

Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

November 2022

Membership Meeting

Saturday November 11th 2022 at 7:00p
at the Herrett Center - CSI Campus

Centennial Observatory

See Inside for Details

Faulkner Planetarium

See Inside for Details

www.mvastro.org

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*Magic Valley Astronomical Society is a
member of the Astronomical League*



*M-51 imaged by
Rick Widmer &
Ken Thomason
Herrett Telescope - Shotwell Camera*

President's Message

Nov President Message

November greetings my friends: Several items to be considered this month include elections for next year, a change in our monthly newsletter, next year's programs and two upcoming celestial events.









Our next meeting at the Herrett Ctr. Library Saturday Nov 12th at 7pm will feature elections for 2023. Your current board includes Gary Leavitt as President, Jay Hartwell as Vice-President, and Jim Tubbs as Treasurer. The Secretarial position is currently vacant. Please come prepared to bring nominations for potential new officers including the secretarial spot. Our November program will feature Rick Hull and Part Two of his Astrophotography Presentation.

Concerning next year's programs, we have lots of good opportunities available. We'll start off January with our regular telescope workshop with a few twists and I'll have more on that later. I'll put together a workshop on some of the new ways to do astrophotography with Cellphones plus lots of other fun stuff.

Finally, two Astro events during the month should provide some fun. Early morning on the 8th is a total Lunar Eclipse and the Leonid Meteor shower should peak around Nov 17-18.

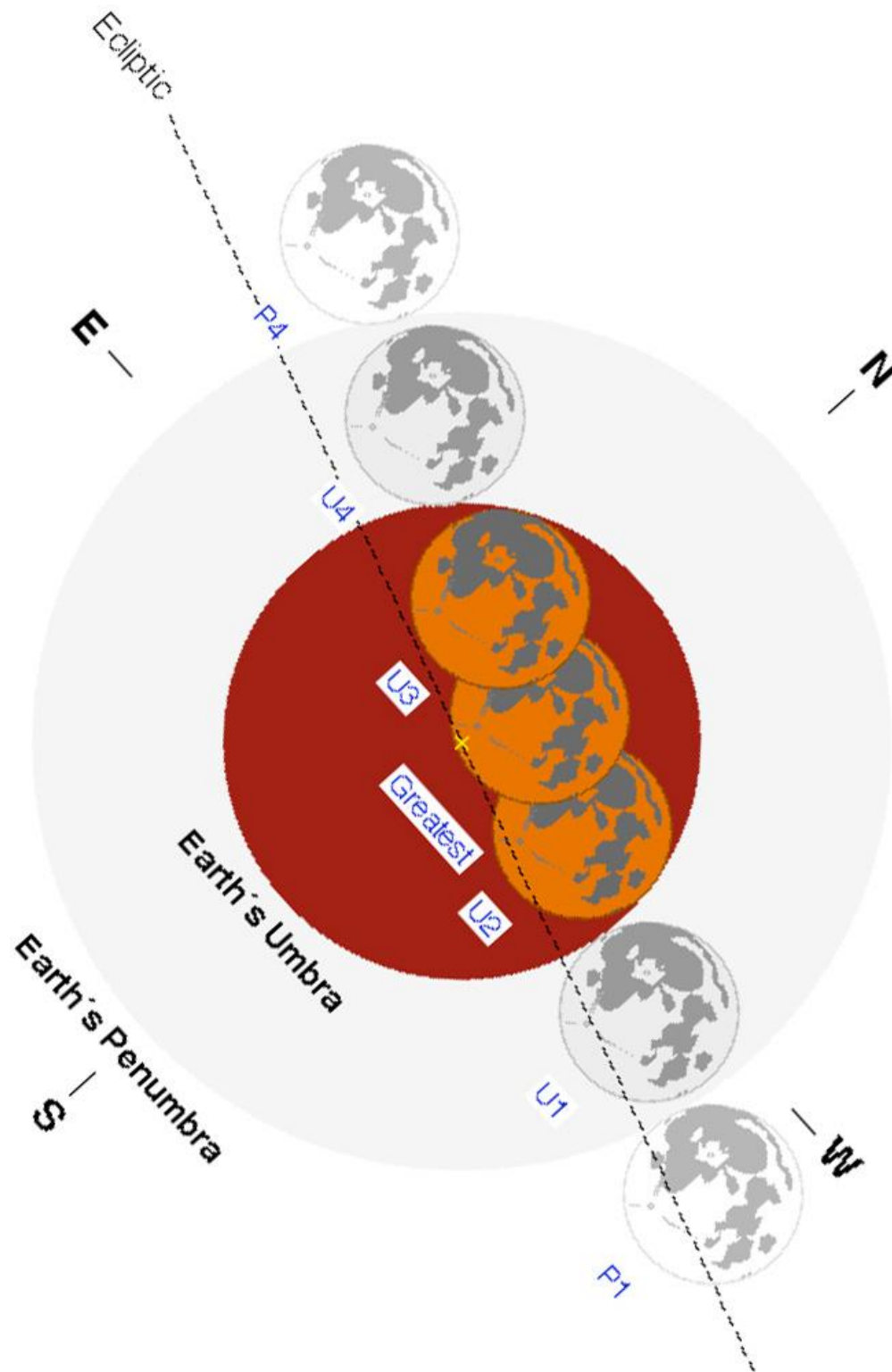
Have a superb month;
Gary Leavitt, President MVAS

November 2022 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 First quarter Moon Visible: 53% ↑ Age: 7.62 days 	2	3	4	5
6 Set your clock back 1-hour DST ends. 	7 Centennial Observatory Telescope Tuesday 	8 Total Lunar Eclipse Visible: 100% Age: 14.81 days 	9	10	11 Veterans Day Remembrance Day 	12 MVAS General Meeting 7:00p Herrett Center Centennial Observatory Public Star Party 6:00p – 9:00p
13	14	15	16 Last quarter Visible: 51% ↓ Age: 22.09 days 	17	18	19
20	21	22 Centennial Observatory Telescope Tuesday 	23 New Moon Visible: 1% ↓ Age: 29.02 days 	24 Thanksgiving Day 	25	26
27	28	29	30			

Total Lunar Eclipse – November 2022

The moon will be above Idaho horizons for the duration of this fairly deep total eclipse.



Adapted from a [diagram by NASA](#). Note that, although the moon's orbital motion causes it to move to the upper left (east-northeast) relative to Earth's shadow, it (and the shadow) are moving to the lower *right* (west) due to Earth's rotation. Thus, for observers in Idaho, the moon moves lower in the sky relative to the local horizon throughout the eclipse.

Eclipse timeline (all times listed are in Mountain Standard Time (GMT-7 hrs.), and lunar altitude/twilight times are given for Twin Falls, Idaho, USA):

- 1:02 AM — **First penumbral phase (P1) begins** Moon begins to enter Earth's penumbral (partial) shadow. No conspicuous darkening will occur until roughly an hour later.
- 1:45 AM — **Centennial Observatory opens**, weather permitting.
- 2:09 AM — **First partial phase (U1) begins** (first umbral contact). A small, dark "bite" begins to appear at the moon's upper left edge.
- 3:17 AM — **Total phase (U2) begins, first partial phase ends** (second umbral contact). The moon is completely immersed in Earth's umbra, taking on a red-orange, orange-brown, or darker color, depending on global atmospheric conditions. Totality begins with the moon appearing darkest at the upper left and brightest at the lower right.
- 4:00 AM — **Greatest eclipse**. The moon reaches its maximum excursion into the umbral shadow, appearing at its darkest. For this particular eclipse, the moon will be fairly deep in the umbral shadow, and so may appear quite dark.
- 4:42 AM — **Total phase (U3) ends, last partial phase begins** (third umbral contact). Just before this point, the moon appears darkest on bottom and brightest on top. As it emerges from Earth's umbra, a growing, bright sliver appears at top edge of the lunar disk.
- 5:44 AM — **Start of morning twilight**.
- 5:49 AM — **Last partial phase (U4) ends, last penumbral phase begins** (fourth umbral contact). The last, dark "bite" of shadow slips off the moon's lower edge. From this point on, the moon appears normal, except for an increasingly subtle darkening of its lower edge from Earth's penumbral shadow.
- 6:00 AM — **Observatory closes**.
- 6:01 AM — **Moon below 15° altitude, too low for 24" telescope**.
- 6:56 AM — **Last penumbral phase (P4) ends** (end of eclipse). Well before this point, the moon appears completely normal to the eye, the penumbral shading being too subtle to detect.

Weather Resources for Twin Falls, Magic Valley use these before observing.

Astrospheric: <https://www.astrospheric.com/?Latitude=42.56318&Longitude=-114.46028> has a mobile app.

Clear Sky Chart: <https://www.cleardarksky.com/c/HrrttObIDkey.html?1> Centennial Observatory

Foreca Weather: <https://www.foreca.com/105610810/Twin-Falls-ID>

Meteo Blue https://www.meteoblue.com/en/weather/week/twin-falls_united-states_5610810 Click the outdoors & sports link on the left and click astronomy seeing.

National Weather Service: <https://forecast.weather.gov/MapClick.php?lat=42.48180555600004&lon=-114.48774999999995>

Weather Underground: <https://www.wunderground.com/weather/KTWF>



Eclipse Photo NASA file photo

As November arrives, northern stargazers enjoy earlier sunsets and longer and colder stargazing sessions, while southern-hemisphere stargazers now enjoy the warmer nights of spring. For deep-sky observers, there are plenty of open star clusters in Cassiopeia and Perseus, and lots of galaxies in Pegasus, Sculptor, and elsewhere. Orion rises well into the evening and dominates the southern sky after midnight, while the stars of northern spring rise before dawn. The bright planets Jupiter, and Saturn are past their prime for the year but still present well in a telescope, while continues to brighten on the way to opposition next month. And the Leonid meteor shower, quiet for the past many years, may offer a spectacular outburst on or about the 18th. Here's what to see in the night sky this month.

1 November 2022. First Quarter Moon, 06:37 UTC

2 Nov. The waxing gibbous Moon lies roughly half way between Saturn (to the west) and brighter Jupiter (to the east). Both planets, though past opposition, still offer a wealth of detail to telescopic observers on nights of steady seeing. As the month begins, Jupiter still spans about 48" and shines at an impressive magnitude -2.8, more than three and a half times as bright as Sirius, the brightest star.

6 Nov. Most of North America sets the clocks back to Standard Time – which means you get to enjoy an extra hour of stargazing.

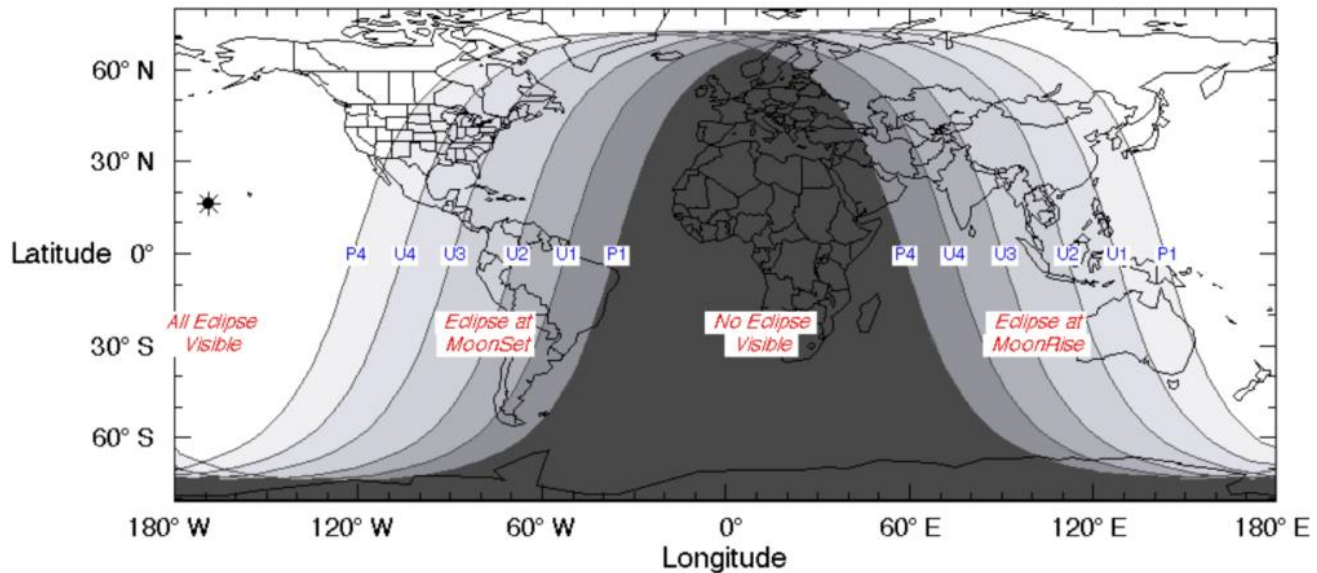


A Taurid fireball photographed on Oct. 28, 2005, by Hiroyuki Iida of Toyama, Japan.

6-12 Nov. The Taurid meteor showers peak this week in less than ideal 'moony' conditions. There are two, the Northern and Southern Taurids, and they both peak in late October through mid-November. They're sometimes called the [Halloween Fireballs](#). You can see these bright, slow-moving fireballs in the northern and southern hemispheres at essentially any time of night. This event usually shows 5-10 meteors an hour, although some predictions suggest more plentiful meteors this year.

8 Nov. Full Moon, 11:02 UTC (The 'Beaver Moon')

8 Nov. A total lunar eclipse arrives with the November full 'Beaver Moon' for observers in the Americas and the Pacific (including Australia and New Zealand). The eclipse occurs with the Moon near apogee, so it appears a little smaller than average. Look for it in Aries about 16 degrees west of the Pleiades. The eclipse happens from 8:02 UTC to 13:56 UTC on November 8, with totality running 86 minutes from 10:16 UTC to 11:42 UTC. Peak eclipse arrives at 10:59 UTC. During this eclipse, the Moon lies at the northern edge of the umbra, the darkest part of the Earth's shadow, so it appears slightly brighter at its northern limb and darker towards its southern limb.



The visibility map of the lunar eclipse of November 8, 2022. Image credit: NASA.



The location of Uranus in mid-November 2022.

9 Nov. Uranus reaches opposition as it rises in the east as the Sun sets in the west. This distant ice giant lies just at the edge of naked-eye visibility at magnitude +5.7 with a disk that spans about 3.7 arc-seconds. You can see it about five degrees south of the 5th-magnitude star epsilon Arietis. Uranus remains visible through the end of 2022 and into the New Year in this part of the sky. If you have dark sky, try to see the planet without optics. Although the planet was plainly, though not easily, visible to pre-telescopic stargazers, it wasn't 'discovered' until William Herschel found it with a 6" telescope on March 13, 1781. For an even bigger challenge – try to find some or all of the bright Moons of Uranus with the help of [this handy-dandy moon finder at Sky&Telescope](#).

An even bigger challenge for telescopic observers – spotting one (or all) of the planet's five brightest moons, all of which lie close to its disk and are somewhat overwhelmed by its glare.



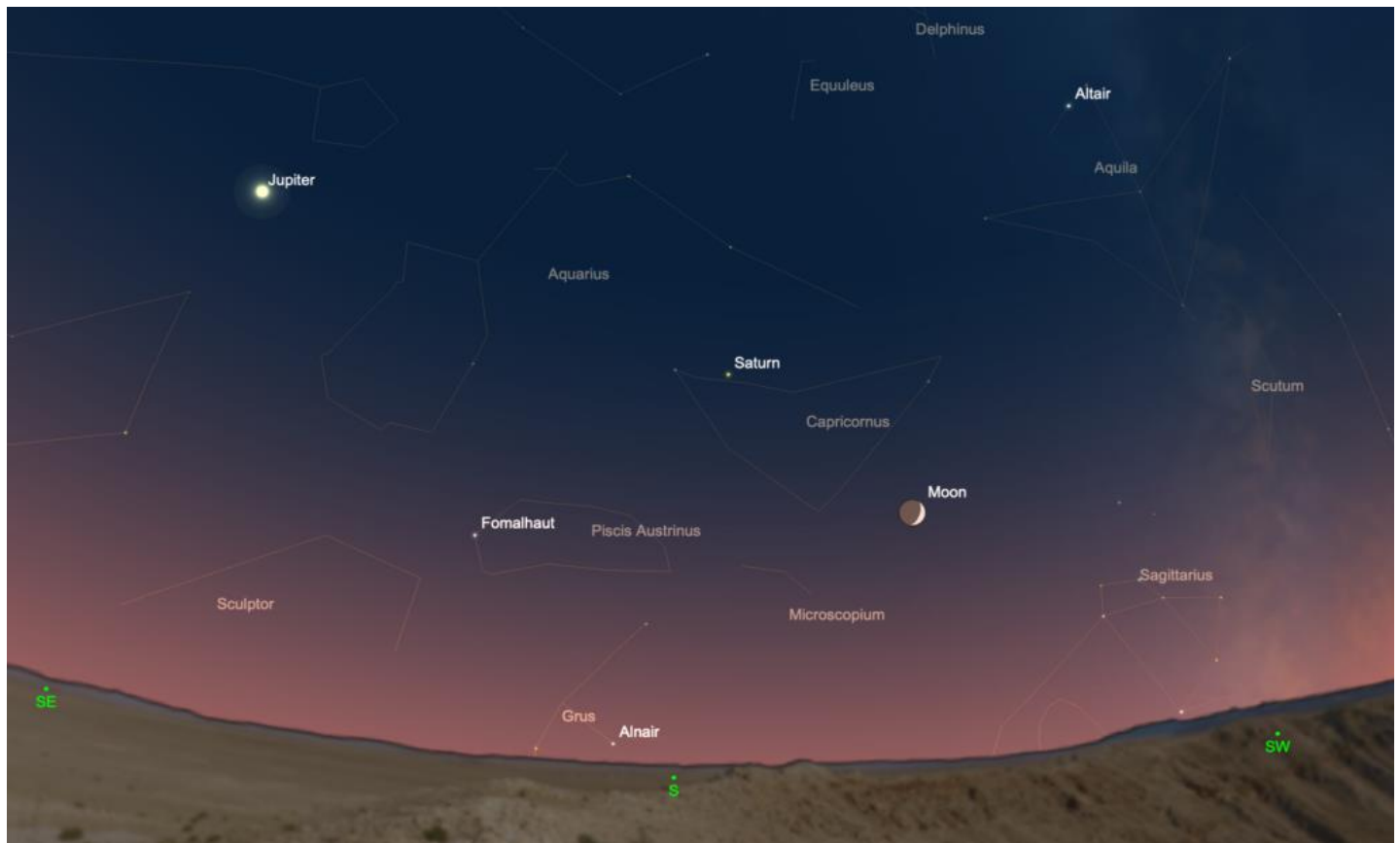
Mars and a fat gibbous Moon on the early morning of Nov. 11, 2022.

11 Nov. The waning gibbous Moon lies less than 3° from brightening Mars in the horns of Taurus early this morning before dawn. The planet now brightens and grows larger each day on its way to opposition next month. Today the planet spans a respectable $16''$ and shines at magnitude -1.5 , brighter than anything in the night sky except for the Sun and Moon.

16 Nov. Last Quarter Moon, 13:27 UTC

18-21 Nov. The Leonid meteor shower has been quiet these past many years. But things might pick up in 2022 as the Earth passes through three clumps of debris left by the parent comet of the Leonids, Comet 55/P Tempel-Tuttle. A peak of 15 meteors per hour is typical for the Leonids, but a burst of an additional 5 meteors per hour may arrive at 07:00 UTC on November 18, which favors western European and North American observers, and again at 15:00 UTC on November 21 which favors observers in the Pacific. Of most interest is a potential outburst of 200-300 meteors per hour (!) at 06:00 UTC on November 19. Nothing's assured – but if your skies are clear, mark these times in your calendar. Leonids can appear anywhere in the sky but appear to trace their paths back to a radiant in the 'Sickle' of Leo.

21 Nov. If you're up early, look eastward to see a slender crescent Moon about 5° east of the 1st magnitude star Spica. Brighter Arcturus lies well to the north.



The waxing crescent Moon, Saturn, and Jupiter in the southwestern sky on the evening of Nov. 27, 2022.

23 Nov. New Moon, 22:57 UTC

27 Nov. A waxing crescent Moon returns to the western sky after sunset with Saturn and Jupiter well to the east, both planets slowly working their way to conjunction with the Sun.

Source: Brian Ventrudo <https://cosmicpursuits.com/> used with permission of the author. If you're not already a subscriber to Cosmic Pursuits, you can [sign up here](#). Copyright © 2022 Mintaka Publishing Inc.

November Skies by Dick Cookman

Highlights: Comet Journal, Martian Landers, Meteor Showers, Planet Plotting, November Moon/Eclipse

Focus Constellations: Ursa Major, Ursa Minor, Draco, Cepheus, Cassiopeia, Perseus, Camelopardalis, Auriga, Taurus, Aries, Pisces, Andromeda, Pegasus, Cygnus, Lyra

Comet Journals

Comet C/2020 V2 (ZTF) is in Camelopardalis near the tail of Draco and will cross into Draco and Ursa Minor in November. It is approaching 10th magnitude and should maintain that brightness until after it passes perihelion in May, 2023. It will be closest to Earth in September, 2023. Comet C/2022 E3 (ZTF) is between Hercules and Bootes. It is currently at 10th magnitude, and is expected to reach naked eye visibility as a Christmas comet and achieve maximum brilliance when at perihelion on January 13 or when it is closest to Earth on the 2nd of February.

Mars Landers

Perseverance is continuing its examination of the foot of the 3.5 billion year old delta in Jezero Crater where it has collected four samples of sandstone and mudstone with organic molecules and sulfate minerals. A location called Three Forks which is flat and free of obstacles has been chosen as an ideal spot for the future Mars Sample Return landing and pickup operations.

The Insight lander is in its final days unless a windstorm suddenly clears its solar panels which are now operating at 20% efficiency. Science measurements will continue until no longer possible.

Curiosity continued its investigation and challenging navigation between buttes separated by a mix of large rocks and sand on Mt. Sharp. It successfully drilled a target named Canaima in October.

Meteor Showers

The Taurid (11/4, 11/12) and Leonid (11/17) meteor showers are the best November northern hemisphere showers. The Southern Taurids could be quite good but the Northern Taurids will have to contend with the gibbous Moon. The Leonids may even produce a storm. To avoid the glare of the waning Crescent Moon in Leo in the southeastern sky during predawn best viewing times, observers of the Leonid shower should focus on the zenith and northwestern sky in order to see the brightest meteors in dark skies. Another outburst may occur in the predawn hours of the 19th.

- **November 4: Southern Taurids.** Active September 10 – November 20, Radiant 3h20m +13°, ZHR 5, 27km/sec. Waxing Gibbous Moon. Progenitor: Comet 2P/Enke.
- **November 11-12: Northern Taurids.** Active October 20 – December 10, Radiant 3h52m +22°, ZHR 5, 66km/sec. Waning Gibbous Moon. Progenitor: Comet 2P/Enke.
- **November 18: Leonids.** Active November 6 – 30, Radiant 10h12m +22°, ZHR 10-15, 71km/sec. Waning Crescent Moon. Progenitor: Comet 55/Tempel-Tuttle

Planet Plottings

After sunset in early November, Saturn (+0.7 to +0.8) is in the south-southwest in Capricornus. It sets after midnight on the 1st with the waxing gibbous Moon and sets with the waxing crescent Moon in the late evening on the 28th. Neptune (+7.8 to +7.9) in Aquarius and Jupiter (-2.6 to -2.5) in Pisces are in the southern evening sky in November and set after 1:00AM EST. The waxing gibbous Moon is nearby on the 4th. Uranus (5.6) rises in the late afternoon in Aries and sets about dawn and can be found near the waning gibbous Moon on the 8th. Mars (-1.3 to -1.8) rises in Taurus in the early evening and sets after the Sun on the 1st. The waning gibbous Moon visits the red planet on the 11th. At month's end, Mars rises as the Sun sets and sets at sunrise as it approaches one of its best oppositions in years on December 1st. Although this is not the closest opposition, it will produce better views than most because Mars is higher in the southern sky lessening the effects of the thick, turbulent air near the horizon.

Mercury (+1.1 to -0.5) and Venus (-3.8) are morning planets buried in the rising Sun's glow as it moves through Libra and Scorpius in November. Mercury scoots through Virgo, Libra, Scorpius, and Ophiuchus while Venus visits Libra, Scorpius, and Ophiuchus. Mercury is at superior conjunction on the 8th.

Planet	Constellation(s)	Magnitude	Planet Passages	Time	Date
Sun	Libra, Scorpius	-26.5	New Moon	3:57pm MST	11/23
Mercury	Virgo, Libra, Scorpius, Ophiuchus	-1.1 to -0.5	Superior Conjunction	10:00am MST	11/8
Venus	Libra, Scorpius, Ophiuchus	-3.8			
Mars	Taurus	-1.3 to -1.8	Closest to Earth		11/30
Jupiter	Pisces	-2.6 to -2.5			
Saturn	Capricornus	+0.7 to +0.8			
Uranus	Aries	5.6	Opposition	1:00AM MST	11/9
Neptune	Pisces, Aquarius	+7.8 to +7.9			

November Moon/Eclipse

The November 23rd New Moon in Scorpius at 5:57PM EST is the start of Lunation 1236 ending 29.47 days later with that of December 23rd in Sagittarius at 5:17AM EST. November's "Frosty" or "Beaver" Full Moon occurs in Aries on the 8th at 6:02AM EST. The total eclipse starts at 3:02AM EST when the Moon begins to darken as it slips into Earth's penumbra. The partial eclipse begins at 4:09AM as it moves into the umbra. Totality starts at 5:16AM and ends at 6:42AM. Sunlight bends around the Earth and has blue light removed as it passes through our atmosphere. When reflected off the shadowed Moon it is deep red or rust color. November's Moon was the "Snow Moon" in Medieval England and for Celts it was the "Dark Moon". Chinese call it the "White Moon" and Colonial Americans had the "Beaver Moon". The 11th Moon is recognized as "Gashkadino-Giizis" (Freezing Over Moon) or "Baashkaakodin-Giizis" (Freezing Moon) for Anishnaabe (Odawa and Ojibwe) first people. Earth Haven Farm in Ontario documents the cultural teaching which explains the cycle of life and nature of the 11th Grandmother Moon of Creation as follows: "this is a time when the Star Nation is closest to us. As every creature being prepares for the coming fasting grounds, we are reminded to prepare ourselves for our spiritual path by learning the sacred teachings and songs that will sustain us."

During the November 14th Lunar Apogee at 1:40AM EST the Moon will be at its maximum distance of 251,606 mi. (63.49 Earth radii). Minimum lunar distance at perigee is 225,450 mi. (56.88 Earth radii) on the 25th at 8:31PM EST. The waxing gibbous Moon passes Saturn on the 1st, and Neptune and Jupiter on the 4th. The waning gibbous Moon passes Uranus on the 8th and Mars on the 11th. On the 23rd, before New Moon, the waning crescent passes Mercury and then, a waxing crescent passes Venus. On the 28th, it passes Saturn.

Planet	Constellation	Magnitude	Moon Passages	Moon Phase	Moon Age
Sun	Scorpius	-26.8	5:57PM EST, 11/23	New	0 Days
Mercury	Ophiuchus	-0.6	0.92°S, 10:00PM EST, 11/23	Waning Crescent	29.80 Days
Venus	Ophiuchus	-3.8	2.27°S, 7:00PM EST, 11/23	Waning Crescent	0.09 Days
Mars	Taurus	-1.5	2.0°N, 9:00AM EST, 11/11	Waning Gibbous	19.30 Days
Jupiter	Pisces	-2.6	2.0°S, 4:00PM EDT, 11/4	Waxing Gibbous	12.84 Days
Saturn	Capricornus	0.7	4.0°S, 5PM EDT, 11/1	Waxing Gibbous	9.75 Days
Saturn	Capricornus	0.8	4.0°S, Midnight EST, 11/28	Waxing Crescent	2.25 Days
Uranus	Aries	5.6	0.7°N, 8:00AM EST, 11/8	Waning Gibbous	16.38 Days
Neptune	Aquarius	7.8	3.0° S, 4:00AM EDT, 11/4	Waxing Gibbous	12.21 Days

Author Phil Harrington offers an excellent freeware planetarium program for binocular observers known as TUBA (Touring the Universe through Binoculars Atlas) at <http://www.philharrington.net/tuba.htm>

Boise State Professor Dr. Brian Jackson's Astronomy Information Website: <http://www.astrojack.com/> has past BSU First Friday's events and other information.

Information on passes of the ISS, the USAF's X-37B, the HST, Star Stink, and other satellites can be found at <http://www.heavens-above.com/> and <https://spotthestation.nasa.gov/>

Information on the celestial events transpiring each week can be found at <https://stardate.org/nightsky> and <http://astronomy.com/skythisweek> and <http://www.skyandtelescope.com/observing/sky-at-a-glance/>

Information on the celestial events transpiring each week can be found at <http://astronomy.com/skythisweek> and <http://www.skyandtel...ky-at-a-glance/>

A monthly podcast on various astronomical topics is available at <https://www.skyandte...onomy-podcasts/>

Free star charts for the month can be downloaded at <http://www.skymaps.com/downloads.html> and <http://whatsouttonight.com/>

Stellarium and Cartes du Ciel are useful freeware planetarium programs that are available at <http://stellarium.org/> and <https://www.ap-i.net/skychart/en/start>

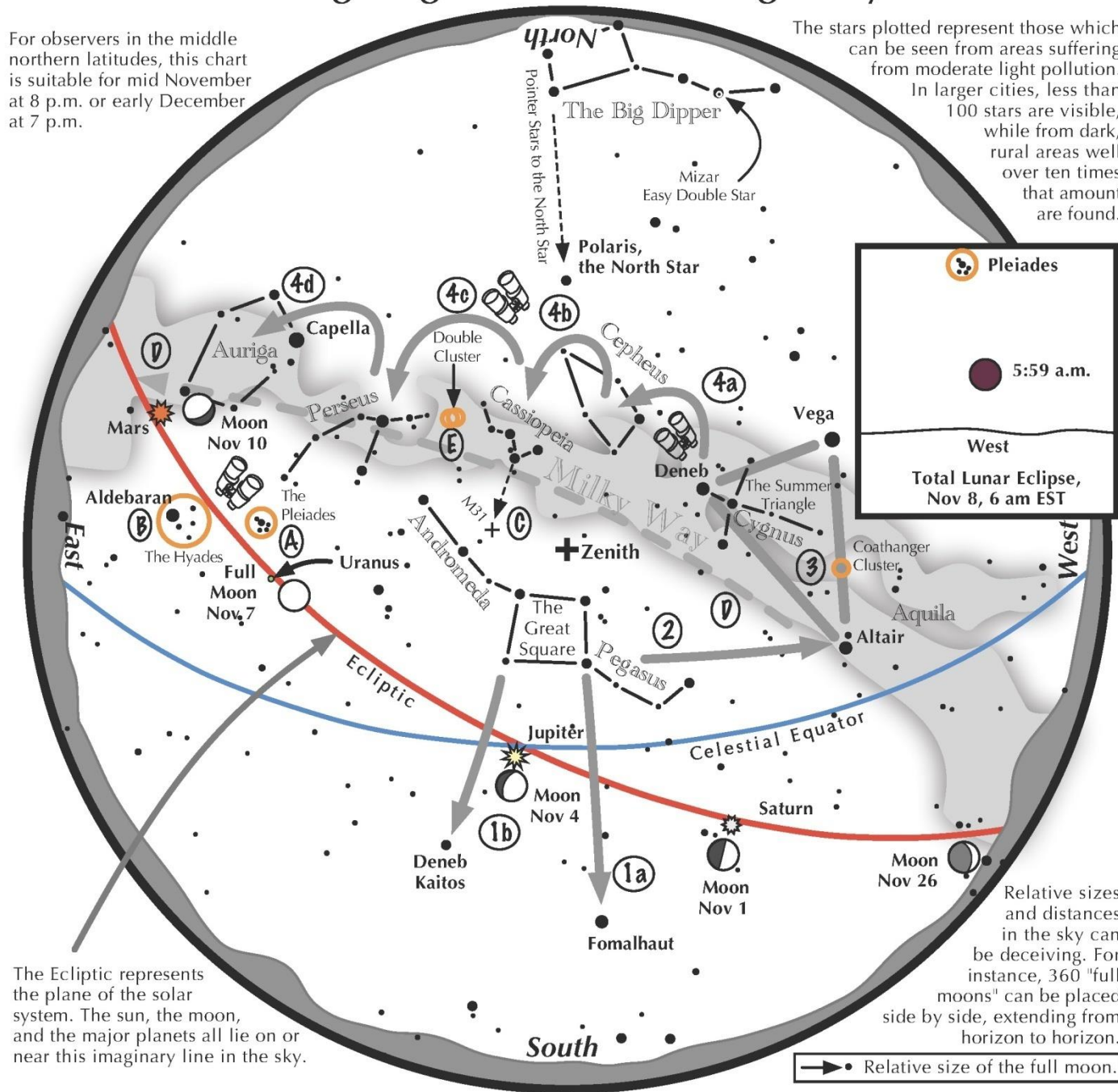
Deep-sky object list generators can be found at <http://www.virtualcolony.com/sac/> and <https://telescopus.com/> and <http://tonightssky.com/MainPage.php>

Freeware sky atlases can be downloaded at <http://www.deepskywa...-atlas-full.pdf> and <https://www.cloudyni...ar-charts-r1021> and <https://allans-stuff.com/triatlas/>

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.

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 brightest 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.





This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

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.

Facing North October Evenings.



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.

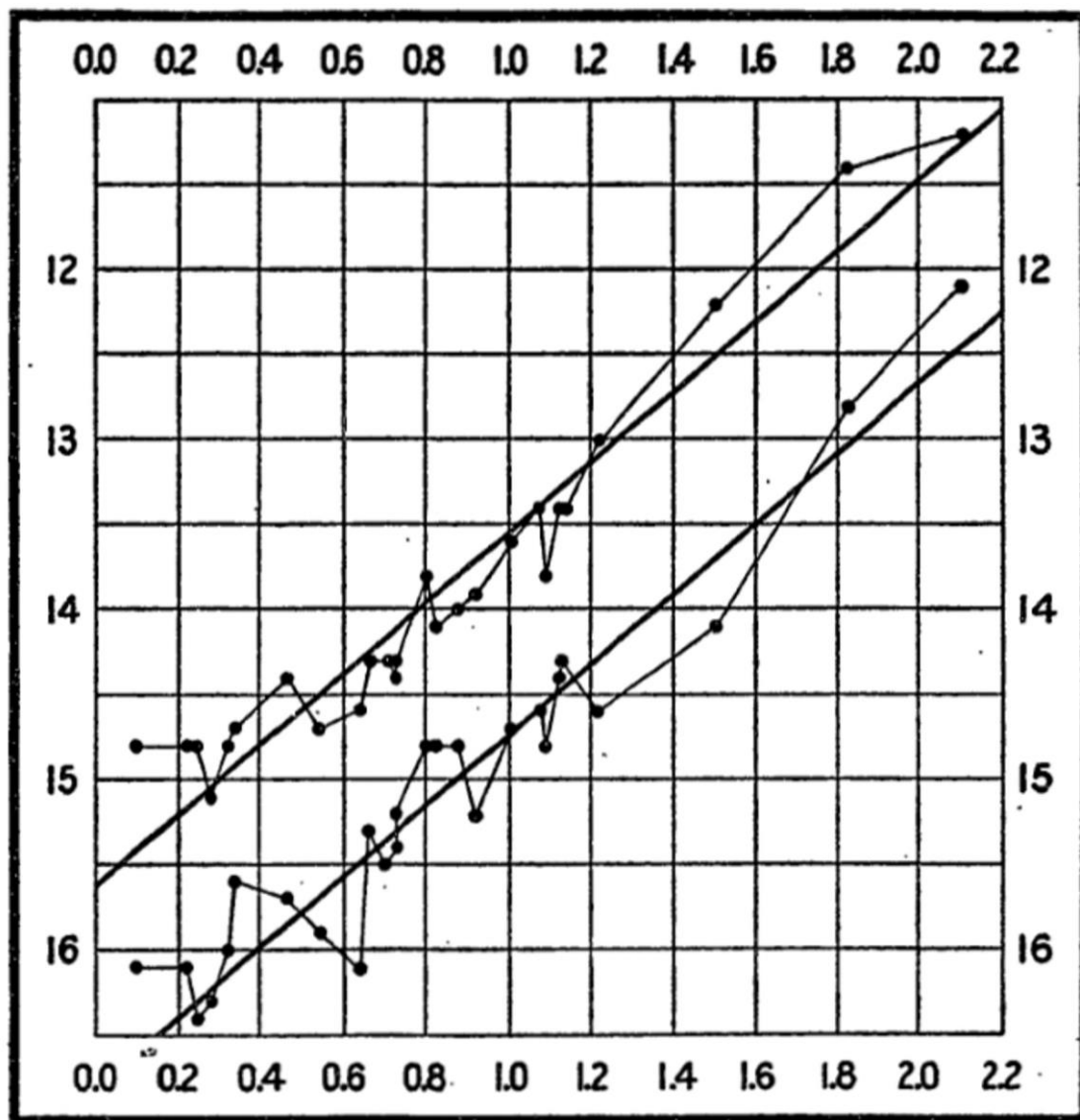


FIG. 2.

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>

November's Cosmic Challenge



Phil Harrington's Cosmic Challenge
This month's suggested aperture range:
10- to 14-inch (25-36 cm) telescopes

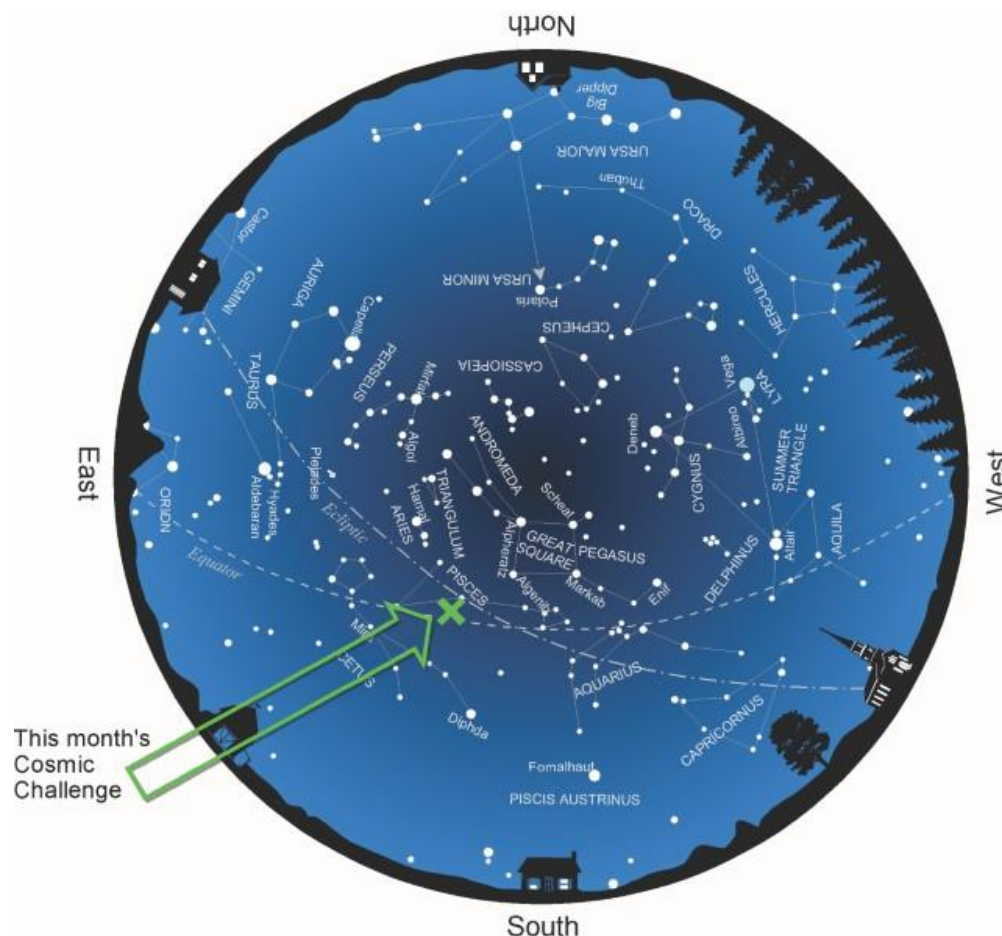


Meade LX-200 12"

Target	Type	RA	DEC	Constellation	Magnitude	Size
IC 1613	Galaxy	01m 04.8m	+02° 17.1'	Cetus	9.9	16.3'x14.5'

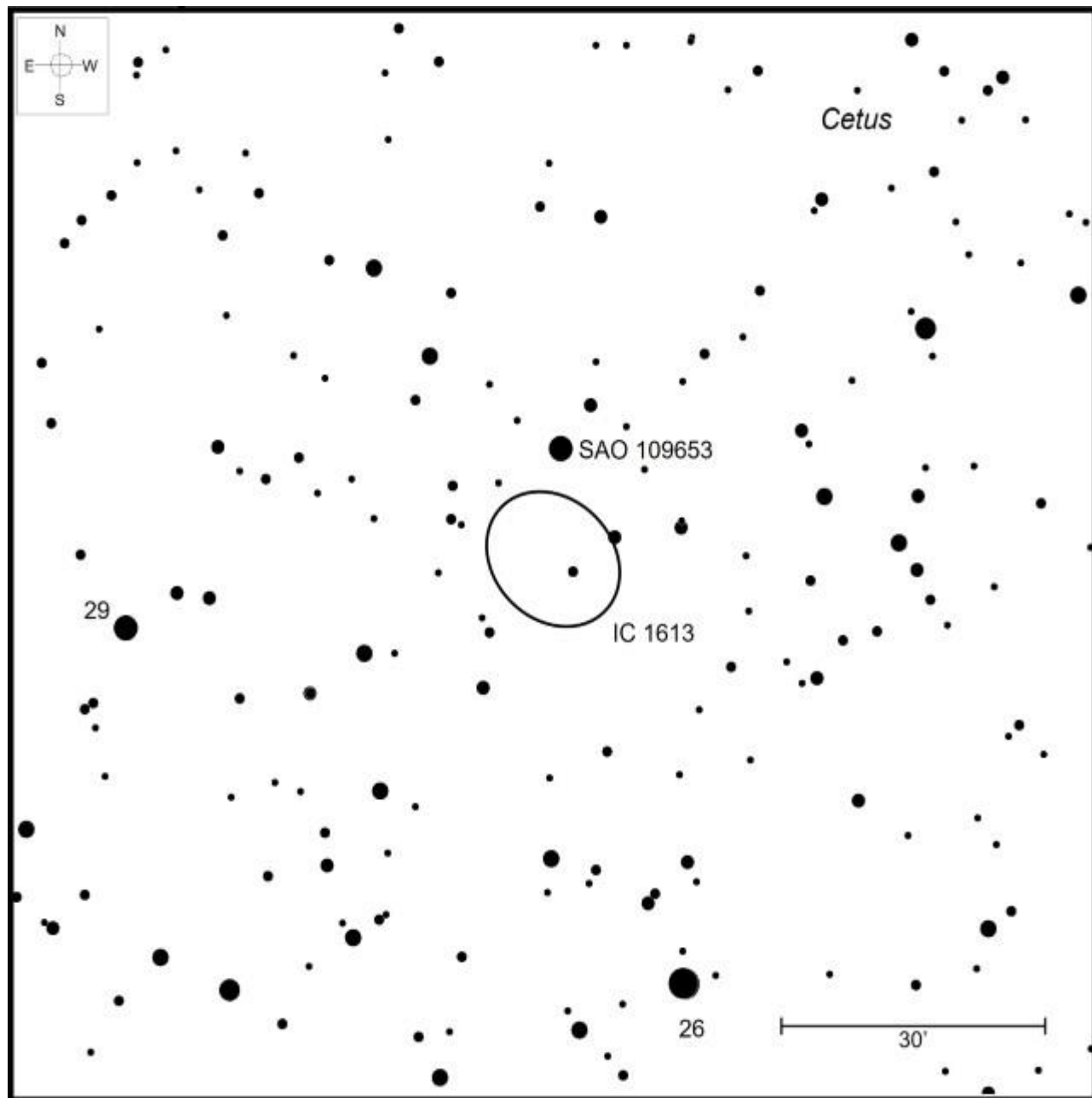
The Local Group of galaxies includes three large spiral galaxies – the Milky Way, the Andromeda Galaxy, and the Triangulum Spiral – and dozens of smaller systems. Two of the toughest to see are found in the constellation Cetus and make up this two-month challenge.

We begin with **IC 1613**, discovered in 1906 by German astronomer Max Wolf on photographs taken with the Bruce 16-inch (41-cm) refractor at the Astrophysical Observatory in Heidelberg. Using data from the Hubble Space Telescope in 1999, Andrew Cole and colleagues confirmed that IC 1613 lies 2.4 million light years away. This places it a bit closer to us than M31 and its cadre of satellites. Like that galactic family, IC 1613 is also approaching the Milky Way, in this case at a rate of 234 km per second. While that is comparable to NGC 147, one of M31's companions, IC 1613 is not gravitational kin to Andromeda. In fact, it is nearly as far away from M31 as it is from the Milky Way.



Above: Late evening star map showing the location of this month's *Cosmic Challenge*.

Credit: Map adapted from [Star Watch](#) by Phil Harrington



Above: Finder chart for this month's *Cosmic Challenge*. **Credit:** Chart adapted from [Cosmic Challenge](#) by Phil Harrington
Click on the chart to open a printable PDF version in a new window

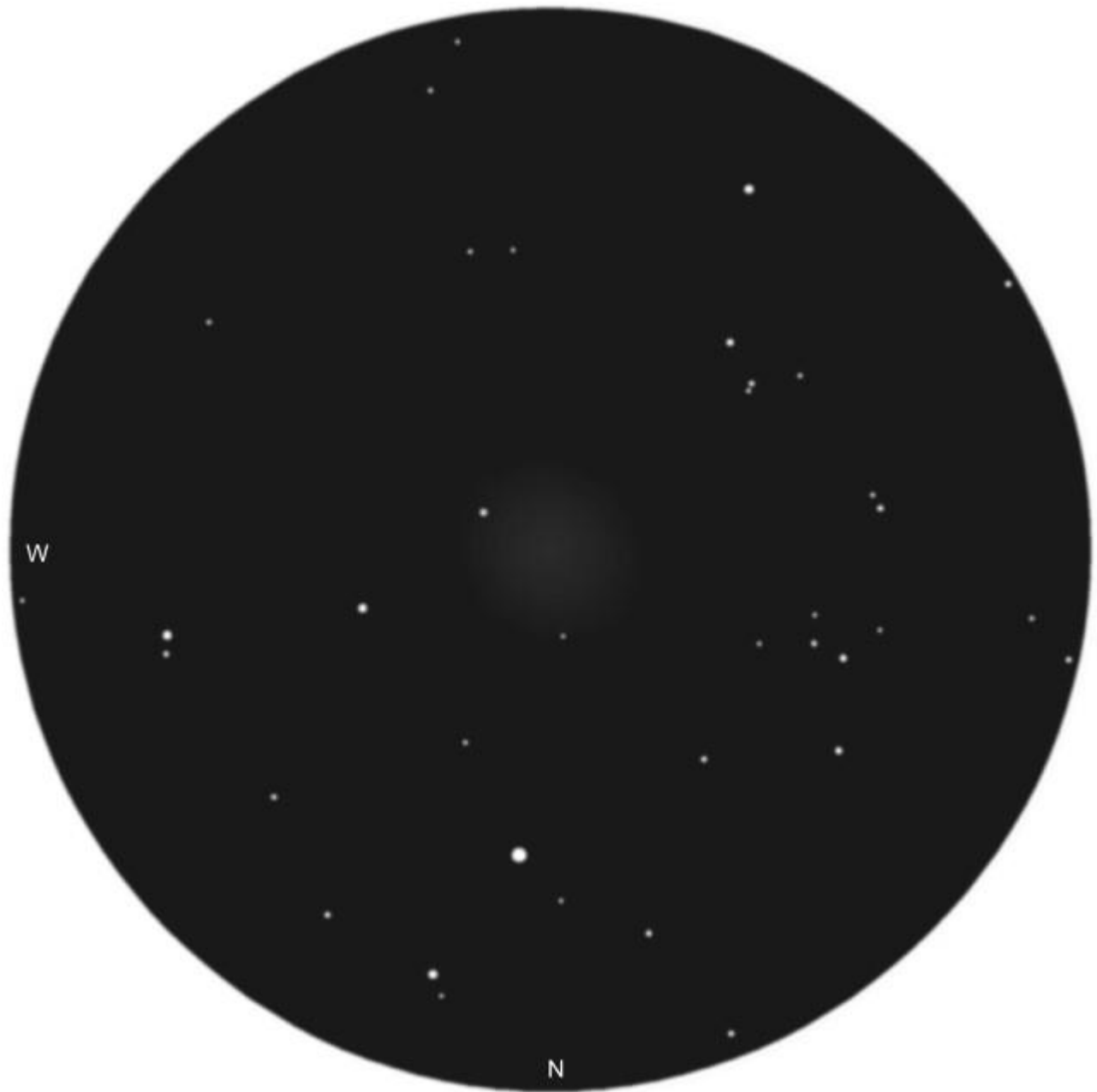
Despite being relatively nearby, IC 1613 suffers from the same problem that plagues many other Local Group members, such as previous challenges [Leo I](#), [Leo II](#), and [Leo III](#) (aka Leo A). Like those systems, the feeble light from IC 1613 is spread across such a large area that its surface brightness drops precipitously. Although it is listed as 9th magnitude, remember that is its *integrated* brightness, or how bright it would appear were it compressed to a stellar point. The fact that the galaxy is spread across an area half the apparent diameter of the Full Moon lowers its surface brightness to only magnitude 15.5.

Although it can be a bear to see, IC 1613 is not hard to locate thanks to its proximity to 26 Ceti. To get there, aim your finderscope along the rope attached to the southern Fish's tail at Epsilon (ϵ) Piscium. Look $2\frac{1}{2}^\circ$ south-southeast of Epsilon for an equilateral triangle of stars made up of 73, 77, and 80 Piscium. From here, move about 4° south to 26 Ceti. Be careful not to confuse it with 29 Ceti, which is more to the east-northeast. IC 1613 is $47'$ north of 26 Ceti and just $11'$ south of an orangish 7th-magnitude sun, SAO 109653.

The galaxy's large apparent size conspires with its low surface brightness to make this such a difficult catch. In order to squeeze it all into a single eyepiece field, we need to use low power. But low power also lowers image contrast. Higher

magnifications boost contrast, but reduce the field size too much. It's a vicious circle that requires experimentation to solve. In my 18 inch (46 cm), I have found the best compromise to be a 22-mm Tele Vue Panoptic eyepiece that yields 94x and a real field measuring 42' in diameter.

With that combination, I can make out that the northeastern section is slightly brighter than the region toward the southwest, but beyond that, I see no distinct boundaries. Instead, the galaxy just diffuses softly into the background.



Above: Sketch of IC 1613 as seen through the author's 18-inch (46-cm) Newtonian reflector at 94x.

Photographs, such as the great image below by CN'er [George Simon](#), show that IC 1613's internal structure is both loosely and poorly organized. Outwardly, it resembles [Barnard's Galaxy, NGC 6822](#), although its total mass is far less. IC 1613 has an estimated mass equal to just 80 million Suns. By comparison, NGC 6822 has a mass equal to 130 million Suns. Like that summertime object, IC 1613 is designated as a dwarf barred irregular, a strangely bloated mishmash highlighted by an axial "bar" across its core. There is also the subtle suggestion of spirality, with a gently curving extension tapering away from a jumbled core.

A brighter northeastern segment corresponds to a region populated with blue-giant stars distributed among more than two dozen stellar associations. The galaxy also contains more than two dozen very small star clusters, as well as a dozen

small nebulae. Under extraordinary conditions the largest scopes may be able to just resolve some of these distant deep-sky objects, as well as several background galaxies shining through IC 1613 itself.

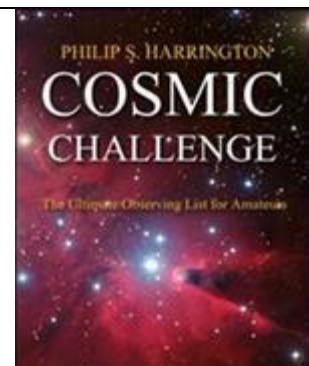


Above: A wonderful image of IC 1613 taken with a TPO/GSO 6" f/6 Imaging Newtonian and Nikon D5300 camera.
Credit: George Simon. Visit his [Astrobin page](#) for more information about this and his other great images.

Don't get too full of yourself if you see IC 1613 through your "big" telescope, however. Arizona astronomer Brian Skiff has seen it through his 2.8-inch (7.1-cm) refractor, while super-eyed Steve O'Meara reports an observation of IC 1613 through his 4-inch (10.2-cm) refractor from a high-altitude site in Hawaii.

Have a favorite challenge object of your own? I'd love to hear about it, as well as how you did with this month's test. Contact me through my [website](#) or post to this month's discussion forum.

Until next month, when we take an even deeper dive into the Local Group, remember that half of the fun is the thrill of the chase. Game on!



About the Author:

Phil Harrington writes the monthly [Binocular Universe](#) column in [Astronomy](#) magazine and is the author of 9 books on astronomy. Visit his web site at www.philharrington.net to learn more.

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Observatory and Planetarium Events



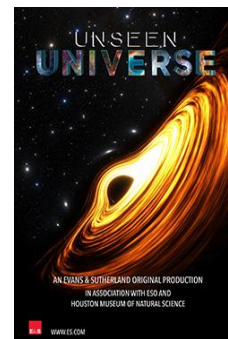
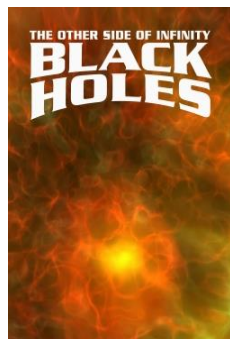
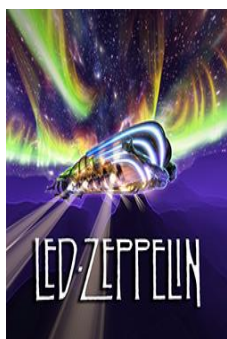
Centennial Observatory Upcoming Events

Event	Place	Date	Time	Admission
Total Lunar Eclipse	Centennial Observatory	Tuesday, November 8 th , 2022	1:45 to 6:00 AM	FREE
Telescope Tuesday	Centennial Observatory	Tuesday, November 8 th , 2022	6:00 to 9:00 PM	\$1.50 or free with Faulkner Planetarium admission
Monthly Free Star Party	Centennial Observatory	Saturday, November 12 th , 2022	6:00 to 9:00 PM	FREE
Telescope Tuesday	Centennial Observatory	Tuesday, November 22 nd , 2022	6:00 to 9:00 PM	\$1.50 or free with Faulkner Planetarium admission

Faulkner Planetarium



[Now Showing!](#)



Note: There are more shows for the Planetarium. To learn more and find show times visit the [Now Showing](#) link above.



About the Magic Valley Astronomical Society

Visit the Herrett Center [Video Vault](#)

Magic Valley Astronomical Society

550 Sparks St.
Twin Falls, ID

The Magic Valley Astronomical Society (MVAS) was founded in 1976. The Society is a non-profit [501(c) 3] educational and scientific organization dedicated to bringing together people with an interest in astronomy.

In partnership with the Centennial Observatory, Herrett Center, College of Southern Idaho - Twin Falls; we hold regularly scheduled monthly meetings and observation sessions, at which we share information on current astronomical events, tools and techniques for observation, astrophotography, astronomical computer software, and other topics concerning general astronomy. Members enthusiastically share their telescopes and knowledge of the night sky with all who are interested. In addition to our monthly public star parties we hold members only star parties at various locations throughout the Magic Valley.

MVAS promotes the education of astronomy and the exploration of the night sky along with safe solar observing through our public outreach programs. We provide two types of outreach; public star parties and events open to anyone interested in astronomy, and outreach programs for individual groups and organizations (e.g. schools, churches, scout troops, company events, etc.), setting up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations. Donations enable us to continue and improve our public outreach programs.

Membership is not just about personal benefits. Your membership dues support the work that the Magic Valley Astronomical Society does in the community to promote the enjoyment and science of astronomy. Speakers, public star parties, classes and support for astronomy in schoolrooms, and outreach programs just to name a few of the programs that your membership dues support.

Annual Membership dues will be:

\$20.00 for individuals, families, and \$10.00 for students.

Contact Treasurer Jim Tubbs for dues information via e-mail: jtubbs015@msn.com

Donations to our club are always welcome and are even tax deductible. Please contact a board member for details.

Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President [Gary Leavitt](#), for more information on these and other benefits.



Telescopes are an individual thing and not practical for public use. However, everyone should have the experience of a good look at the moon for at least 5 minutes in their life time. It is a dimension and feeling that is unexplainable. Pictures or TV can't give this feeling, awareness, or experience of true dimension. A person will not forget seeing our closest neighbor, the moon.

Norman Herrett in a letter to Dr. J. L. Taylor, president of the College of Southern Idaho, Twin Falls, ID, USA.