San Diego Astronomy Association

Celebrating Over 50 Years of Astronomical Outreach

November 2022

https://www.sdaa.org/
A Non-Profit Educational Association
P.O. Box 23215, San Diego, CA 92193-3215

Next SDAA Business Meeting
November 8th at 7:00pm
10070 Willow Creek Rd
San Diego, CA 92131
Via Zoom

Next Program Meeting
November 16th at 7:00pm
Mission Trails Regional Park
Visitor and Interpretive Center
1 Father Junipero Serra Trail

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November 2022, Vol LX, Issue 11
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San Diego Astronomy Association
Incorporated in California in 1963

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

SDAA Update

SDAA will have an in-person program meeting at Mission Trails Regional Park

Program Meeting November 16th

Topic: Astronomical Word Play
Speaker: Dr. Richard Lederer

Our speaker is the distinguished verbavore Dr. Richard Lederer, who is an American linguist, author, speaker, and teacher. He is best known for his books on the English language and on wordplay such as puns, oxymorons, and anagrams. He has been dubbed "the Wizard of Idiom," "Attila the Pun," and "Conan the Grammarian." He will focus on astronomical terminology and language as only he can.

Link to SDAA Merchandise Store https://sdaa28.wildapricot.org/SDAA-Store

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
October 11th, 2022 -Unapproved and subject to revision

1. Call to Order Wood

After some zoom issues, the meeting was called to order at 7:22pm. Present - Dave Wood, Hiro Hakozaki, Dave Decker, Mike Chasin, Kin Searcy, Gracie Schutze. Absent – Gene Burch, Melany Biendara, Alicia Linder. Guests - Steve Meyers, Paul Krizak, Bee Pagz, Sandy Kiser.

2. Approval of Last Month's Meeting Minutes Wood

Approved as submitted

3. Treasurer's & Membership report Biendara

- Membership total is 835.
- JSF reconciliation: waiting on outstanding balance confirmation from one vendor, otherwise, no material difference in Dan's report last month
- Amazon Smile donation of $400 and scope sales donation of $600 received
- Working with tax preparer for final return preparation -see old business for details

Approved as submitted

4. Standard Reports

a. Site Maintenance – no report Grunbaum

b. Observatory Report Rumsey

All is going well. Star parties continue to be staffed and well attended. Equipment is in great condition.

c. Loaner Scope Report Krizak

Loaner scope status:

- 3 telescopes currently out:
- SDAA-026 (8" Zhumell) due Oct 28
- SDAA-027 (astrophotography rig) due Oct 28
- SDAA-029 (iOptron skyguider) due Oct 28
- SDAA-004 (8" LX-90) likely to be issued Oct 15 or Oct 22

Inventory updates:

- Telrad bases installed on scopes that need them
- With growing inventory, will likely begin working on selling off a few under-utilized loaner scopes over the next few months, to make more room in the storage container:
  SDAA-001 (Coulter 10") -- we have two, will sell one of them
  SDAA-002 (4.5" Takahashi reflector) -- 0.965" eyepieces, small aperture
  SDAA-024 (Celestron SPC8) -- two other 8" SCTs available in loaner fleet

Equipment donations and sales:

- USB 3.0 fiber extender still for sale, lowered price another $25 on eBay, still no nibbles.

d. Private Pad Report Smith

We have 7 free pads and 10 people on the waiting list (one who is looking to upgrade).

e. Program Report Searcy

Program Meeting Report

- October meeting is Steven Shore from the AAVSO on amateur spectroscopy
- November: Richard Lederer on Star Names (should be in person)
- December no meeting
- January: Jessica Rzeszut (NASA Solar System Ambassador) on Artemis

Status of in-person meetings.

We have a draft agreement to resume meetings in the visitor center auditorium. Gathering insurance information to forward to MTRP. We will need to pay for three hours of security.

Received the certificate of insurance and forwarded to MTRP who rogered for it. Kin was authorized to sign the agreement for the November and pay $120 for three hours of security.

Working on next year's approach to in-person meetings. No security fee for January - March since trail guide training is occurring.

f. AISIG Report Linde

No report, Dave will contact Kevin Linde

g. Newsletter Report Kuhl

All looks great – Thanks Andrea!

h. Website Report Stevens

I have the program meeting link on the website at https://sdaa.org/program-meeting/ and on the post for the upcoming program meeting. Seems to be working now after some confusion earlier this month.

i. Social Media Report Flynn

No report

j. Outreach Report Decker

Outreach Report – For September 2022

Below is a summary of outreach event participation with numbers for September and for YTD:

2022	September	YTD
Events Completed	**8**	**61**
Events Cancelled	**1**	**16**
Total Attendance	**479**	**4727**
Starmaster Events	**1**	**11**

October and November will be very busy months for outreach. Included are events for the Webelos Woods at Camp Mataguay, Mt. Helix public event, Cabrillo National Monument, Dixon Lake, Borrego Springs Library, Crestridge Ecological Preserve, Lunar Eclipse live view with Timeanddate.com, Children's Discovery Museum, and NIghtFall, as well as our standard monthly recurring events at parks. We could use some additional volunteer help for these special programs.

k. TARO Wood

TARO is operational after guide camera re-calibration. Accepting DSO and Exo Planet observation requests.

l. Cruzen Wood/Krizak

Paul Krizak has tentatively offered to pick up the observatory director position Cruzen observatory improvement plan. Submitted to Board by Krizak. Plans to work on eliminating trip hazards, installing red lighting and limited white lights. Working on documentation. G-11 mount is tricky to use and needs good documentation. Goal is to be usable and reliable.

Need reservation and vetting system, requirements for use discussed. Also discussed communications with club members. Paul will review further.

Board approved up to $500 of expenses for Cruzen enhancements.

m. Merchandise Report – no report Burch

n. Astro League Report – no report Decker

o. Julian Starfest Report Kiser

Finances being worked on with Mel, sending thank you letters, estimated $6000 profit, no injuries. A good time was had by all. Beginning to plan for next year

p. Primary Grid Rebuild Planning Report Myers/Wood

The initial site-walk with Paul Ericsson went as planned. Many issues were discovered. While Paul is willing to donate his time, the initial estimates for engineering services including grid design to permit submission will be $7000 – $9000. Paul is developing scope of work and plan

5. Old Business

a. Bank Fraud Update Biendara/Chasin

Attorney is working with Chase to avoid us filing suit.

b. Electrical Grid Update - see above Wood

c. Banquet Updates Chasin
- Now scheduled for January 28, 2023 at the Handlery.
- Kin confirmed the speaker. Planning for a buffet at $70/pp

d. Other Old Business - none Wood

6. New Business

   a. Cruzen Observatory Director — Krizak

      Updates/Needs/Budget - see above

   b. Power Security Gate — Chasin

      One estimate to install a rolling electric front gate with access key cards was received. Second quote pending. Project may cost $35,000. If TDS site users continue to not secure the gate or allow access to others who are not authorized, this expense may be unavoidable.

   c. New BoD Slate of Officers – Nomination Comm. — Wood

      Dave Wood was selected to be the Chair of the nominating committee

   d. Other New Business – none. — Wood

7. Adjournment - Adjourned at 9pm.

Astrophotography Exhibit

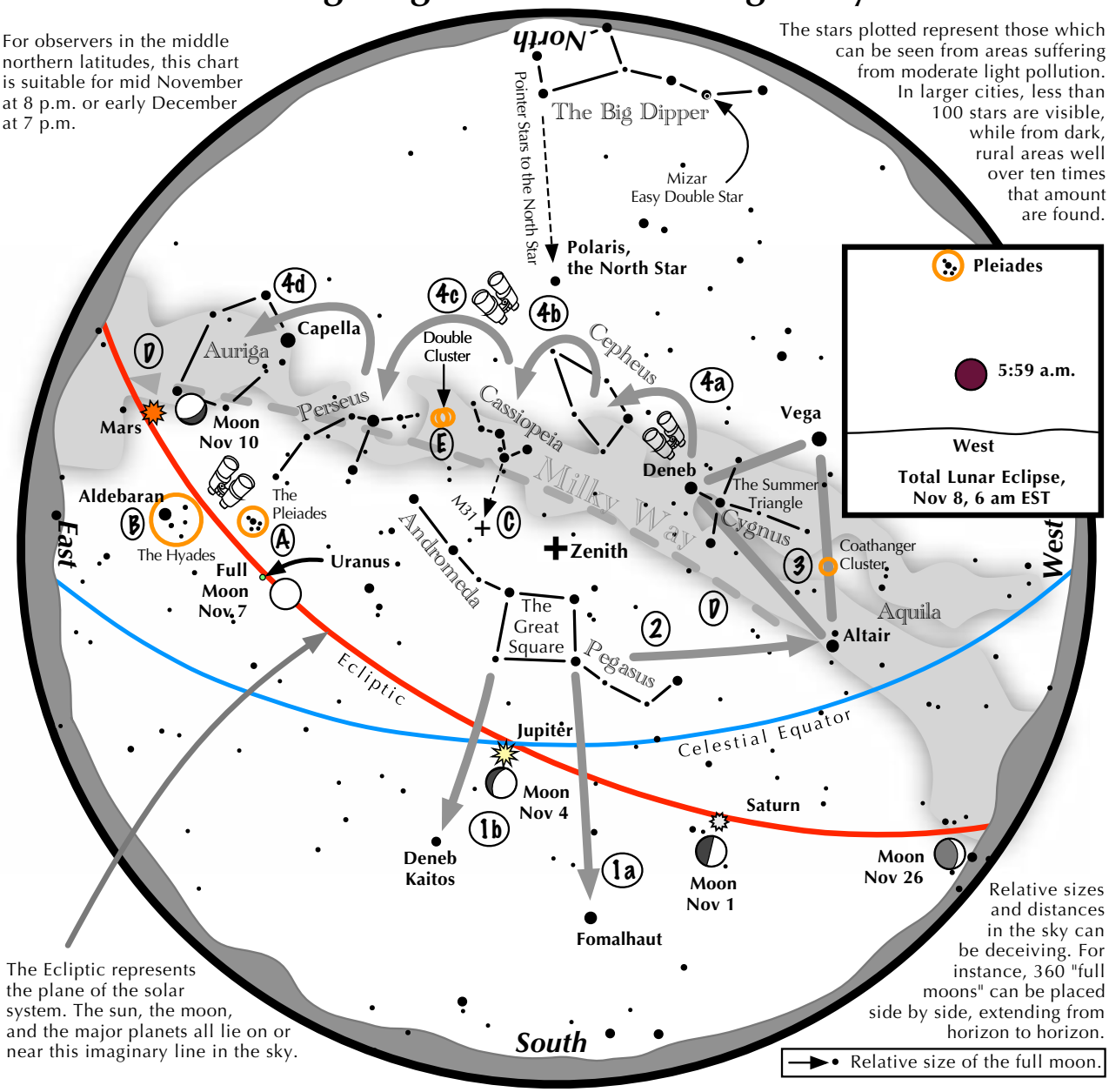
A new restaurant/bar recently opened in Oceanside called KNVS (pronounced, "Canvas") which is an art-themed venue. The owner, Kevin Shin, is on the board of the Oceanside Museum of Art and created the place to showcase local artists and their work in exhibits that run for 3-4 months. The hors d'oeuvres and drinks are created to align with the theme of the art on display. Kevin is a self-proclaimed astronomy nerd and invited the SDAA to share our images from November 11th through February. This is an excellent outreach opportunity for the club. SDAA members stepped up and submitted 171 digital and 22 printed images from 24 astrophotographers covering 85 different targets. A 5-member judging panel faced the daunting task of selecting which of those spectacular images would be included in the exhibit. There is space on the walls for 12-15 printed images and 2 digital projectors will display slideshows of digital images. We're working to get some guest speakers for some "special event" evenings as well. Kevin Shin is already amping up the hype on social media. If you haven't had the pleasure of visiting KNVS and the Switchboard restaurant next door, it is definitely worth dropping by. The soft opening will be 11/11 and promises to be a lively event.

San Diego Astronomy Association

Navigating the November Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid November at 8 p.m. or early December 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.

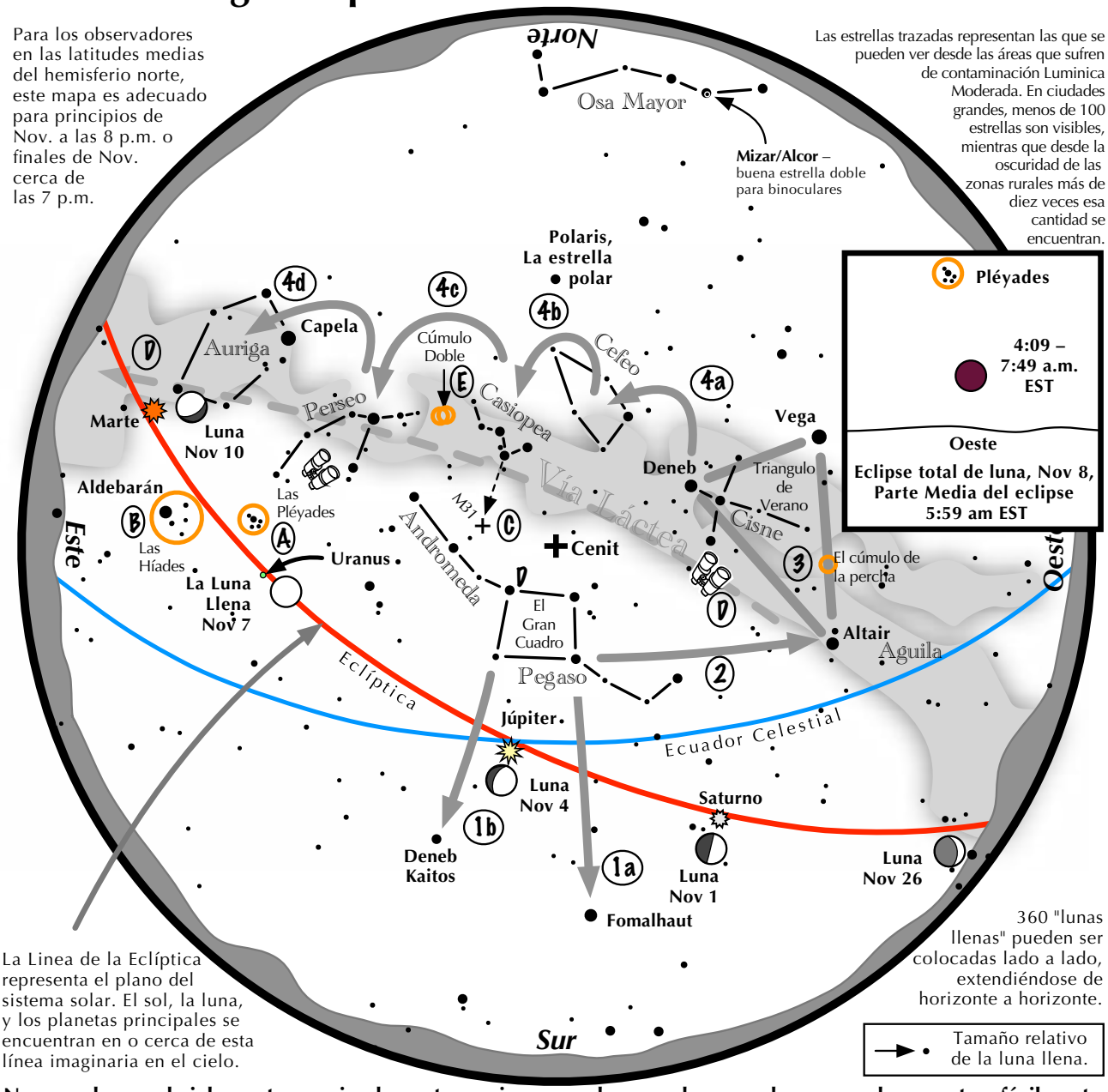
Navigating the November night sky: Simply start with what you know or with what you can easily find.

1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E.** The Double Cluster.

Navegando por el cielo nocturno de Noviembre



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

1 Hacia el sur. Casi arriba está el "Gran Cuadro" con cuatro estrellas con el mismo brillo que las de la Osa Mayor. Extiende una línea imaginaria hacia el sur siguiendo las dos estrellas más occidentales del Gran Cuadro. La línea lleva a Fomalhaut, la estrella más brillante del sur. Una línea que se extiende hacia el sur desde las dos estrellas más orientales, lleva a Deneb Kaitos, la segunda estrella más brillante del sur.

2 Dibuja otra línea, esta vez hacia el oeste siguiendo el borde sur del Gran Cuadro. Lleva a la estrella Altair.

3 Ubique a Vega y Deneb, las otras dos estrellas del "Triángulo de verano." Vega es su miembro más brillante, mientras que Deneb se localiza en el medio de la Vía Láctea.

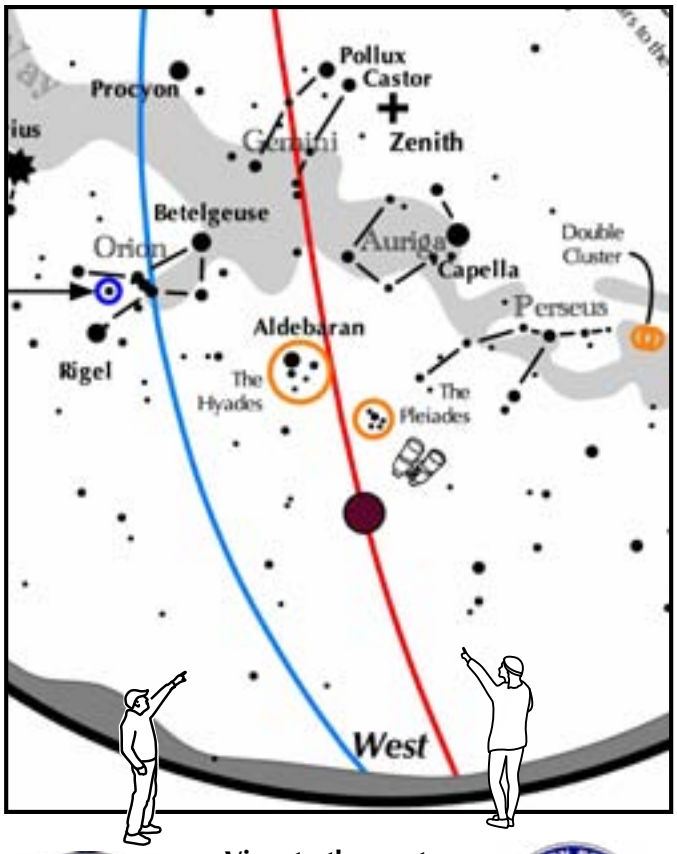
4 Salta a lo largo de la Vía Láctea desde Deneb hasta Cefeo, que se asemeja al contorno de una casa. Continúa saltando a la "W" de Casiopea, a Perseo y finalmente a Auriga con su brillante estrella Capela.

Destacan con Binoculares. A y B: examina las estrellas de las Pléyades y las Híades, dos cúmulos de estrellas a simple vista. **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:** Barrer a lo largo de la Vía Láctea desde Altair, pasar Deneb, a través de Cefeo, Casiopea y Perseo, y luego a Auriga por muchos intrigantes cúmulos de estrellas y áreas nebulosas. **E.** Cúmulo Doble de Perseo.

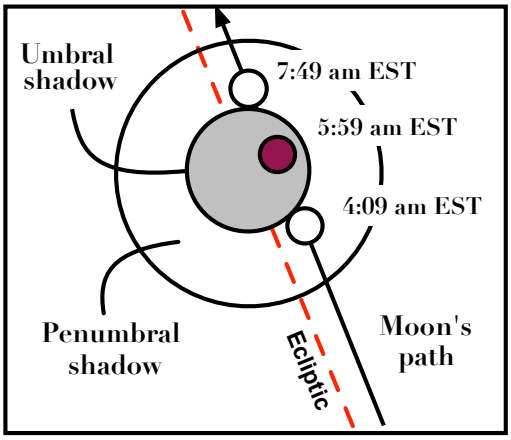
Traducción al español por Dr. Salvador Aguirre

Liga Astronómica

In the early morning of November 8, try this challenge:



View to the west on November 8 from 1:09 a.m. PST to 4:49 a.m. PST



The Moon slides through a total eclipse

In the early morning hours of Nov. 8, the brilliant full moon slides into Earth's shadow. East coast viewers can view until mid eclipse before the morning twilight becomes too bright. Viewers farther west in the US can witness the complete total and partial phases.

- Even though the partial umbral eclipse begins at 4:09 EST, darkening may not be noticed for another 5 minutes.
- At mid eclipse, what color is the moon? How dark is it?
- Before the eclipse begins, the moon's sky glow blocks viewing the Pleaides star cluster and many other sky objects. During totality, though, the Pleiades, the Double Cluster, and M42 will all be visible. Now you can say that you've seen these celestial wonders during a full moon!

Opportunity knocks at the *Reflector*

After seven years of service to the ***Reflector*** magazine, Carla Johns is stepping down as the magazine's advertising representative. Thank you, Carla, for helping make the ***Reflector*** the excellent publication that it is today!

Amateur astronomy has a wide field of view, featuring all sorts of interesting events and cool equipment. The Astronomical League is seeking someone to help amateur astronomy by volunteering to be part of the ***Reflector*** magazine team, and to assume the duties of the ***Reflector*** advertising representative. This is an opportunity to interact with star party and convention organizers, merchandise vendors, and equipment manufacturers while gaining a firsthand view of the state of the hobby.

The responsibilities of this volunteer position include:

- Coordinate all incoming advertisements from multiple sources
- Send ad placement deadline reminders to all advertisers
- Review the ads for spelling, grammar, image placement, correct information and contact advertisers to make any necessary changes
- Send all ads to Design Editor for placement
- Proofread draft issues to ensure all ads are included and accurate
- Generate invoices for each advertiser and send via email or hard copy (with complimentary current issue)
- Send invoices to Treasurer to track payments
- Identify (and contact) potential new advertisers
- Field emails and answer questions from advertisers

We estimate about 10 hours per month should be adequate to fulfill all the above duties.

As Carla enthusiastically states, "This is a great opportunity to connect with star party organizers and industry experts across the US!"

If this fun and important role is for you, please send your name to ***Reflector*** managing editor Ron Kramer at managingeditor@astroleague.org.

2022 November Another Look

On November 8th, the full Beaver Moon with undergo the last eclipse of 2022. In the Pacific Time Zone, the eclipse will start for us (penumbral) at 0002 hrs. Totality is at 0259 hrs and eclipse end at 0556, almost 6 hours of eclipse.
Other names for the November moon are Digging/Scratching Moon, Freezing Moon, Frost Moon and Whitefish Moon
Celtic and Old English names are Mothers' Moon, Bright Moon, Hare Moon, and Grass Moon.
New moons for November are Oct. 25 and Nov. 25.

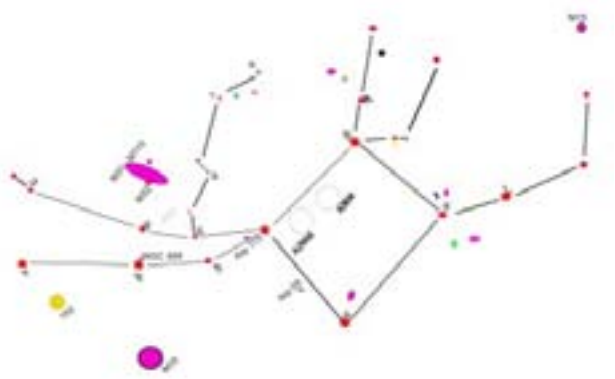
It has been my honor over my lifetime to have had associations with some astronomy Titans. Msgr Ronald Royer has spent a lifetime developing new astrophoto techniques, chasing total solar eclipses and making thousands of variable star observations as a senior member of the AAVSO.

Leslie Peltier, the sine non qua, also contributed thousands of variable star observations from his famous “Merry-Go-Round” observatory. I have spent many nights at the 18” telescope at Ford Observatory on Mr. Peltier outside Wrightwood, now under the aegis of the Los Angeles club.

One of my proudest possessions is a little blue postcard with the picture of a slightly tubby man looking up through a telescope. Walter Scott Houston wrote a deep sky column for Sky and Telescope for 46 years. I met Twinky years ago at a meeting of the Riverside Astronomers. He was a delightful person. Why the postcard? He wrote me to tell me how much he enjoyed my column on Barnard’s ring that I wrote for the PVAA’S Nightwatch.
It was typical of Walter to challenge his readers in his “Deep Sky Wonders” column. Someone always responded and Walter would include them in later articles. Two of his challenges were about globular clusters around M31 and counting naked eye stars in the square of Pegasus.

“Within the area of this Square
Argelander counted only about 30
naked-eye stars, but in the clearer sky
of Athens Schmidt saw 102.”
Star Names and their Meaning,
1899, **Richard H. Allen**

Pegasus
" The poetic steed With beamy
mane, whose hoof struck out from earth
The fount of Hippocrene. ' **Bryant**



I have never taken up the challenge to count stars
in the square of Pegasus. Houston cites several accounts from his correspondents. In one a correspondent reports 38 stars, in another, a correspondent took special care in his preparations and reported seeing down to magnitude 8.3. Perhaps even more stunning, he writes that there are 100 deep sky object within reach of the larger amateur telescope within the square. Sadly, Scotty isn’t here for our revolution in astrophotography, but I am sure he would appreciate the instrumentation and techniques in use today.
An interesting place to start this month is two degrees south of Alpheratz, Alpha α Andromedae, is NGC 1. You will need a 12” or larger scope to see detail on N1; it is a face on 13th magnitude spiral. I’ve never looked for it, but the images show faint spiral arms and a brighter nucleus. NGC 7840, the last item in the NGC catalogue is just over the boundary into Pisces about 20 degrees further south.

Houston, using the references he had at the day, decided that NGC 7840 was an error and that NGC 7839 was a faint >15th galaxy. Current references name NGC 7839 as a double star.

We have one Messier, three Caldwell objects, one Arp object, and a couple of galaxies Burnham thought we should look at in Pegasus. We also have two Abell clusters and a slew of double and multiple stars in Pegasus.

Up near the top of the square are two Abell galaxy clusters: Abell 2666 and Abell 2634. The clusters are far flung and its not easy to pick out individual members, though each has an anchor galaxy that we can find. Abell 2634 has NGC 7720. N7720 is a 12th magnitude elliptical with a very close background galaxy giving it a double appearance. Abell 2666 also has a large elliptical, NGC 7768, also 12th magnitude with a scattering of smaller galaxies around it. Images you can use as finders can be found on the internet. APOD has a particularly nice Abell 2666 in March, 2017 and Simbad has a terrific NGC 7720 with scattered galaxies all around.
George Abell has two catalogues named after him. He used the Palomar sky survey plates to identify galaxy clusters of a particular size and red shift. His later catalogue is of planetary nebula and was also compiled from the Palomar plates with additions from his own and others observations.

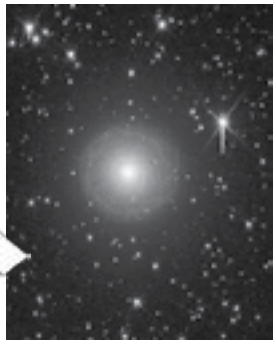
Adam Block/Mount Lemmon SkyCenter/University of Arizona,

NGC7814 is also number 43 on the Caldwell list. It looks like the Sombrero, though not as bright at 11th magnitude. You can find it in the left hand corner of the square about 2 degrees from Algenib, Gamma, γ, meaning a wing tip. It has decent dimensions, 5' across and half that thick.
Move next to the other side of the square to Alpha, α, Markab, meaning Saddle. At 2.5 degrees, a medium Telrad circle from Markab, you will find NGC 7448, a rather small tilted spiral odd enough to find a itself #13 in Arp's catalogue. Its bright at 11th magnitude, but wonder of wonders it is right next to a cluster of galaxies, of 12th and 13th magnitude, dominated by NGC 7463. You may also be able to put NGC 7464 and NGC 7465 in the same field. N7463 was named a galaxy of the month. Go to the Webb Deep Sky page for a finder chart. ***Sloan Digital Sky Survey***

NGC 7448

NGC 7479 is also number 44 on the Caldwell list. Its 11th, almost 12th magnitude with wild sweeping arms and a frenetic nucleus. It is also just a degree away from Palomar 13, 13th magnitude and a real ghost. Look up the APOD 2003 Christmas image of Pal 13. That bright star is 7th or 8th magnitude so it would be easily visible in your finder.

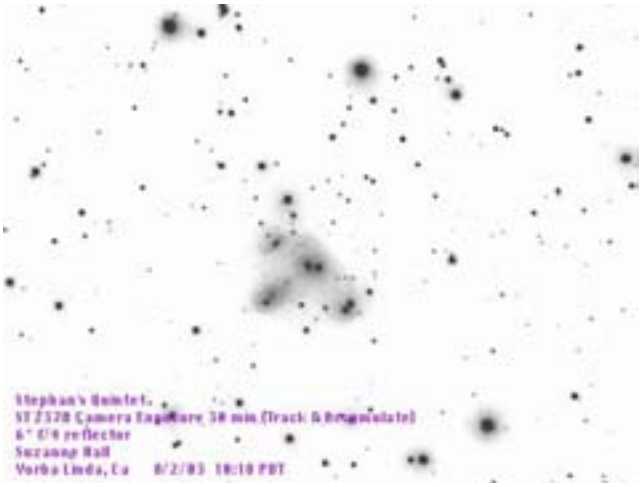
Up by the left knee of Pegasus are several deep sky objects made famous over the years. Start by finding Eta η Pegasi. Before you head up to NGC 7331 and Stephan's Quintet, move to your east and look for NGC 7217. It is at 11th magnitude, but it is such a tightly wound spiral you probably won't see a trace of the arms. Check out the image taken by **OCA astronomer Chuck Edmonds** back in 2005 as an example of what I mean. **https://ocastronomers.org/user_images/ngc-7217/**



West of Chuck Edmonds's beautiful image of NGC 7217 is the NGC 7331 group including (probably) Stephan's Quintet consisting of NGC 7317 through NGC 7320. NGC 7318 is an Aand B which brings the count up to 5.

This awesome image of Arp 213/Stephan's Quintet was taken by Suzanne Hall of the OCA back in 2003. I massaged the image slightly to bring out the nebulosity around the galaxies.

The image of NGC 7331 and its companion galaxies NGC's 7337, 7335 and 7340 can be found it the OCA gallery. It was taken on November 26, 2013 and is unattributed



Credit:NASA,ESAhttp://www.spacetelescope.org/images/heic1321a/ http://www.spacetelescope.org/static/archives/images/large/heic1321a.jpg, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=29625944

https://esahubble.org/images/heic1321a/

M15 is awesome. It is almost visible to the naked eye, its 6th magnitude and a fuzzy star in your 7x50's, pretty decent in your 4" APO, and blows out in a13.1 Dob. Scientifically Its a beast. That bright nucleus is a collapsed core of thousands of stars. It has blue new stars, golden older stars and a planetary nebula. Checkout the Hubble link then go look at in your eyepiece.

Sidney Hall - Urania's Mirror - Pegasus and Equuleus

This image of M31, M32, m110 and NGC 206 was taken last month at the Dark Sky Festival in JoshuaTree by Rick (Speedy) Gonzalez. Rick is a member of the Temecula ValleyAstronomers and is, as you see, a very accomplished amateur astrophotographer.

https://skyandtelescope.org/online-gallery/globular-clusters-in-m31/

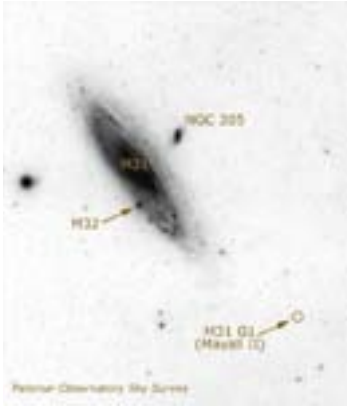
Another query that seemed to interest Scotty was the number of globular clusters around M31 that could be seen visually. He had correspondents who were able to identify a couple with instruments as small as a 6” Newtonian. One gentleman with a 12.5” homemade Newtonian was able to observe all 15 that had been cataloged at that time.

Early last century Edwin Hubble and Walter Baade compiled a catalog of 250 possible globular clusters around M31. The suspects were cataloged with HB numbers. Now the globulars are simply noted with a G(#) and a magnitude. There are plenty of web pages that will show the location of M31 globulars. A good one to start with is the link to: **Imgur: The magic of the Internet**. Also check out **Cosmic Challenge: Globular clusters in M31 - Phil Harrington's Cosmic Challenge - Articles - Articles - Cloudy Nights**.

I don’t know what list Scotty was using back in the 70’s. I could not find any reference to a HB catalog. There are dozens of globulars that are a part of the M31 gravity sink, some dwarf galaxies are even as far as Cassiopeia; the most famous of which is M110. Two dwarf galaxies that are worth looking for are just across the boundary into Cassiopeia. NGC 147 Caldwell 17 and NGC 185 Caldwell 18 are two 10th magnitude dwarf galaxies orbiting M31. Another good reference to extra-galactic clusters is the Sky and Telescope link: **https://skyandtelescope.org/sky-and-telescope-magazine/extragalactic-globular-clusters/**

I have never looked for G1, NGC 224-G1, also known as Mayall II. It is the brightest of the extra-galactic clusters and the first found by Nicholas Mayall and O.J. Eggen in 1953 off of a plate from the Schmidt.
Your 8” can find it but probably as a fuzzy dot. The specs tell us that the 14” can resolve .33”. G1 is .28” so your everyday 14” Schmidt-Cass should spread it out a bit. Steve Gottlieb of Sky and Tel. Has compiled an Excel spreadsheet of the 75 brightest M31 globulars. You will find it at **M31GC-Brightest75.xls (live.com)**, By the way, Gottlieb gives a dimension of 36” to G1.

Uranographia by Johannes Hevelius (1690)



(Hevelius’ Andromedae has been manipulated to mimic correct sky orientation)
Sobiescianum hi-res stock photographand images - Alamy (1690)

Another astronomy hero of mine, a friend, is Joe Neu. Joe lives up in Idyllwild and has been an amateur astronomer his whole life. Joe worked for Coulter Instruments up until the founder, Jim Jacobson died. Joe's favorite galaxy is NGC 4565, a spectacular edge on galaxy in Coma Berenices. We have our own beautiful edge-on galaxy in Andromeda. Its NGC 891 and Caldwell 23. Its 10th magnitude and almost 14 minutes-of-arc long. **Chuck Edmonds & Bill Hall** have both produced excellent images of NGC 891. Control-Click on their name to be taken to the OCA website.

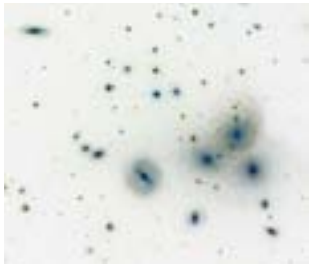
Our other Caldwell object is NGC 752, Caldwell 28. It is a big sprinklings of bright stars some naked eye bright. Its an old cluster, easily seen with you 7x50's. Using your binoculars are good. When I pointed the 17 at it it blew right through it.
There is a fun galaxy to look for next in the same neighborhood. Go to second magnitude Beta β Andromedae, Mirach, which means the Girdle. Easily making the same field as β is NGC 404, an 11th magnitude face on spiral that can be difficult unless you move β out of your eyepiece. Its fairly big, almost 4x4 minutes. Take your time, I would like to see any image you take.

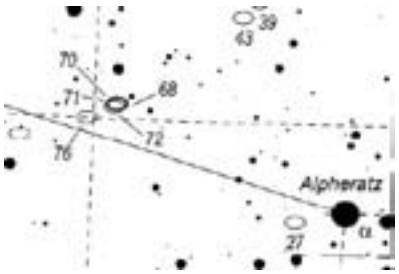
You are going to enjoy NGC's 752, 892 and 404. Starting at β and moving along the left to Gamma γ Andromedae, Almach, Arabian for desert lynx. γ is a beautiful, bright double star of golden and blue colors. It is not that far from Alberio, so you can check them out together. γB, the smaller, blue companion is also a multiple star system with a 5th and 6th companions and even a couple orbiting γC2. This is also interesting because Almach is your finder for NGC752 and NGC891. While in the area you can slip across the boundary line into Perseus and find M34, another open star cluster with interesting components. I remember two bright stars shining out of its middle.

On the other hand, the left hand of the "Hevelius" Andromedae is defined by the naked eye stars ι Iota, κ Kappa, λ Lamba and, ο Omicron. Three of which can be seen on the Hevelius rendering. These stars are your finder for NGC 7662, Caldwell 22 and nicknamed the Blue Snowball, its 8th magnitude, but tiny in your smaller telescope, belying its nickname. This image was taken by another OCA astrophotographe, Arnie Roser. Copy and paste his address to find his image or just Ctrl-Click on the hyperlink. **https://ocastronomers.org/wp-content/uploads/2019/01/n7662-01.jpg**
While up near the hand of Andromeda, follow the line made by kappa and lamba to NGC 7686, another open cluster punctuated by a bright 6th magnitude star shining from the middle and several 9th(?) magnitude stars framing the cluster.

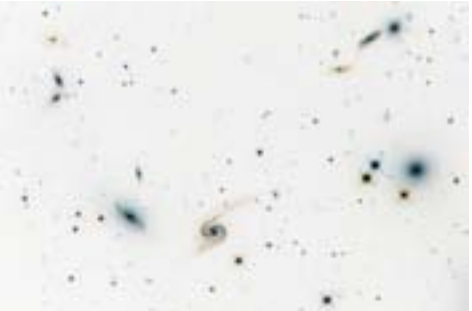
Harlan Arp (d. 2013) compiled the *Atlas of Peculiar Galaxies* a catalog of unusual galaxies. He was trying to provide other astronomers with images that would help them study galaxies and their evolution. The atlas is expecially useful when looking at odd and interacting galaxies, like the two examples in Andromeda.

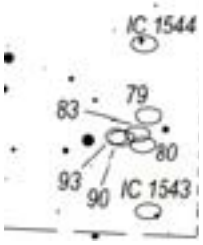
Arp 113 is the NGC 68 group close to Alpheratz on the line to delta δ. NGC 68 is the anchor to Arp 113. It's 12th magnitude while N70 thru 76 fall into the 13th magnitude. NGC 68 is the elliptical at the bottom right of the group. NGC 70 is the spiral above it and the third member if the triangle is NGC 71.





Arp 65 is the NGC 90 group located in the Pisces, Pegasus, Andromeda corner south of Alpheratz. It is anchored by 13th magnitude NGC 90 and the companions range 13th magnitude and lower.
NGC 90 is the spiral at the bottom of the image.
Both images credit: **Adam Block/Mount Lemmon SkyCenter/University of Arizona** – **http://www.caelumobservatory.com**

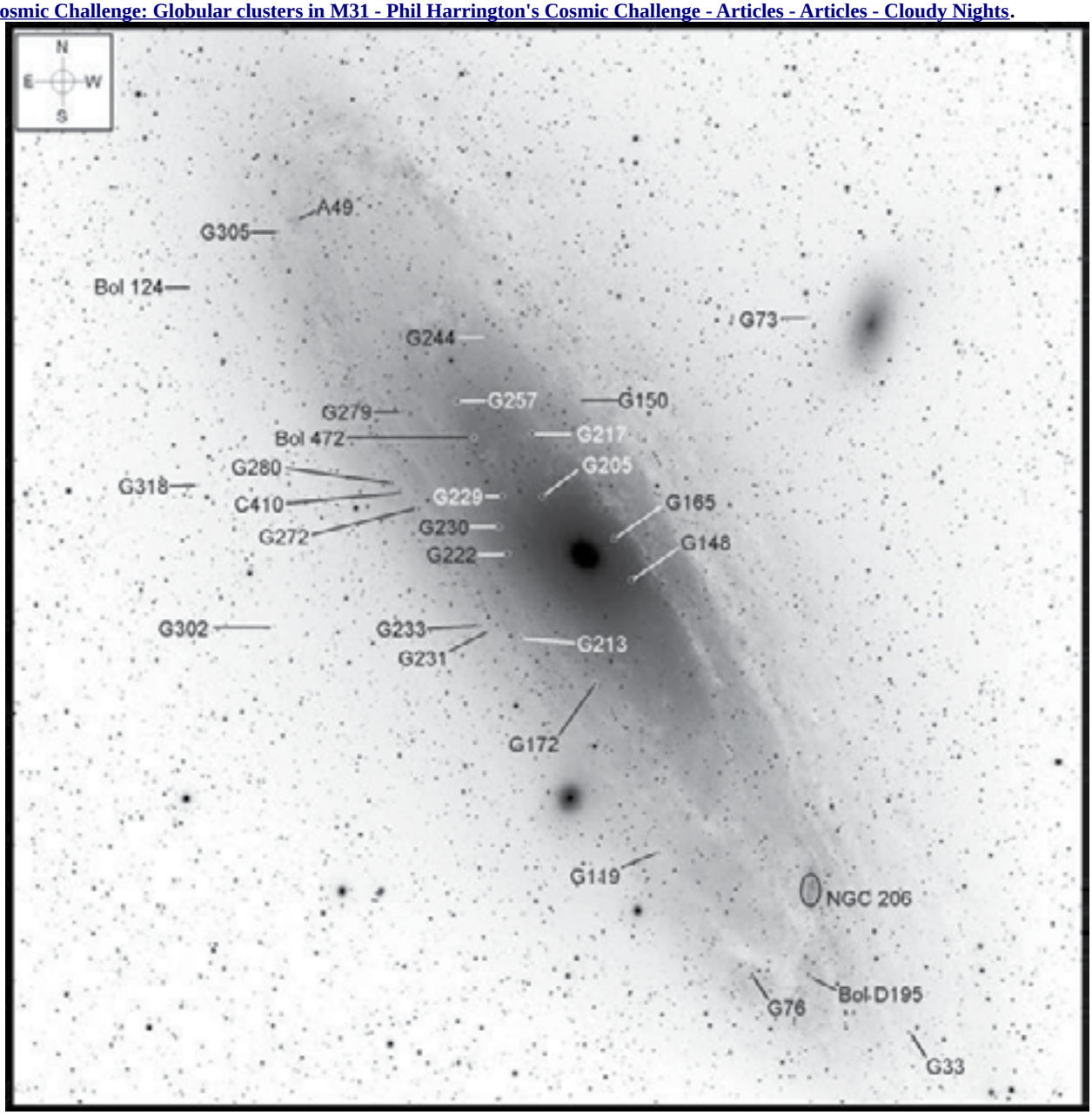




Dark Skies

Dave Phelps

Cosmic Challenge: Globular clusters in M31 - Phil Harrington's Cosmic Challenge - Articles - Articles - Cloudy Nights.



San Diego Astronomy Association

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Cepheus: A House Fit for a King

David Prosper

Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of Cepheus for the first time. These stars represent Cepheus, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original **Cepheid Variable**.

Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the "Garnet Star" Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the "Fireworks Galaxy" NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star **Delta Cephei**. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a cycle of where it dims and then brightens). Once the period for a Cepheid Variable (or **Cepheid**) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called "Leavitt's Law.". So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid's distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this "nebula" was actually another galaxy outside of our own Milky Way! You may now know this object as the "Andromeda **Galaxy**" or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

Because of their importance as a "standard candle" in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was even studied in detail by Edwin Hubble's namesake telescope, NASA's Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA's Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA's latest observations of stars and galaxies across our universe at nasa.gov.

The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: stellarium.org.

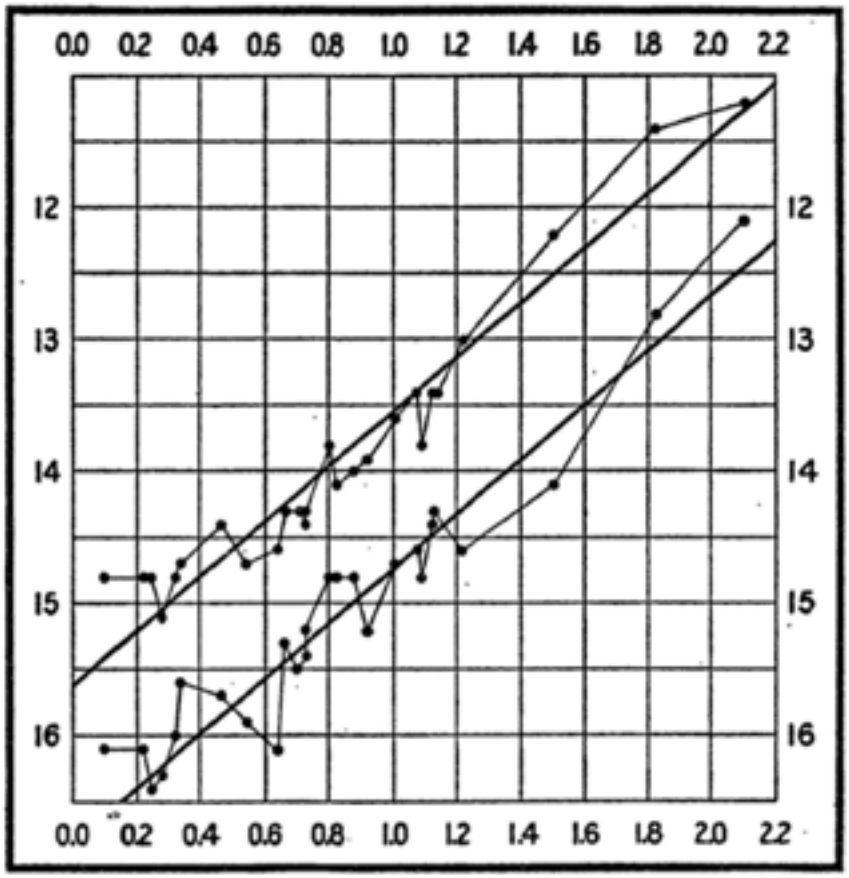

FIG. 2.

This historical diagram from Henrietta Leavitt's revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering's 1912 paper, "Periods of 25 Variable Stars in the Small Magellanic Cloud," a copy of which can be found at: https://ui.adsabs.harvard.edu/abs/1912HarCi.173....1L/abstract

San Diego Astronomy Association

2022/3 TDS Star Party Schedule

Date	Type	Sunset	Astro. Twi.	Moonrise(set)	Illum.†	Notes	Hosts
Nov-19	Public	4:45 PM	6:11 PM	2:50 AM	21.1%	Leonids peak night of Nov 17-18 (ZHR†† 15)	Sara Brown & Bob Roth
Nov-26	Member	4:43 PM	6:09 PM	(7:31 PM)	12.4%	Thanksgiving Weekend	
Dec-17	Public	4:44 PM	6:13 PM	1:34 AM	37.8%	Geminids peak night of Dec 13-14 (ZHR†† 150)	Bob Roth
Dec-24	Member	4:48 PM	6:16 PM	(6:21:PM)	3.4%	Ursids peak night of Dec 21-22 (ZHR†† 10)	Lipp unmanned
1/14/2023	Public	5:04 PM	6:31 PM	12:21 AM	55.6%		
1/21/2023	Member	5:10 PM	6:36 PM	7:52 AM	0.2%	Mercury at greatest western elongation. (1/30)	
2/11/2023	Public	5:30 PM	6:53 PM	11:14 PM	72.0%		
2/18/2023	Member	5:36 PM	6:59 PM	6:23 AM	3.7%		
3/18/2023	Member	6:58 PM	8:20 PM	5:55 AM	12.6%		
3/25/2023	Public	7:03 PM	8:26 PM	(11:40 PM)	20.9%		
4/15/2023	Member	7:18 PM	8:44 PM	4:29 AM	24.8%	Mercury at greatest eastern elongation. (4/11)	
4/22/2023	Public	7:23 PM	8:51 PM	(10:27 PM)	8.6%	Lyrids peak night Apr 22-23 (ZHR 18)	
5/13/2023	Public	7:39 PM	9:13 PM	3:03 AM	38.5%		
5/20/2023	Member	7:43 PM	9:20 PM	(9:14 PM)	1.6%	Mercury at greatest western elongation. (5/29)	
6/10/2023	Public	7:56 PM	9:37 PM	1:36 AM	52.8%	Venus at greatest eastern elongation. (6/4)	
6/17/2023	Member	7:58 PM	9:40 PM	8:03 PM	0.3%		
7/8/2023	Public	7:59 PM	9:39 PM	12:07 AM	67.3%		
7/15/2023	Member	7:57 PM	9:35 PM	4:36 AM	3.9%		
8/12/2023	Public	7:36 pm	9:06 PM	3:26 AM	12.2%	Perseids peak night of Aug 12-13 (ZHR 100)	
8/19/2023	Member	7:29 PM	8:57 PM	(9:23 PM)	10.9%	Saturn at Opposition. (8/27)	
9/9/2023	Public	7:02 PM	8:26 PM	2:17 AM	24.5%		
9/16/2023	Member	6:53 PM	8:16 PM	(7:52 PM)	3.0%	Neptune at Opposition. (9/19)	
10/7/2023	Public	6:25 PM	7:47 PM	1:07 AM	40.2%	Draconids Meteor Shower. (10/7)	
10/14/2023	Member	6:16 PM	7:38 PM	(6:22 PM)	0.0%	Annular Solar Eclipse. (partial here)	
11/4/2023	Public	5:55 PM	7:18 PM	11:54 PM	57.8%	Taurids peak night Nov 4-5. (ZHR 5)	
11/11/2023	Member	4:49 PM	6:14 PM	5:34 AM	2.8%	Uranus at Opposition - Nov 13	
12/9/2023	Member	4:42 PM	6:10 PM	4:22 AM	12.0%	Mercury at greatest eastern elongation. (12/4)	
12/16/2023	Public	4:44 PM	6:12 PM	(8:54 PM)	20.1%	Geminids peak night Dec 13-14 (ZHR 150)	

† Illumination at meridian crossing.

†† Published *zenithal hourly rate(s)* ZHR vary widely between sources.

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