Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

December 2020

MVAS President's Message

Membership Meeting See President's Message for December

Centennial Observatory Due to the need to maintain social distance during the Covid-19 pandemic, access to the observatory dome is one small group at a time.

> 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

Colleagues,

It is argued that one cannot fight the weather. However, we have learned that we can adapt and deal with it. The weather was indeed a challenge to the Dec. 21st Jupiter-Saturn conjunction. I was at the Herrett Center with Chris Anderson that day, and the two planets stayed behind the clouds until the very last moment. Even in that case, I was unable to image the two because the battery on my laptop went out. However, because the two still stayed close, I was able to do some imaging the next day, but again the wind and clouds weakened the images.

Not only does astronomy give us the opportunity to learn to adapt, but it also requires us to take a longer perspective. Too often, I get wrapped up with what dim planetary nebula a high-power eyepiece in a large aperture telescope can look like at that moment, but I often forget that astronomy is just as pleasurable at wider fields of view over longer periods of time. Stepping outside in the evening to watch the two planets come together and then separate over the past four five weeks has been not only fascinating to watch, but a reminder to disconnect from the instantconnection world we live in. If you ever need another slower moment like that, but don't have the time, get online and find out when Algol dims again.

Meanwhile, January is the time for the annual telescope clinic. Again, with COVID-19 restrictions, we're going to have to go with video. I will be sending out a meeting link later. While these Zoom meetings can be a challenge, I am looking forward to setting up this one, as I get to set up some telescopes and discuss. That will be at 7 p.m. Saturday, Jan. 9.

Lastly, I am a little nervous about writing this, but there were some significant steps forward in trying to get star parties to go live over Youtube or Facebook watch. I think we are one test away from finding out. Keep your fingers crossed.

Clear Views Rob Mayer

Calendar

January 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6 Last Quarter Moon Visible: 49%↓ Age: 22.24 Days	7	8	9 MVAS General Meeting see president's msg. for details Centennial Observatory Public Star Party 6:15p - 9p
10	11	12 Centennial Observatory Tuesday 6:15-9:00pm	13 New Moon Visible 0% Age: 0.32 Days	14	15	16
17	18	19	20 First Quarter Moon Visible 46% ↑ Age: 7.04 Days	21	22	23
24/31	25	26 Centennial Observatory Tuesday 6:45-9:00pm	27	28 Full Moon 12:18 pm Visible 100% Age: 14.46 Days Wolf Moon	29	30

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Be Careful - Be Safe - Get Out There - Explore Your Universe

November Celestial Calendar by Dave Mitsky

All times, unless otherwise noted, are UT (subtract 7 hours and, when appropriate, 1 calendar day for MST)

1/2 The Earth is at perihelion (147,093,463 kilometers or 91,399,454 miles distant from the Sun) at 13:51

1/3 The peak of the Quadrantid meteor shower (40 to 120 or more per hour) is predicted to occur at 14:30; the Moon is 4.5 degrees north of the first-magnitude star Regulus (Alpha Leonis) at 2:00

1/4 The latest sunrise of the year at latitude 40 degrees north occurs today

1/5 Mercury is at its southernmost latitude from the ecliptic plane (-7.0 degrees) at 9:00

1/6 Last Quarter Moon occurs at 9:37

1/7 The latest onset of morning twilight of the year at latitude 40 degrees north occurs today; the Moon is 6.4 degrees north-northeast of the first-magnitude star Spica (Alpha Virginis) at 0:00; the Curtiss Cross, an X-shaped clair-obscure illumination effect located between the craters Parry and Gambart, is predicted to begin at 7:08

1/9 The Moon is at perigee, subtending 32' 32" from a distance of 367,389 kilometers (228,284 miles), at 15:37 1/10 Mercury (magnitude -0.9) is 1.6 degrees southeast of Saturn (magnitude +0.6) at 5:00; the Moon is 5.4 degrees north-northeast of the first-magnitude star Antares (Alpha Scorpii) at 6:00; Mercury, Jupiter, and Saturn lie within a circle with a diameter of 2.4 degrees at 19:00; the Moon is at the descending node (longitude 259.7 degrees) at 20:00 1/11 Mercury (magnitude -0.9) is 1.4 degrees southeast of Jupiter (magnitude -1.9) at 19:00; the Moon is 1.5 degrees south of Venus at 21:00

1/12 Venus is at its southernmost declination (-23.2 degrees) at 6:00

1/13 New Moon (lunation 1201) occurs at 12:13; the Moon is 3.2 degrees southeast of Saturn at 23:00

1/14 The Moon, Mercury and Saturn lie within a circle with a diameter of 6.0 degrees at 0:00; the Moon, Jupiter, and Saturn lie within a circle with a diameter of 3.8 degrees at 0:00; the Moon is 3.3 degrees southeast of Jupiter at 3:00; the Moon, Mercury and Jupiter lie within a circle with a diameter of 4.0 degrees at 5:00; Pluto is in conjunction with the Sun (35.18 astronomical units from the Earth, latitude -1.2 degrees) at 7:00; the Moon is 2.3 degrees southeast of Mercury at 10:00; Uranus is stationary, with prograde (eastward) motion to commence, at 11:00

1/16 Venus is at the descending node through the ecliptic plane at 12:00

1/17 The Moon is 4.1 degrees southeast of Neptune at 10:00

1/19 The Sun enters Capricornus (ecliptic longitude 299.7 degrees) at 15:00; the Sun's longitude is 300 degrees at 21:00 1/20 The Lunar X (the Purbach or Werner Cross), an X-shaped clair-obscure illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be fully formed at approximately at 18:31; Mars (magnitude +0.2) is 1.6 degrees north-northwest of Uranus (magnitude +5.8) at 20:00; First Quarter Moon occurs at 21:02

1/21 The Moon is 3.1 degrees southeast of Uranus at 10:00; the Moon, Mars, and Uranus lie within a circle with a diameter of 4.6 degrees at 10:00; the Moon is 4.7 degrees southeast of Mars at 11:00; the Moon is at apogee, subtending 29' 33" from a distance of 404,360 kilometers (251,258 miles), at 13:11; asteroid 15 Eunomia (magnitude +8.4) is at opposition in Cancer at 19:00

1/22 Mars is 1.7 degrees north of Uranus at 0:00

1/23 The Moon is 5.7 degrees southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 10:00; asteroid 4 Vesta (magnitude +7.1) is stationary in Leo at 22:00

1/24 Mercury is at greatest eastern elongation (18.6 degrees) at 2:00; Saturn is in conjunction with the Sun at 3:00; the Moon is 4.0 degrees north of Aldebaran at 4:00; Mercury is at the ascending node through the plane of the ecliptic at 10:00; asteroid 14 Irene (magnitude +9.3) is at opposition in Cancer at 17:00; the Moon is at the descending node (longitude 79.1 degrees) at 22:00

1/26 The Moon is 0.3 degrees north-northeast of the bright open cluster M35 in Gemini at 0:00; Uranus is at eastern quadrature (90 degrees from the Sun) at 13:00

1/27 The Moon is 7.4 degrees south of the first-magnitude star Castor (Alpha Geminorum) at 11:00; the Moon is 3.8 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 16:00

1/28 The Moon is 2.6 degrees north-northeast of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 17:00; Full Moon (known as the Ice Moon, the Moon after Yule, the Old Moon, and the Wolf Moon) occurs at 19:16 1/29 Jupiter is in conjunction with the Sun (6.071 astronomical units from the Earth, latitude -0.63 degrees) at 2:00; Mercury is at perihelion (0.3075 astronomical units from the Sun) at 2:00

1/30 Mercury is stationary, with retrograde (western) motion to commence, at 2:00; the Moon is 4.4 degrees northnortheast of Regulus at 9:00



The Moon is 17.2 days old, is illuminated 97.0%, subtends 31.1 arc minutes, and is located in Gemini on January 1st at 0:00 UT. It attains its greatest northern declination for the month on January 27th (+24.8 degrees) and its greatest southern declination (-24.8 degrees) on January 12th. Longitudinal libration is at a maximum of +5.4 degrees on December 16th. It's at a minimum of -5.2 degrees on January 1st and -5.3 degrees on January 28th. Latitudinal libration is at a maximum of +6.7 degrees on January 17th and a minimum of -6.7 degrees on January 4th. Favorable librations for the following lunar features occur on the indicated dates: Crater Inghirami on January 3rd, Crater Kircher on January 8th, Crater Bel'Kovich on January 19th, and Crater Pingre on January 31st. The Moon is at perigee (distance 57.60 Earthradii) on January 9th and at apogee (distance 63.40 Earth-radii) on January 21st. The Maginus Lunar Sunrise Crater Light Ray is predicted to occur at 12:41 UT on January 21st. Browse http://www.lunar-occ...ota/iotandx.htm for information on lunar occultation events. Visit https://saberdoesthe...does-the-stars/ for tips on spotting extreme crescent Moons and http://www.curtrenz.com/moon06.html for Full Moon data. Consult http://time.unitariu...moon/where.html or download http://www.ap-i.net/avl/en/start for current information on the Moon. Visit https://www.fourmila.../lunarform.html for information on various lunar features and https://upload.wikim...tCZImsof8HUNAKI for a simple map of the Moon. See https://svs.gsfc.nasa.gov/4768 for a lunar phase and libration calculator and https://quickmap.lro...2vIBvAXwF1SizSg for the Lunar Reconnaissance Orbiter Camera (LROC) Quickmap. Click on https://www.calendar...ar/2021/january for a lunar phase calendar for this month. Times and dates for the lunar crater light rays predicted to occur this month are available at http://www.lunar-occ...o/rays/rays.htm

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

Mercury, Jupiter, and Saturn lie within a circle with a diameter of 2.4 degrees on January 10th. On the evening of January 13th (January 14th UT), the Moon, Mercury and Saturn lie within a circle with a diameter of 6.0 degrees, the Moon, Jupiter, and Saturn lie within a circle with a diameter of 3.8 degrees, and the Moon, Mercury and Jupiter lie within a circle with a diameter of 4.0 degrees. The Moon, Mars, and Uranus lie within a circle with a diameter of 4.6 degrees on January 21st.

Mercury is at its greatest heliocentric latitude south on January 5th. It returns to the evening sky at twilight after January 8th and is 1.6 degrees southeast of Saturn on January 10th. Mercury is 1.4 degrees southeast of Jupiter on January 11th. The speediest planet is located 2.3 degrees north of the young Moon on January 14th. Mercury is at greatest eastern elongation, the second best of 2021, on January 23rd (January 24th UT). Mercury sets about 90 minutes after the Sun and shines at magnitude -0.6 on that date. Mercury reaches perihelion on January 29th. On that date, it is also stationary and subsequently begins to retrograde.

Venus grows increasingly more difficult to observe at January progresses. It rises more than an hour before sunrise on January 1st but only about 30 minutes before the Sun rises as January ends. Venus lies between M8 (the Lagoon Nebula) and M20 (the Trifid Nebula) on the morning of January 9th. A slender waning crescent Moon passes 1.5 degrees south of the brightest planet on January 11th. Venus is at its southernmost declination on January 12th. The prominent globular cluster M22 lies 46 arc minutes south of Venus on January 15th.

Earth is 0.9833 a.u. distant from the Sun at perihelion on January 2nd. On that date, it's about 3% (5.0 million kilometers or 3.1 million miles) closer to the Sun than at aphelion on July 5th and about 2.7% closer to the Sun than on average.

Mars begins the month with a brightness of magnitude -0.2 and an apparent diameter of 10.4 arc seconds. It is illuminated 89% for the entire month. As January begins, Mars is near the sixth-magnitude star Pi Piscium. The Red Planet departs Pisces and enters Aries on January 5th. Mars passes within six degrees of the fourth-magnitude star Mesarthim (Gamma Arietis) on January 13th. Mars and Uranus are less than two degrees apart from January 18th to January 22nd. On January 21st, Mars is located 1.7 degrees due north of Uranus. The waxing gibbous Moon passes 4.7 degrees southeast of Mars on that date. At month's end, Mars shines at only magnitude +0.4 and subtends just 7.9 arc seconds.

Jupiter and Saturn are steadily growing apart since the historic conjunction on December 21st and are 1.3 degrees apart on January 1st. By January 7th, the two gas giant planets are separated by two degrees. The young crescent Moon passes 3.3 degrees southeast of Jupiter on January 14th. Jupiter is in conjunction with the Sun on January 29th.

Saturn can be seen during evening twilight until January 7th. The very young crescent Moon passes 3.2 degrees southeast of Saturn on January 13th. The Ringed Planet is in conjunction with the Sun on January 24th.

Uranus is located about half-way between fifth-magnitude star Xi Arietis and the sixth-magnitude 19 Arietis. The first planet to be discovered with a telescope reaches its second stationary point on January 14th. The waxing gibbous Moon passes 3.1 degrees southeast of Uranus on January 21st. Uranus is at eastern quadrature on January 26th. Visit http://www.nakedeyep....com/uranus.htm for a finder chart.

Neptune is located one degree east of the fourth-magnitude star Phi Aquarii. The waxing crescent Moon passes 4.1 degrees southeast of Neptune on January 17th. The eighth planet sets before 9:00 p.m. local time as January ends. Browse http://www.nakedeyep...com/neptune.htm for a finder chart.

Finder charts for Uranus and Neptune are also available online at https://skyandtelesc...W_WebFinder.pdf

See <u>http://www.curtrenz.com/uranep.html</u> for additional information on the two outer planets.



Asteroid 16 Psyche shines at tenth magnitude as it glides northwestward through Taurus about 1.5 degrees north of Aldebaran. Asteroids brighter than magnitude +11.0 that reach opposition this month include 15 Eunomia (magnitude +8.4), the largest stony asteroid, on January 21st, 14 Irene (magnitude +9.3) on January 24th, and 10 Hygiea (magnitude +9.9) on January 28th. See http://asteroidoccul.../2021_01_si.htm for information on asteroid occultation events taking place this month. Consult http://www.curtrenz.com/asteroids.html to learn more about a number of various asteroids.



During January, Comet 88P/Howell travels northeastward through Aquarius this month. The faint periodic comet passes relatively close to Neptune by the end of January. The fragmented Comet 141P/Machholz 2 heads towards Mira (Omicron Ceti) from the vicinity of Neptune this month. Comet 17P/Holmes, which brightened to second magnitude in 2007, lies to the west of Comet 88P/Howell. Visit <u>http://cometchasing.skyhound.com/</u> and <u>http://www.aerith.ne...t/future-n.html</u> for information on these and other comets visible this month.

A list of the closest approaches of comets to the Earth is posted at http://www.cometography.com/nearcomet.html



The Quadrantid meteor shower is predicted to peak around 9:30 a.m. EST (14:30 UT) on January 3rd. The radiant lies at the junction of the constellations of Boötes, Hercules, and Draco, in what was once called Quadrans Muralis, and is highest just prior to dawn. Unfortunately, a waning gibbous Moon will compromise the peak of this year's Quadrantids. The Quadrantid shower can sometimes reach zenithal hourly rates of more than 100 meteors per hour for a relatively short period of time. The near-Earth asteroid 2003 EH1, which may be an extinct comet, is believed to be the source of these meteors. See https://earthsky.org/?p=155137 and htttps://earthsky.org/?p=155137 and

Earth & Miscellaneous



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

A wealth of current information on solar system celestial bodies is posted at <u>http://nineplanets.org/</u> and <u>http://www.curtrenz.com/astronomy.html</u>

Information on the celestial events transpiring each week can be found at https://stardate.org/nightsky and http://astronomy.com/skythisweek and <a hre

An article titled Sky Highlights for 2021 appears on pages 48-50 of the January 2021 issue of Sky & Telescope.

Another article on some of the astronomical events taking place in the coming year can be found at <u>https://www.universe...he-coming-year/</u>

Free star maps for January can be downloaded at <u>http://www.skymaps.com/downloads.html</u> and <u>http://www.telescope...thly-Star-Chart</u>

Data on current supernovae can be found at http://www.rochesterastronomy.org/snimages/

Finder charts for the Messier objects and other deep-sky objects are posted at <u>https://freestarcharts.com/messier</u> and <u>https://freestarcharts.com/ngc-ic</u> and <u>https://www.cambridge.org/turnleft/seasonal_skies_october-december</u>

Telrad finder charts for the Messier Catalog and the SAC's 110 Best of the NGC are posted at http://www.custerobservatory.org/docs/messier2.pdf and http://sao64.free.fr/observations/catalogues/cataloguesac.pdf respectively.

Information pertaining to observing some of the more prominent Messier galaxies can be found at http://www.cloudynights.com/topic/358295-how-to-locate-some-of-the-major-messier-galaxies-and-helpful-advice-for-novice-amateur-astronomers/

Author Phil Harrington offers an excellent freeware planetarium program for binocular observers known as TUBA (Touring the Universe through Binoculars Atlas), which also includes information on purchasing binoculars, at http://www.philharrington.net/tuba.htm

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

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

Freeware sky atlases of varying "depth" can be downloaded at <u>http://www.deepskywatch.com/deep-sky-hunter-atlas.html</u> and <u>http://www.olle-eriksson.com/night-sky-maps/</u> and <u>https://allans-stuff.com/takis-8-5-magnitude-star-atlas/</u>

Click on <u>http://www.skyandtel...watching-tools/</u> for JavaScript utilities that will illustrate the positions of the five brightest satellites of Uranus and the position of Triton, Neptune's brightest satellite.

Deep Sky



Omicron2 (40) Eridani is a fourth-magnitude triple star system consisting of three dwarf stars: a type K1V yellow-orange dwarf [A] known as Keid, a type DA4 white dwarf [B], and a type M4.5e red dwarf [C]. Omicron is located about 16 light years from the Earth at 4h15m16.32s, -7°39'10.34". Ninth-magnitude Omicron B is the most easily visible white dwarf star and can be seen with an aperture of six inches.

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on January 3rd, 6th, 9th, 12th, 15th, 18th, 21th, 23rd, 26th, and 29th. The Demon Star is at minimum brightness for approximately two hours and is well-placed for observers in North America on the night of January 15th, centered at 2:12 a.m. EST. Minima can also be observed on the night of January 17th, centered at 11:01 p.m. EST, and on the evening of January 20th, centered at 7:50 p.m. EST. Consult page 50 of the January 2021 issue of Sky & Telescope for the times of the minima. See http://www.solstatio...ars2/algol3.htm for more on Algol.

One hundred and five binary and multiple stars for January: Omega Aurigae, 5 Aurigae, Struve 644, 14 Aurigae, Struve 698, Struve 718, 26 Aurigae, Struve 764, Struve 796, Struve 811, Theta Aurigae (Auriga); Struve 485, 1 Camelopardalis, Struve 587, Beta Camelopardalis, 11 & 12 Camelopardalis, Struve 638, Struve 677, 29 Camelopardalis, Struve 780 (Camelopardalis); h3628, Struve 560, Struve 570, Struve 571, Struve 576, 55 Eridani, Struve 596, Struve 631, Struve 636, 66 Eridani, Struve 649 (Eridanus); Kappa Leporis, South 473, South 476, h3750, h3752, h3759, Beta Leporis, Alpha Leporis, h3780, Lallande 1, h3788, Gamma Leporis (Lepus); Struve 627, Struve 630, Struve 652, Phi Orionis, Otto Struve 517, Beta Orionis (Rigel), Struve 664, Tau Orionis, Burnham 189, h697, Struve 701, Eta Orionis, h2268, 31 Orionis, 33 Orionis, Delta Orionis (Mintaka), Struve 734, Struve 747, Lambda Orionis, Theta-1 Orionis (the Trapezium), Theta-2 Orionis, Iota Orionis, Struve 750, Struve 754, Sigma Orionis, Zeta Orionis (Alnitak), Struve 790, 52 Orionis, Struve 816, 59 Orionis, 60 Orionis (Orion); Struve 476, Espin 878, Struve 521, Struve 533, 56 Persei, Struve 552, 57 Persei (Perseus); Struve 479, Otto Struve 70, Struve 495, Otto Struve 72, Struve 510, 47 Tauri, Struve 517, Struve 523, Phi Tauri, Burnham 87, Xi Tauri, 62 Tauri, Kappa & 67 Tauri, Struve 548, Otto Struve 84, Struve 562, 88 Tauri, Struve 572, Tau Tauri, Struve 598, Struve 623, Struve 645, Struve 670, Struve 674, Struve 680, 111 Tauri, 114 Tauri, 118 Tauri, Struve 730, Struve 742, 133 Tauri (Taurus)

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 for January: IC 2118 (Eridanus)

The objects listed above are located between 4:00 and 6:00 hours of right ascension.

NASA Night Sky Notes

This article is distributed by NASA Night Sky Network



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

Check Your Sky's Quality with Orion!

David Prosper

Have you ever wondered how many stars you can see at night? From a perfect dark sky location, free from any light pollution, a person with excellent vision may observe a few thousand stars in the sky at one time! Sadly, most people don't enjoy pristine dark skies – and knowing your sky's brightness will help you navigate the night sky. The brightness of planets and stars is measured in terms of **apparent magnitude**, or how bright they appear from Earth. Most visible stars range in brightness from 1st to 6th magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. A few stars and planets shine even brighter than first magnitude, like brilliant Sirius at -1.46 magnitude, or Venus, which can shine brighter than -4 magnitude! Very bright planets and stars can still be seen from bright cities with lots of light pollution. Given perfect skies, an observer may be able to see stars as dim as 6.5 magnitude, but such fantastic conditions are very rare; in much of the world, human-made light pollution drastically limits what people can see at night.

Your sky's **limiting magnitude** is, simply enough, the measure of the dimmest stars you can see when looking straight up. So, if the dimmest star you can see from your backyard is magnitude 5, then your limiting magnitude is 5. Easy, right? But why would you want to know your limiting magnitude? It can help you plan your observing! For example, if you have a bright sky and your limiting magnitude is at 3, watching a meteor shower or looking for dimmer stars and objects may be a wasted effort. But if your sky is dark and the limit is 5, you should be able to see meteors and the Milky Way. Knowing this figure can help you measure light pollution in your area and determine if it's getting better or worse over time. And regardless of location, be it backyard, balcony, or dark sky park, light pollution is a concern to all stargazers! How do you figure out the limiting magnitude in your area? While you can use smartphone apps or dedicated devices like a Sky Quality Meter, you can also use your own eyes and charts of bright constellations! The Night Sky Network offers a free printable Dark Sky Wheel, featuring the stars of Orion on one side and Scorpius on the other, here: <u>bit.ly/darkskywheel</u>. Each wheel contains six "wedges" showing the stars of the constellation, limited from 1-6 magnitude. Find the wedge containing the faintest stars you can see from your area; you now know your limiting magnitude! For maximum accuracy, use the wheel when the constellation is high in the sky well after sunset. Compare the difference when the Moon is at full phase, versus new. Before you start, let your eyes adjust for twenty minutes to ensure your night vision is at its best. A red light can help preserve your night vision while comparing stars in the printout.

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



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

Phil Harrington's Cosmic Challenge

Simeis '	147
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Monster scopes: 15-inch (38cm) and larger

Target	Туре	RA	DEC	Constellation	Mag	Size
Simeis 147	Supernova remnant	05h 39.0m	+28° 00.0'	Taurus		200'

The year 1054 must have been an active one for stargazers. That was the year that the famous Crab Nebula supernova blasted forth, shining brightly enough for Chinese and Native American skywatchers to note a "new star" blazing near what we now call the tip of one of Taurus the Bull's two horns. The 1054 supernova was so bright that it was visible in broad daylight during the summer of that year and remained visible to the naked eye for nearly a year. Today, we know the fading gaseous remnant of that all-consuming event as the Crab Nebula, M1.



Above: Evening star map. Credit: Map adapted from <u>Star Watch</u> by Phil Harrington.

Some 99,000 years earlier, another massive star in the Bull, just 7° north of the Crab underwent a similar detonation. Our earliest cave-dwelling ancestors could have been witnessed the explosive devastation first-hand if it was bright enough to reach naked-eye visibility, but there are no records to confirm that. The only evidence we have of that once mighty star is a filamentary debris field that continues to expand around ground zero.

None of the classical observers from the 18th and 19th centuries ever spotted those remains. Instead, the discovery of this ruptured bubble of star-splatter was made only recently, in 1952 by G.A Shajn and V.E. Hase at the <u>Crimean</u>

<u>Astrophysical Observatory</u> at Simeis, Russia. The tendrils of expanding nebulosity are so faint and so broad that it took the light-gathering ability of a 25" Schmidt camera to record their whisper. Today, we know it as Simeis 147, or S147. Some references, however, prefer to identify it as Sh2-240, for its entry in <u>Stewart Sharpless's 1959 catalog of HII</u> regions. You may know it by its nickname, the Spaghetti Nebula.



Call it what you will, this is one tough target. The biggest problem with seeing Simeis 147 visually is its huge size, more than 3° across. Can your 1scope cram 3° into a single field of view? Probably not. That's why we need a strategy for hunting down this tough object.

Most observers who have seen it report success after dividing the nebula into four or more regions, and then looking for those specific sections. Even with that approach, glimpsing a small portion of Simeis 147 takes a concentrated effort. Dark skies are also needed to see the full breadth of the clouds, but I have been able to spot the brightest section through my 18-inch (46cm) telescope under naked-eye limiting magnitude 5.0 skies using a low-power, wide-field eyepiece coupled with an O-III filter.





To zero in on Simeis 147, scan 3° due east of Elnath [Beta (β) Tauri], the northern horn. That puts you right in the thick of things, but there is nothing to see at that exact location. The brightest section, and the one that I spotted under 5th-magnitude skies, lies about a degree due south. Place 6th-magnitude SAO 77322 along the western edge of your eyepiece field and scan slowly to the east. With averted vision, look for a thin lane of nebulosity threading across the center of the field. The effect looks like a fainter, less structured version of the Veil Nebula in Cygnus. You might also a hint of the two branches that veer off to the north.

Another "bright" section of nebulosity is centered at right ascension 05h 43m, declination +28° 16', or about half a degree southeast of 8th-magnitude SAO 77397. You are in the right area if you see a square of four 8th- to 10th-magnitude stars surrounded by several fainter suns. The stars appear embedded in nebulosity, with a tuft extending about 10' further to the northwest of the square. Although it is invisible from my backyard, this section is fairly obvious through the same scope under darker skies, again with the O-III filter firmly in place. Without the filter, all bets are off.

A third segment, more intricate, but also more challenging than the other two, lies at right ascension 05h 44.5m, declination +28° 58'. Though only visible from truly dark sites, this portion hints at the true complexity of the entire cloud that we marvel at in photographs.

Finally, a fourth subdivision of the Simeis 147 complex lies across the border in southern Gemini, centered at right ascension 05h 39m, declination +29° 08', near 6th-magnitude SAO 77354. All we can hope for here is the faintest hint of an east-west lane of nebulosity, curving slightly to the southeast as it passes the star.

Few amateurs have seen, or perhaps have even tried to see, Simeis 147. But with a little patience, top-notch optics, and a good eye for fine detail, you just might surprised at not just seeing a dim hint of this once mighty star, but a patchwork of gossamer clouds interwoven throughout a starry backdrop.



About the Author: Phil Harrington writes the monthly <u>Binocular Universe</u> column in <u>Astronomy</u> magazine and is the author of 9 books on astronomy. Visit his web site at <u>www.philharrington.net</u> to learn more.

A revised, second printing of <u>Cosmic Challenge: The Ultimate Observing List for Amateurs</u> is now available with updated data tables and charts for finding various solar system objects, such as Pluto and Vesta, as well as improved renditions of the many eyepiece sketches that accompany each of the 187 challenges encompassing more than 500 individual objects. The book is available from <u>Amazon.com</u>.

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Simeis 147 Credit: Rogelio Bernal Andreo, via Wikimedia Commons

Observatory and Planetarium



The Herrett Center has re-opened, with <u>COVID-19 safety protocols</u> for your protection. Check out our <u>reopening video message</u> and we hope to see you soon!



Centennial Observatory Upcoming Events

Event	Place	Date	Time	Admission
Monthly Free Star	Centennial	Saturday, January 9 th ,	6:15 to 9:00	FREE
Party	Observatory	2021	PM	
Telescope Tuesday	Centennial	Tuesday, January 12 th ,	6:30 to 9:00	\$1.50 or free with <u>Faulkner Planetarium</u>
	Observatory	2021	PM	admission
Telescope Tuesday	Centennial	Tuesday, January 26 th ,	6:45 to 9:00	\$1.50 or free with <u>Faulkner Planetarium</u>
	Observatory	2021	PM	admission

Due to the need to maintain social distance during the Covid-19 pandemic, access to the observatory dome is one small group at a time. Contact the Herrett Center 208-732-6655 for more info.





Faulkner Planetarium Now Showing!



Visit the Herrett Center Video Vault



About the Magic Valley Astronomical Society

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.

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.