Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, January 14th 2017
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho.

Public Star Party Follows at the Centennial Observatory

Club Officers

Robert Mayer, President
mayerrbrt@gmail.com
208-312-1203

Tim Frazier, Vice President
fraztimo@gmail.com

Gary Leavitt, Secretary
leavittg@cableone.net
208-731-7476

Jim Tubbs, Treasurer / ALCOR
jtubbs015@msn.com
208-404-2999

David Olsen, Newsletter Editor
editor@mvastro.org

Rick Widmer, Webmaster
rick@developersdesk.com

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

Colleagues,

It's time for our annual telescope clinic, where Tom Gilbertson shows off scopes and teaches beginners that those new scopes can indeed be worth their time. This is a good time to bring in a friend who received a telescope for Christmas or found one in the attic. With that in mind, we ask you to set aside 7 p.m., Saturday, Jan. 14, for the clinic in the Rick Allen Room in the Herrett Center.

In addition, we are still taking reservations for the Lodge at the City of Rocks. Cost is $20 per member, and if the skies don't cooperate, there will be other activities. This one is set for Friday, Feb. 24. Please contact a member of the board to get your reservation in.

Until then,
Clear Views,
Rob Mayer

Calendar for January

un	Mon	Tue	Wed	Thu	Fri	Sat
1 New Year's Day 	2	3	4	5 First Quarter 47% Visible Age: 7-days 	6	7
8	9	10	11	12 Full Moon 100% Visible Age: 14-days 	13	14
15	16 Martin Luther King Day	17	18	19 Last Quarter Visible 55% Age: 21-Days 	20	21
22	23	24	25	26	27	28 New Moon Lunation 1164 1% Visible 
29	30	31				

Celestial Calendar

The Sky This Month – January 2017

1/1 Mars is 0.02 degree south of Neptune
1/2 Venus is 1.9 degrees south of the Moon; the Moon is at the descending node
1/3 Neptune is 0.4 degree south of the Moon, with an occultation visible from the west coast of North America, at 4:00; Mars is 0.2 degree south of the Moon, the peak of the Quadrantid meteor shower
1/4 The latest sunrise of 2017 at latitude 40 degrees north occurs today; the Earth is at perihelion (147,100,998 kilometers or 91,404,322 miles distant from the Sun)
1/6 Uranus is 3.0 degrees north of the Moon
1/7 The latest onset of morning twilight of 2017 at latitude 40 degrees north occurs today; Pluto is in conjunction with the Sun
1/8 Mercury is stationary in right ascension
1/9 Mercury is 6.7 degrees north of Saturn; the Moon is 0.4 degree north of the first-magnitude star Aldebaran (αTauri),
1/10 The Moon is at perigee, subtending 32' 54" from a distance of 363,238 kilometers (225,706 miles)
1/12 Jupiter is at western quadrature today; Full Moon (known as the Ice Moon) occurs in Gemini; Venus is at greatest eastern elongation (47.1 degrees)
1/13 Venus is 0.4 degree north of Neptune; the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer is 3.9° north of the Moon
1/14 Venus is at dichotomy (50% illumination) today
1/15 The Moon is 0.8 degree south of the first-magnitude star Regulus (Alpha Leonis); the Moon is at the ascending node
1/18 Asteroid 4 Vesta (magnitude +6.2) is at opposition
1/19 Jupiter is 3.0 degrees south of the Moon; Mercury is at greatest western elongation (24.1 degrees)
1/22 The Moon is at apogee, subtending 29'31" from a distance of 404,914 kilometers (251,602 miles)
1/24 Saturn is 4.0 degrees south of the Moon
1/26 Mercury is 4.0 degrees south of the Moon
1/29 The Moon is at the descending node
1/30 Neptune is 0.2 degree south of the Moon,
1/31 Jupiter is 3.5 degrees north of the first-magnitude star Spica; Venus is 4.0 degrees north of the Moon.

Johannes Hevelius (1611-1687) was born this month.

Galileo Galilei discovered Io, Europa, and Callisto on January 7, 1610. He discovered Ganymede on January 13, 1610. William Herschel discovered Titania and Oberon, two satellites of Uranus, on January 11, 1787. Giuseppe Piazzi discovered the first asteroid, 1 Ceres, on January 1, 1801.

The Apollo 1 Disaster happened on January 27th 1967

The Space Shuttle Challenger Disaster happened on January 28th 1986

NASA New Horizons launched for Pluto on January 19th 2006 and took almost 10-years to fly-by Pluto.

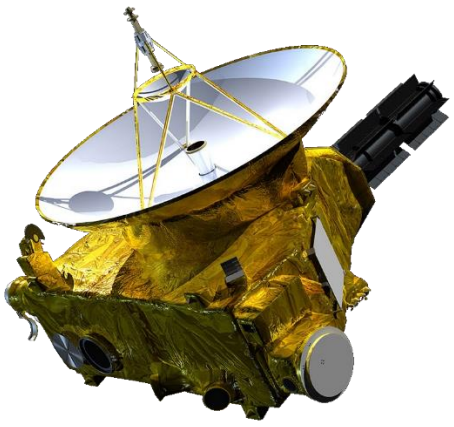


Image: New Horizons Spacecraft Source NASA

The Sun, the Moon, & the Planets

The Moon is 2.7-days old, is illuminated 7.2%, subtends 30.6 arc minutes, and is located in Capricornus on January 1st at 0:00 UT. The Moon is at perigee on January 10th and at apogee on January 22nd. New Moon occurs on January 28th. The Moon occults Neptune and Mars from certain parts of the world this month. The waxing gibbous Moon occults the fourth-magnitude star Gamma Tauri in the early morning of January 9th.

Times and dates for the lunar light rays predicted to occur are available at http://www.lunar-occ...o/rays/rays.htm

The Sun is located in Sagittarius on January 1st. It enters Capricornus on January 25th.

Data (magnitude, apparent size, illumination, and distance from the Earth in astronomical units) for the planets and Pluto on January 1: Mercury (+3.3, 9.8", 5%, 0.68 a.u., Sagittarius), Venus (-4.4, 21.7", 57%, 0.77 a.u., Aquarius), Mars (+0.9, 5.7", 90%, 1.64 a.u., Aquarius), Jupiter (-1.9, 35.5", 99%, 5.55 a.u., Virgo), Saturn (+0.5, 15.2", 100%, 10.97 a.u., Ophiuchus), Uranus (+5.8, 3.5", 100%, 20.01 a.u. on December 16th, Pisces), Neptune (+7.9, 2.2", 100%, 30.65 a.u. on December 16th, Aquarius), Pluto (+14.3, 0.1", 100%, 33.22 a.u. on December 16th, Sagittarius).

During the evening, Venus, Mars, and Neptune lie in the southwest and Uranus in the south. At midnight, Uranus is in the west. Mercury and Saturn can be seen in the southeast and Jupiter in the south in the morning.

Jupiter and Saturn will not be occulted by the Moon this year.

Mercury grows brighter (magnitude +3.3 to magnitude -0.2) as it shrinks in apparent size (9.8 arc seconds to 5.6 arc seconds) but waxes in phase (5% illumination to 80% illumination) during the course of the month. The speediest planet should be visible to the lower left of Saturn after January 5th. The gap between the two planets shrinks to 7 degrees by January 9th.

Venus increases in brightness from magnitude -4.4 to magnitude -4.7 this month. It passes 0.4 degree north of Neptune on January 13th. The brightest planet lies two degrees south of the Moon on January 2nd and four degrees north of the Moon on January 31st. The gap between Venus and Mars decreases to 5.5 degrees by January 31st.

Earth is 0.9833 a.u. distant from the Sun at perihelion on January 4th. On that date, it's about 3% (5.0 million kilometers or 3.1 million miles) closer to the Sun than at aphelion in July.

Mars grows smaller and dimmer in January. The Red Planet exhibits a gibbous phase this month. Mars (5.7 arc minutes) and Neptune (2.2 arc minutes) experience an extremely close conjunction on the night of December 31st-January 1st. Mars departs Aquarius and enters Pisces on the night of January 18th-January 19th. Mars (magnitude +1.1), Venus (magnitude -4.7), and the young crescent Moon form a compact triangle on the evening of January 31st.

Jupiter's disk increases in size by 3.4 arc seconds to 38.9 arc seconds. It brightens from magnitude -19.2 to magnitude -2.1. The waning gibbous Moon passes 3.0 degrees north of Jupiter on the evening of January 19th. Shadow transits by Io take place on January 6th starting at 5:24 a.m. EST (10:24 UT) and January 15th starting at 1:45 a.m. EST (6:45 UT). A shadow transit by Europa occurs on January 18th beginning at 1:12 a.m. EST (6:12 UT). On the morning of January 22nd, Callisto is south of Jupiter. Galilean satellite events is available online http://www.shallowsky.com/jupiter/

Saturn rises 90 minutes before sunrise on January 1st and three hours before sunrise on January 31st. At the end of the month, the planet's disk subtends almost 16 arc seconds and its rings span 35 arc seconds. (Saturn's rings are 2.27 times larger in extent than the planet's equatorial diameter.) Saturn lies four degrees south of the Moon on January 24th.

Uranus can be found 0.6 degree east of the fifth-magnitude star Zeta Piscium on January 1st. By month's end, it's situated 1.0 degree east of that star. Uranus sets around local midnight this month.

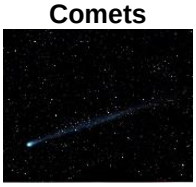
Neptune is located 0.5 degree west-southwest of Mars on January 1st and 0.4 degree south of Venus on January 12th. The eighth planet lies 2.1 degrees southwest of the fourth-magnitude star Lambda Aquarii on January 1st. By January 31st, Neptune is within 1.3 degrees of that star.

Pluto is in conjunction with the Sun on January 7th.

Asteroids

Asteroid 4 Vesta (magnitude +6.2) reaches opposition on the night of January 17th-January 18th. The third-largest main belt asteroid starts the month in Cancer to the east of the sixth-magnitude star Mu Cancri and ends it in Gemini 0.7 degree east-northeast of the fourth-magnitude star Kappa Geminorum. Asteroid 13 Egeria (magnitude +10.1) reaches opposition on January 8th and 21 Lutetia (magnitude +10.9) on January 11th.

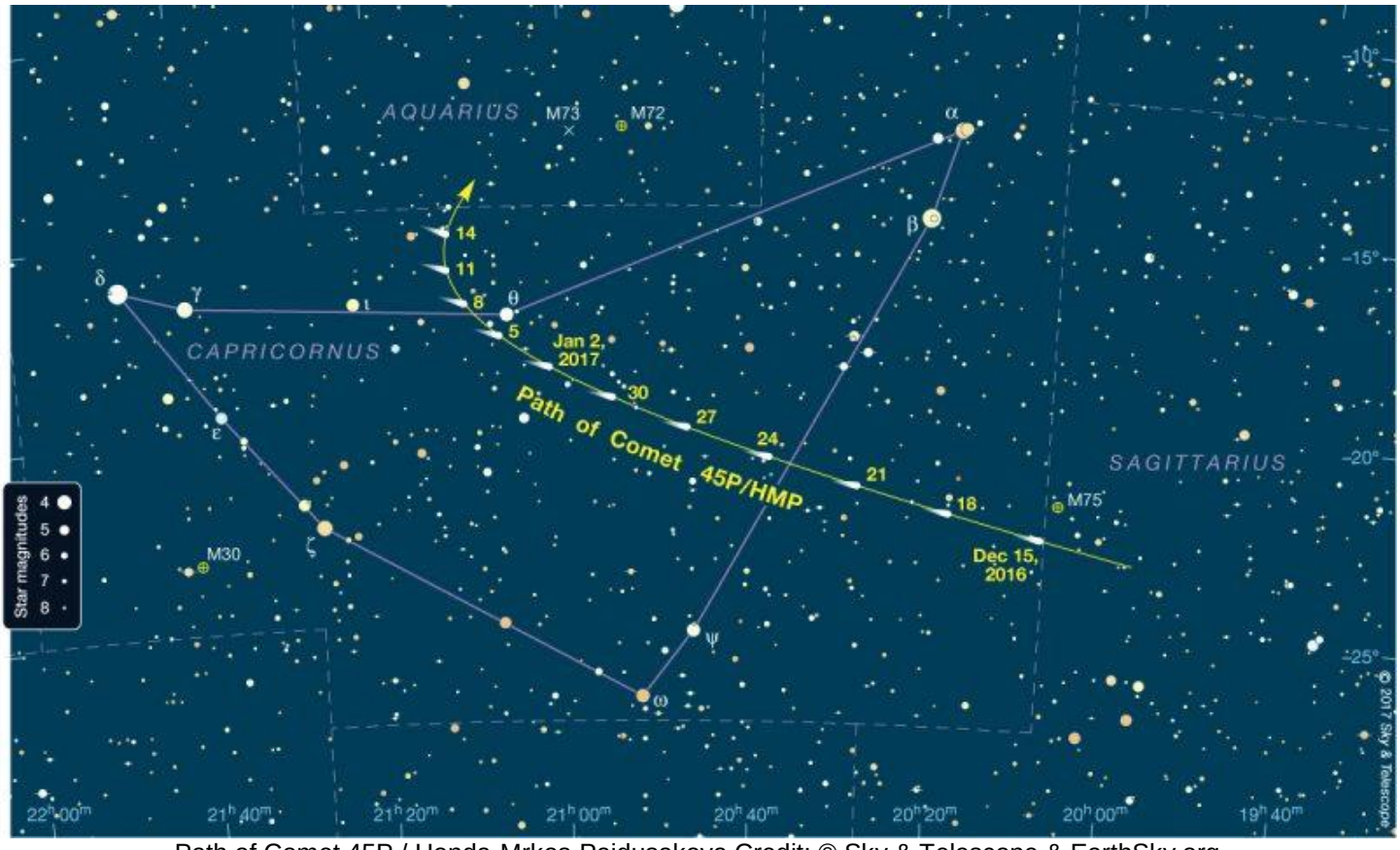
Comets



Periodic comet 45P/Honda-Mrkos-Pajdusakova is a short-period (5.26 years) comet that will be well-positioned for evening viewing in the New Year. It's predicted to exhibit a double peak in brightness, with the first being around Jan. 4 at mag. 7.1, and the second in late February at mag. 6.5.

On Saturday evening (New Year's Eve) it will be at perihelion, sitting just 3° to the lower left of the thin (8%) waxing crescent moon, in Capricornus, and setting at 7:45 PM. It will be setting in brighter twilight each day that follows, as it swings north of the sun into the morning sky, popping up in dark (pre-twilight) skies in Aquila in the first week of February. From there it takes off, zipping from E to W into darker skies, passing almost through our local zenith at the start of morning twilight (6:00 AM) on Feb. 13.

Comet C/2016 U1 NEOWISE may brighten to sixth magnitude in mid-January. It will pass near the globular M14 in Ophiuchus on January 3rd, the third-magnitude star Nu Ophiuchi on January 7th, M16 (the Eagle Nebula) in Serpens Cauda on Jan 10th, M17 (the Swan Nebula) in Serpens Cauda, and the open cluster M25 in Sagittarius on Jan 13th.



Path of Comet 45P / Honda-Mrkos-Pajdusakova Credit: © Sky & Telescope & EarthSky.org

Meteors

The Quadrantid meteor shower peaks on January 3rd. The Moon will not interfere with watching the peak of the shower this year. The Quadrantid shower can sometimes reach zenithal hourly rates of more than 100 meteors per hour. The radiant of the Quadrantids lies at the junction of the constellations of Boötes, Hercules, and Draco, in what was once called Quadrans Muralis. The near-Earth asteroid 2003 EH1, which may be an extinct comet, is believed to be the source of these meteors browse http://meteorshowers...uadrantids.html and http://earthsky.org/?p=4287 for more on the Quadrantids.

Carbon Star

January Carbon star: R Leporis (Hind's Crimson Star) Right Ascension: $04^h\ 59^m\ 36.3487^s$ Declination: −14° 48′ 22.518″

The Deep Sky

Seventy deep-sky objects for January: B26-28, B29, M36, M37, M38, NGC 1664, NGC 1778, NGC 1857, NGC 1893, NGC 1907, NGC 1931 (Auriga); IC 361, Kemble 1 (Kemble's Cascade asterism), NGC 1501, NGC 1502, NGC 1530, NGC 1569 (Camelopardalis); NGC 1507, NGC 1518, NGC 1531, NGC 1532, NGC 1535, NGC 1537, NGC 1600, NGC 1637, NGC 1659, NGC 1700 (Eridanus); IC 418, M79, NGC 1832, NGC 1888, NGC 1964 (Lepus); B33, Cr65, Cr69, Cr70, IC 434, M42, M43, M78, NGC 1662, NGC 1973-75-77, NGC 1981, NGC 1999, NGC 2022, NGC 2023, NGC 2024, NGC 2112 (Orion); Be11, NGC 1491, NGC 1496, NGC 1499, NGC 1513, NGC 1528, NGC 1545, NGC 1548, NGC 1579, NGC 1582, NGC 1605, NGC 1624 (Perseus); DoDz3, DoDz4, M1, Mel 25, NGC 1514, NGC 1587, NGC 1647, NGC 1746, NGC 1807, NGC 1817 (Taurus)

Top ten binocular deep-sky objects for January: Cr65, Kemble 1, M36, M37, M38, M42, NGC 1528, NGC 1647, NGC 1746, NGC 1981

Top ten deep-sky objects for January: M1, M36, M37, M38, M42, M43, M78, M79, NGC 1501, NGC 2024

Challenge deep-sky object: IC 2118 (Eridanus) the Witch Head Nebula RA: $05^h\ 02^m\ 00.00^s$ Dec: −07° 54′ 00

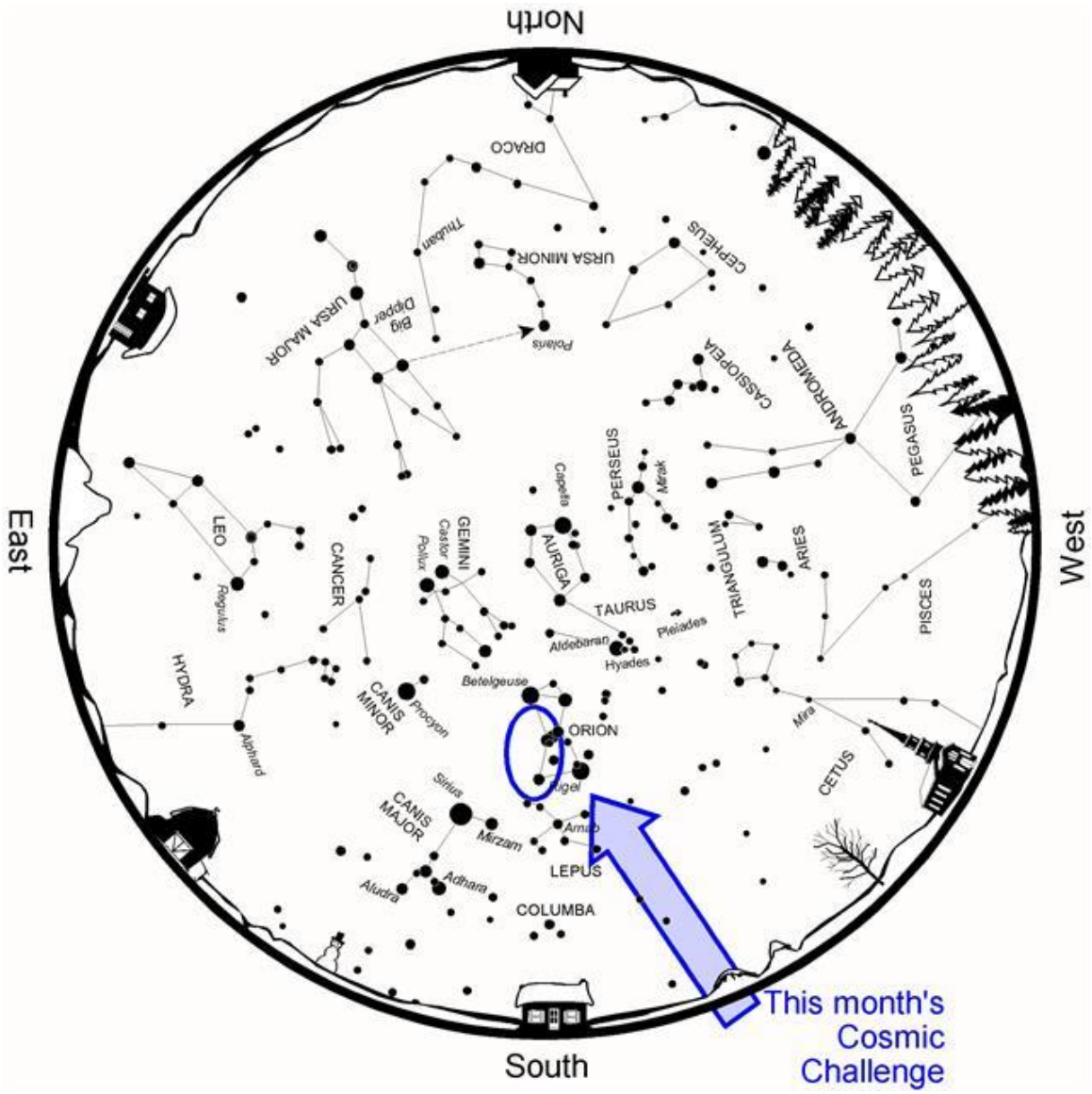
ISS

Information on Iridium flares and passes of the ISS, the Tiangong-1, the USAF's X-37B, the HST, and other satellites can be found at http://www.heavens-above.com/

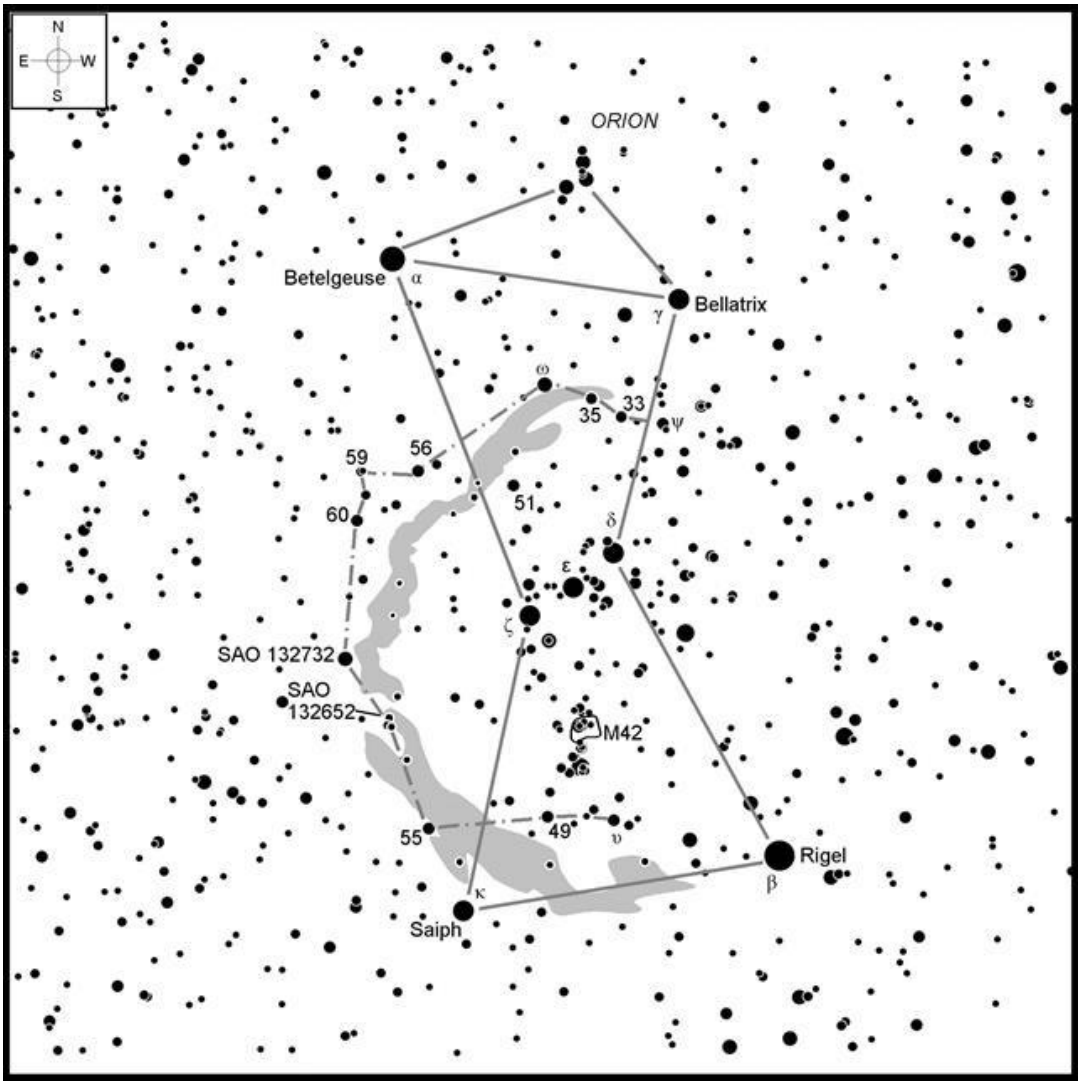
Current information on solar system celestial bodies is posted at http://www.curtrenz.com/astronomy.html and http://nineplanets.org/

Phil Harrington's Cosmic Challenge

One of the greatest naked-eye challenges goading amateur astronomers around the world is trying to spot the elusive arc of nebulosity known as **Barnard's Loop**. Cataloged officially as Sharpless 2-276, Barnard's Loop is a ghostly, 10°-wide semicircular bow of nebulosity that wraps around the eastern side of Orion, the Hunter. In long exposure photographs, it bears the unmistakable resemblance to portions of the Veil Nebula supernova remnant in Cygnus. Spotting it by eye stands as a monumental test for observers.



Above: Winter star map. ***Credit:*** *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.

Although named for the renowned American astronomer Edward Emerson Barnard (1857–1923), who described the scene he captured on photographs made in October 1894 as a "great nebula extending in a curved form over the entire body of Orion," Barnard was not the first person to glimpse the Loop. Records show that Barnard's Loop was discovered visually by Sir William Herschel. Herschel published observations of 52 broad regions of the sky that he thought contained traces of nebulosity. The region around Barnard's Loop is listed as Area 27 and is centered at Right Ascension 05h 48.3m, Declination +01° 09.9'. Practicing an economy of words, Herschel simply described his 27th entry as "affected with milky nebulosity."

Few confirming observations were made of Herschel's 52 nebulous regions, igniting a debate over their existence that raged in certain astronomical circles for more than a century. While some of Herschel's 52 regions have subsequently been proven false, Barnard's images of Area #27 left little doubt about its existence.

Debate over Herschel's Area #27 continues to this day, but now, it revolves around seeing the Loop by eye. Many amateurs have noted sections of the Loop through surprisingly small apertures, ranging in size from 50-mm binoculars to 3- to 5-inch telescopes. But can Barnard's Loop be seen by eye alone? It certainly is large enough, spanning the height of Orion's star-studded torso. Is it too faint, or more correctly, too red for the human eye to detect?

The answer is "no;" it can and has been glimpsed without optical aid. But there are a few caveats.

I have read many accounts of observers claiming to have seen Barnard's Loop by eye, but I suspect many of them are false. That's not to say the observers are falsifying what they saw. I don't doubt their honesty in the least.

But from their descriptions, I suspect that they did not see the real Loop, but rather a string of faint stars that follow very nearly the same path through Orion. The False Loop is formed by 10 stars that shine between magnitude 4.5 and 5. The illusion begins north of the Belt stars at Psi (Ψ) Orionis, and then hooks counterclockwise around the Belt, connecting the stars 33, 38, Omega (ω), 56, and 60 Orionis. The False Loop then winds to the southwest, linking the faint stars SAO 132732, and 55, 49, and Upsilon (υ) Orionis as it curves between Orion's Sword and the stars Saiph and Rigel. Although

these stars are widely separated, as evidenced on the chart above, the brain tends to play tricks on us when we're not careful. Rather than interpret the False Loop as a series of faint stars, our eye-brain system tends to fill in empty gaps to create a single image, especially at low light levels. This optical illusion is caused by our psychological tendency to connect indistinct features into some sort of comprehensible whole, and is exactly why Percival Lowell saw straight canals crisscrossing Mars.

In order to see the real Barnard's Loop, several factors have to come together. First, a clear, dark night free of any trace of moonlight, haze, and clouds is an absolute must. Light pollution, especially in the direction of Orion, is also a no-no. It is best to wait for Orion to be highest in the sky, to further remove any terrestrial interference. You, the observer, should be seated or lying down; standing will only cause eye strain and interference. The best solution would be to lie a chaise lounge tilted so that you are looking at Orion more or less straight on. You also need to know the point where your eyes' peripheral vision is most sensitive. Review the discussion in chapter 1 for further thoughts.

If you have them available, try narrowband and Hydrogen-Beta filters to improve image contrast. If possible, hold identical filters in front of both eyes simultaneously to take advantage of binocular vision. Some observers report good results with these, but Oxygen-III filters seem to offer little benefit.

Start with the Loop's brightest segment, which lies just south of 56 Orionis and ends just west of SAO 132732. If you spot that segment successfully, see if you can extend it toward the region in between 56 and 51 Orionis. Try staring toward the Belt stars, while focusing your peripheral vision toward SAO 132732. Okay, take a breath. Unfortunately, the southern half of Barnard's Loop is quite a bit fainter than the northern half. To spot the segment lying between Saiph (Kappa [κ] Orionis) and Rigel (Beta [β] Orionis) try blocking both stars with your fingers using the "V for Victory" sign. Doing so just might make you victorious.

Above: Barnard's Loop. ***Credit:*** *Kevin Dixon*

Until next month, remember that half of the fun is the thrill of the chase.

Big Science in Small Packages

By Marcus Woo

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS ("minks") is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares – eruptions on the sun that produce dramatic bursts of energy and radiation. Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes, researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

The $1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017. MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

UK Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE — short for CubeSat investigating Atmospheric Density Response to Extreme driving - built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA.

Centennial Observatory and Faulkner Planetarium

Herrett Telescope CSI Centennial Observatory

Event	Place	Date	Time	Admission
Twin Falls Parks & Recreation "Cabin Fever Day" Solar Viewing	Centennial Observatory	Saturday, January 7th, 2017	11:00 AM to 2:00 PM	FREE
Telescope Tuesday	Centennial Observatory	Tuesday, January 10th, 2017	6:15 to 9:00 PM	$1.50 or free with Faulkner Planetarium admission
Monthly Free Star Party	Centennial Observatory	Saturday, January 14th, 2017	6:15 PM to midnight	FREE
Telescope Tuesday	Centennial Observatory	Tuesday, January 24th, 2017	6:30 to 9:00 PM	$1.50 or free with Faulkner Planetarium admission

Faulkner Planetarium Show Times

To find out what shows are available, and to view trailers click this link:
Now Showing

About the Magic Valley Astronomical Society

Magic Valley Astronomical Society
P.O. Box 445
Kimberly, ID, USA 83341

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, $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.

Membership Benefits:
Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President Robert Mayer, 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 circa 1980.