with the wedge, you may need to use a shim to level the scope on an uneven surface.

All in all, this is an excellent value for those looking for large aperture. Call me with questions or to make a purchase.

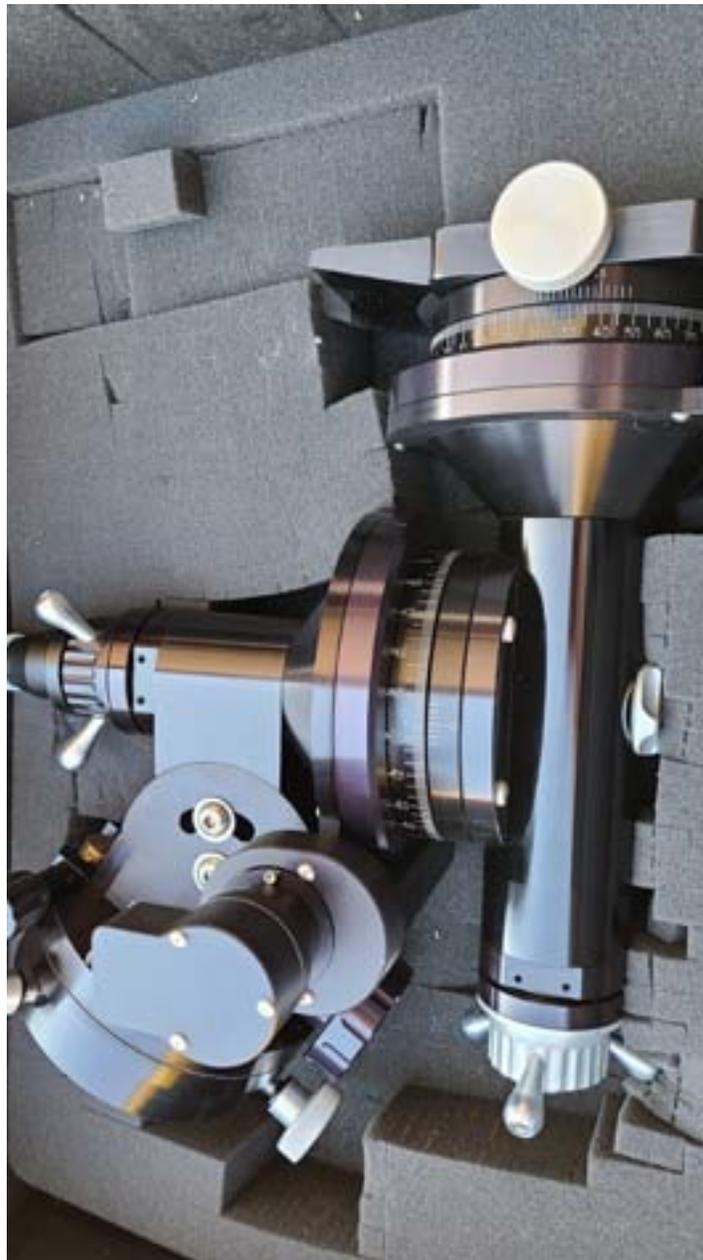
Ed Rumsey
(858) 722-3846



San Diego Astronomy Association

For Sale:

Losmandy G11 system with Gemini 2, steel tripod, Pelican case, other stuff. Used five times at TDS.
Like new, no scrapes, scratches. \$2,000.
Doug 619-925-3684





San Diego Astronomy Association

NASA Night Sky Notes

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The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Check Your Sky's Quality with Orion!

David Prosper

Have you ever wondered how many stars you can see at night? From a perfect dark sky location, free from any light pollution, a person with excellent vision may observe a few thousand stars in the sky at one time! Sadly, most people don't enjoy pristine dark skies – and knowing your sky's brightness will help you navigate the night sky.

The brightness of planets and stars is measured in terms of **apparent magnitude**, or how bright they appear from Earth. Most visible stars range in brightness from 1⁺ to 6⁺ magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. A few stars and planets shine even brighter than first magnitude, like brilliant Sirius at -1.46 magnitude, or Venus, which can shine brighter than -4 magnitude! Very bright planets and stars can still be seen from bright cities with lots of light pollution. Given perfect skies, an observer may be able to see stars as dim as 6.5 magnitude, but such fantastic conditions are very rare; in much of the world, human-made light pollution drastically limits what people can see at night.

Your sky's **limiting magnitude** is, simply enough, the measure of the dimmest stars you can see when looking straight up. So, if the dimmest star you can see from your backyard is magnitude 5, then your limiting magnitude is 5. Easy, right? But why would you want to know your limiting magnitude? It can help you plan your observing! For example, if you have a bright sky and your limiting magnitude is at 3, watching a meteor shower or looking for dimmer stars and objects may be a wasted effort. But if your sky is dark and the limit is 5, you should be able to see meteors and the Milky Way. Knowing this figure can help you measure light pollution in your area and determine if it's getting better or worse over time. And regardless of location, be it backyard, balcony, or dark sky park, light pollution is a concern to all stargazers!

How do you figure out the limiting magnitude in your area? While you can use smartphone apps or dedicated devices like a Sky Quality Meter, you can also use your own eyes and charts of bright constellations! The Night Sky Network offers a free printable Dark Sky Wheel, featuring the stars of Orion on one side and Scorpius on the other, here:

bit.ly/darkskywheel. Each wheel contains six “wedges” showing the stars of the constellation, limited from 1-6 magnitude. Find the wedge containing the faintest stars you can see from your area; you now know your limiting magnitude! For maximum accuracy, use the wheel when the constellation is high in the sky well after sunset. Compare the difference when the Moon is at full phase, versus new. Before you start, let your eyes adjust for twenty minutes to ensure your night vision is at its best. A red light can help preserve your night vision while comparing stars in the printout.

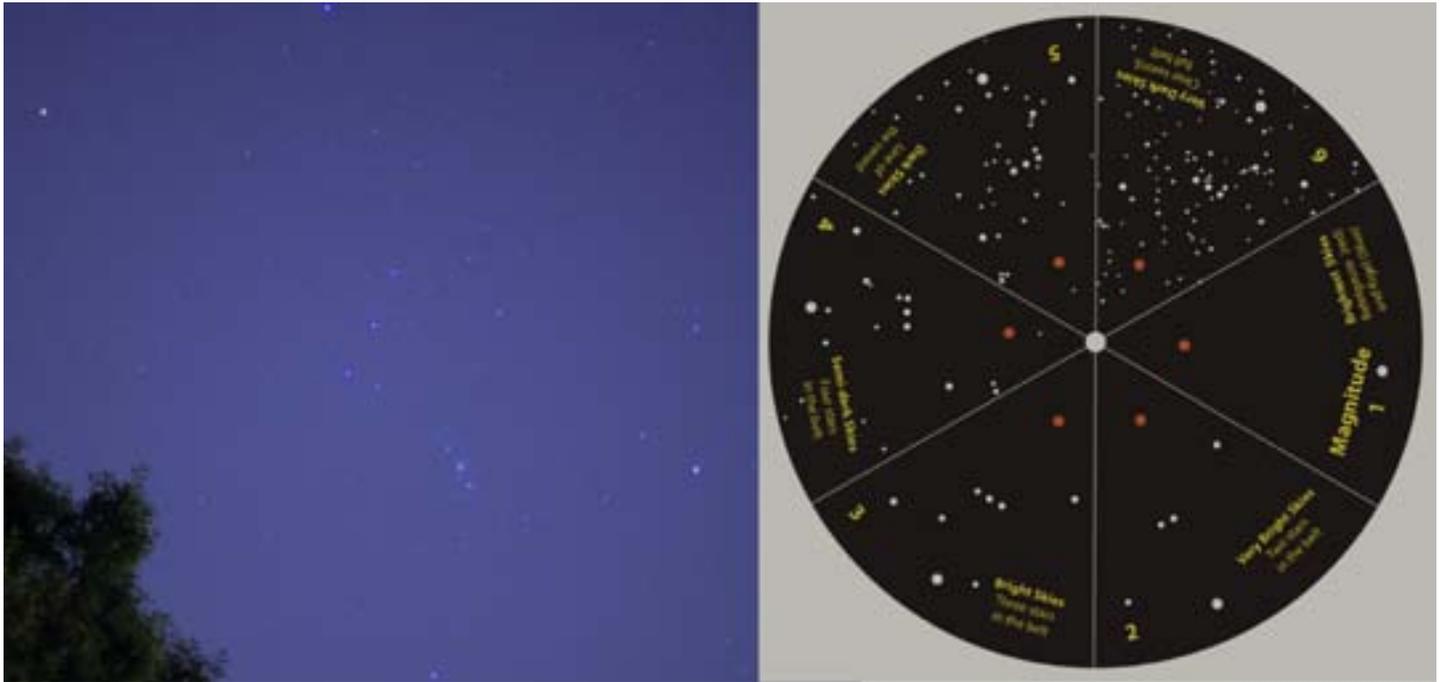
Did you have fun? Contribute to science with monthly observing programs from Globe at Night's website (globeatnight.org), and check out the latest NASA's science on the stars you can - and can't - see, at nasa.gov.



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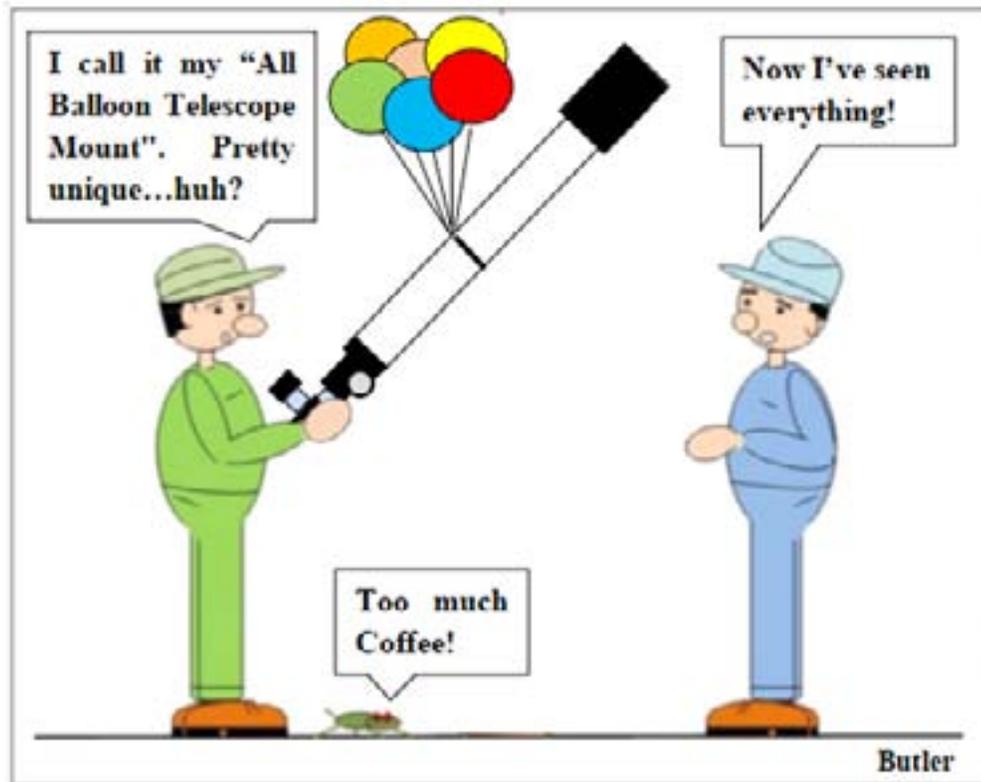
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The Dark Sky Wheel, showing the constellation Orion at six different limiting magnitudes (right), and a photo of Orion (left). What is the limiting magnitude of the photo? For most observing locations, the Orion side works best on evenings from January-March, and the Scorpius side from June-August.



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