

Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

April 2020

Membership Meeting
Cancelled
Centennial Observatory
Closed
Faulkner Planetarium
Closed

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

MVAS President's Message

Colleagues,

CoVid-19 continues to be in the news, and it would be an understatement to say it has an impact on our lives. We worry about our health and our jobs, and even our interests in astronomy are challenged. The journal *Nature* has a couple of remarkable podcasts, one about weekly updates in science, and another they and I hope is temporary, called the CoronaCast, which shifts the focus from news in science in general to looks at the science of the virus, the response to it, and the processes impacted. This last Thursday, I listed to a podcast that featured interviews with scientists whose work has been shut down by the quarantines and orders. One who works with fruit flies had to find a way to bring his samples home to his family, while another who works with live animals was not allowed to tend to them, and was required to put them down.

That is indeed a sobering thought, far more sobering than any thought that usually accompanies this page. We as a group are well aware of how science works, and how seriously the researchers treat this. However, many of us are dealing with either the temptation to duck the restrictions or more directly, deal with those who blow this off. These temptations likely come from the challenge it is to distance ourselves socially – and physically. However, while it has its significant flaws, social media does have the potential to keep us connected, and over the past week, I have seen some remarkable connections. That is something to keep mind as I remind us that at this point, MVAS will not hold any formal gatherings this month. That doesn't mean that our connections need stop. We have already seen via E-mail and Facebook members' efforts to get out and capture the intertwining of the Pleiades and Venus. This should not be the last images we will see during this shuttering-in – there are two bright comets alone that should get our attention. While we have been asked to refrain from practicing astronomy in public, it doesn't mean we can't do it from our backyard.


At one point, this will all come to pass, and when it does, I look forward to meeting you all again and talking about what you shared with us from your backyard telescope or camera.

Clear Views,

Rob Mayer

Calendar

April 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			<div>1</div> <div>April Fools'</div> <div>  </div> <div>1st Quarter Moon</div>	<div>2</div>	<div>3</div>	<div>4</div>
<div>5</div>	<div>6</div>	<div>7</div>	<div>8</div> <div>Full Moon</div> <div>00:35H</div> <div>  </div> <div>Visible 100% Age: 15.52 Days Sprouting Grass</div>	<div>9</div>	<div>10</div>	<div>11</div> <div>MVAS Meeting Cancelled.</div> <div>Public Star Party Cancelled</div>
<div>12</div> <div>Easter</div> <div>  </div>	<div>13</div>	<div>14</div> <div>Last Quarter Moon</div> <div>  </div> <div>Visible: 49% ↓ Age: 22.23 Days</div>	<div>15</div>	<div>16</div>	<div>17</div>	<div>18</div>
<div>19</div>	<div>20</div>	<div>21</div>	<div>22</div> <div>Earth Day</div> <div>  </div>	<div>23</div> <div>New Moon</div> <div>  </div> <div>Visible 0% ↑ Age: 0.35 Days</div>	<div>24</div>	<div>25</div>
<div>26</div>	<div>27</div>	<div>28</div>	<div>29</div>	<div>30</div> <div>First Quarter Moon</div> <div>  </div> <div>Visible 47% ↑ Age: 7.03 Days</div>		

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

Celestial Calendar by Dave Mitsky

All times, unless otherwise noted, are UT (subtract four hours and, when appropriate, one calendar day for MDT)

4/1 First Quarter Moon occurs at 10:21

4/2 The Moon is 8.5 degrees south of the first-magnitude star Castor (Alpha Geminorum) at 4:00; the Moon is 4.9 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 8:00; asteroid 3 Juno (magnitude +9.7) is at opposition at 20:00

4/3 The Moon is 1.3 degrees north of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 7:00; Mercury is 1.4 degrees south of Neptune at 15:00; Venus is 0.3 degree south of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 20:00

4/4 Mercury (magnitude 0.0) is 1.3 degrees south-southeast of Neptune (magnitude +8.0) at 1:00; Venus (magnitude -4.4) passes 16 arc minutes southeast of Alcyone (magnitude +2.9) at 2:00; the Moon is 3.8 degrees north-northeast of the first-magnitude star Regulus (Alpha Leonis) at 22:00

4/7 The Moon is at its closest perigee of 2020, subtending 33' 29" from a distance of 356,907 kilometers (221,771 miles), at 18:09

4/8 The Martian autumnal equinox occurs at 1:00; the Full Moon, known as the Egg or Grass Moon, occurs at 2:35; the Moon is 6.7 degrees northeast of the first magnitude star Spica (Alpha Virginis) at 12:00

4/10 Venus is at its northernmost latitude from the ecliptic plane (3.4 degrees) at 18:00

4/11 The Moon is 6.4 degrees northeast of the first magnitude star Antares (Alpha Scorpii) at 15:00

4/13 The Moon is at the descending node (longitude 271.6 degrees) at 3:00

4/14 The Moon is 1.2 degrees south of the dwarf planet Pluto, with an occultation taking place in a portion of the Antarctic peninsula, at 22:00; Last Quarter Moon occurs at 22:56; the Moon is 2 degrees south of Jupiter at 23:00

4/15 Venus is 9.9 degrees north-northwest of the first magnitude star Aldebaran (Alpha Tauri) at 2:00; the equation of time is equal to 0 at 3:00; the Moon, Jupiter, and Saturn lie within a circle with a diameter of 5.5 degrees at 7:00; the Moon is 2.4 degrees southeast of Saturn at 11:00; Jupiter is at western quadrature (90 degrees from the Sun) at 11:00

4/16 Mercury is at its southernmost latitude from the ecliptic plane (-7.0 degrees) at 11:00; the Moon is 2.0 degrees south of Mars at 5:00; the Curtiss Cross, an X-shaped Clair-obscure illumination effect located between the craters Parry and Gambart, is predicted to be visible at 15:59

4/18 The Sun enters Aries (longitude 29.1 degrees on the ecliptic) at 17:00

4/19 The Moon is 3.9 degrees southeast of Neptune at 11:00; the Sun's longitude is 30 degrees at 15:00

4/20 The Moon is at apogee, subtending 29' 24" from a distance of 406,462 kilometers (252,564 miles), at 19:00

4/21 Saturn is at western quadrature (90 degrees from the Sun) at 7:00; the Moon is 3 degrees south of Mercury at 17:00

4/22 The peak of the Lyrid meteor shower (a zenithal hourly rate of 15 to 20 per hour) occurs at 6:00

4/23 New Moon (lunation 1204) occurs at 2:26; the Moon is 3.7 degrees southeast of Uranus at 10:00

4/24 The apparent brightness of Mars exceeds magnitude +0.5 today

4/25 Pluto is stationary in longitude, with retrograde (westward) motion to commence, at 5:00; the Moon is 6.6 degrees southeast of M45 at 10:00

4/26 Pluto is stationary in right ascension, with retrograde motion to begin, at 1:00; the Moon is 3.7 degrees north of Aldebaran at 3:00; Uranus is in conjunction with the Sun (20.811 astronomical units from the Earth, latitude -0.47 degree) at 9:00; the Moon is 0.1 degree north of asteroid 4 Vesta, with an occultation taking place in southern Japan, the Philippines, most of southeastern Asia, China, northern and central India, southern Kazakhstan, most of the Middle East, and central and northeastern Africa, at 11:00; the Moon is 5.9 degrees southeast of Venus at 18:00; the Moon is at the ascending node (longitude 90.3 degrees) at 18:00

4/27 The Moon is 0.8 degree southeast of the bright open cluster M35 in Gemini at 23:00; Venus is at greatest brilliancy (magnitude -4.7) at 18:00

4/29 The Moon is 8.3 degrees south of Castor at 10:00; the Moon is 4.6 degrees south of Pollux at 15:00

4/30 The Lunar X (also known as the Werner or Purbach 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 2:04; the Moon is 1.6 degrees north of M44 at 14:00; First Quarter Moon occurs at 20:38

Christiaan Huygens (1629-1695) was born this month.

Charles Messier discovered the open cluster M50 in Monoceros on April 5, 1772. Charles Messier discovered the spiral galaxy M58 in Virgo on April 15, 1772. Johann Koehler discovered the elliptical galaxies M59 and M60 in Virgo on April 11, 1779. Caroline Herschel discovered C/1790 H1 (Herschel) on April 18, 1790. The first photograph of the Sun was taken on April 2, 1845. The first radar signal was bounced off of the Sun on April 7, 1959. The Hubble Space Telescope was placed in orbit on April 25, 1990. The Compton Gamma Ray Observatory achieved orbit on April 7, 1991.

The Sun, the Moon, & the Planets



The Moon is 7.4 days old, is illuminated 43.8%, subtends 31.2', and is located in Gemini at 0:00 UT on April 1st. The Moon is at its greatest northern declination of +23.6 degrees on April 1st and +23.9 degrees on April 29 and its greatest southern declination of -23.8 degrees on April 14th. Longitudinal libration is at a maximum of +7.5 degrees on April 14th and a minimum of -8.0 degrees on April 2nd and -7.2 on April 30th. Latitudinal libration is at a maximum of +6.6 degrees on April 20th and a minimum of -6.5 degrees on April 7th. The Moon is at perigee on April 7th (at a distance of 55.96 Earth-radii) and at apogee on April 20th (at a distance 63.73 Earth-radii). The Moon will be at its closest to the Earth for the year on April 7th. Large tides will occur following the Full Moon on April 8th. New Moon occurs on April 22nd. The Last Quarter Moon, Jupiter, Saturn, and Mars form a 20-degree arc above the south-southeastern horizon on the morning of April 14th. The waning crescent Moon is positioned three degrees south of Saturn, with Jupiter to the upper right and Mars to the left, on the morning of April 15th. On April 26th, the waxing crescent Moon is positioned about four degrees from the third-magnitude star Zeta Tauri. The Moon occults Pluto on April 14th and asteroid 4 Vesta on April 26th from certain parts of the world. Consult <http://www.lunar-occ...ota/iotandx.htm> for information on 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. See <https://svs.gsfc.nasa.gov/4768> for a lunar phase and libration calculator and <https://svs.gsfc.nasa.gov/4768> for the Lunar Reconnaissance Orbiter Camera (LROC) Quickmap. Click on <https://www.calendar...ndar/2020/april> 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>

The Sun is located in Pisces on April 1. It enters Aries on April 19th.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on April 1: Mercury (0.0, 6.6", 64% illuminated, 1.02 a.u., Aquarius), Venus (-4.5, 25.5", 47% illuminated, 0.65 a.u., Taurus), Mars (+0.8 magnitude, 6.4", 88% illuminated, 1.46 a.u., Capricornus), Jupiter (-2.1 magnitude, 37.0", 99% illuminated, 5.32 a.u., Sagittarius), Saturn (+0.7 magnitude, 16.1", 100% illuminated, 10.30 a.u., Sagittarius), Uranus (+5.9 magnitude, 3.4", 100% illuminated, 20.79 a.u. on April 16th, Aries), Neptune (+7.9 magnitude, 2.2", 100% illuminated, 30.73 a.u. on April 16th, Aquarius), and Pluto (+14.3 magnitude, 0.1", 100% illuminated, 33.98 a.u. on April 16th, Sagittarius).

Venus and Uranus are located in the west in the evening. Mercury and Neptune can be found in the east, and Mars, Jupiter, and Saturn in the southeast in the morning sky.

Mercury brightens from magnitude 0.0 to magnitude -1.2 this month as it decreases in angular (apparent) size from 6.6 arc seconds to 5.1 arc seconds but increases in illumination from 64% to 98%. Mercury has a close conjunction with Neptune on April 3rd. The speediest planet shines at magnitude -0.2 by April 10th and is at its greatest heliocentric latitude south on April 16th. The Moon passes three degrees south of Mercury on April 16th. Observers in the southern hemisphere are favored during the current morning apparition of Mercury.

Brilliant **Venus** is in one of the very best months of its eight-year cycle of recurring apparitions. During April, Venus grows in brightness to magnitude -4.7 and in angular size to 38.2 arc seconds but drops in illumination from 47% to 26%. On the first day of April, the brightest planet sets approximately four hours after the Sun. On April 3rd, Venus passes one quarter degree southeast of the third-magnitude star Alcyone (Eta Tauri), the brightest star in M45 (the Pleiades). On that day eight years later, Venus will come exceptionally close to the fourth-magnitude star Merope (23 Tauri). The waning gibbous Moon passes six degrees to the south of Venus on April 26th. Venus reaches its greatest illuminated extent, which is the optimum combination of angular size and phase angle, on the evening of April 27th.

Mars increases in brightness from magnitude +0.8 to magnitude +0.4 and grows in angular size from 6.4 arc seconds to 7.6 arc seconds by the end of April. The Red Planet is one degree southeast of Saturn on the morning of April 1st. On April 16th, a waning crescent Moon lies two degrees south of Mars. By the end of the month, Mars is 2.7 degrees due west of the third-magnitude star Deneb Algedi (Delta Capricorni) and rises by

Jupiter increases in brightness to magnitude -2.3 and in apparent diameter from 37.0 to 40.6 arc seconds during April. A very faint Pluto is 45 arc minutes south of Jupiter on April 6th. As the month begins, Jupiter rises just before 1:30 a.m. local daylight time. A waning gibbous Moon passes within two degrees of Jupiter on the morning of April 23rd. The Galilean satellite Ganymede undergoes a shadow transit that ends at 5:52 a.m. MDT (9:52 UT) on April 15th, Europa transits Jupiter starting at 5:17 a.m. MDT (9:17 UT) on April 19th, Io's shadow crosses Jupiter beginning at 2:43 a.m. MDT

(8:43 UT) on April 20th, and Ganymede reappears from occultation shortly after the shadow of Europa begins to transit the planet at 5:18 a.m. MDT (9:18 UT) on April 26th. Data on other Galilean satellite events is available at <http://www.skyandtel...watching-tools/> and page 51 of the April 2020 issue of Sky & Telescope. For information on transits of Jupiter's central meridian by the Great Red Spot, consult https://www.projectp...eve_grs.htm#apr or page 50 of the April 2020 issue of Sky & Telescope.

Saturn rises with Mars at approximately 4:00 a.m. local daylight time on April 1st. As April progresses, Jupiter moves closer to Saturn from the west while Mars heads away from Saturn to the east. The three planets are equally spaced, with Saturn approximately 5.5 degrees from Jupiter and Mars, on April 9th. The Ringed Planet rises before 2:00 a.m. local daylight time, brightens to magnitude +0.6, and subtends 16.9 arc seconds by the end of the month. At midmonth, its rings span 37 arc seconds and are inclined by about 21 degrees. Saturn is two degrees north of the Last Quarter Moon on April 15th. Saturn is at western quadrature on April 21st. Titan, Saturn's brightest satellite at eighth magnitude, will most likely be the only Saturnian satellite visible in early April due to Saturn's meager altitude, only some 15 degrees, at the start of morning twilight. Browse <http://www.skyandtel...watching-tools/> for information on Saturn's satellites.

Uranus is in conjunction with the Sun on April 26th and consequently is not visible after the first few days of this month.

Eighth-magnitude **Neptune** is very low in the east at dawn in late April.

The dwarf planet **Pluto** is fairly high in the sky in northwestern Sagittarius during morning twilight.

For more on the planets and how to locate them, browse <http://www.nakedeyeplanets.com/>. A wealth of current information on solar system celestial bodies is posted at <http://www.curtrenz.com/astronomy.html> and <http://nineplanets.org/>. Various events taking place within our solar system are discussed at <http://www.bluewater...ed-4/index.html>

Asteroids



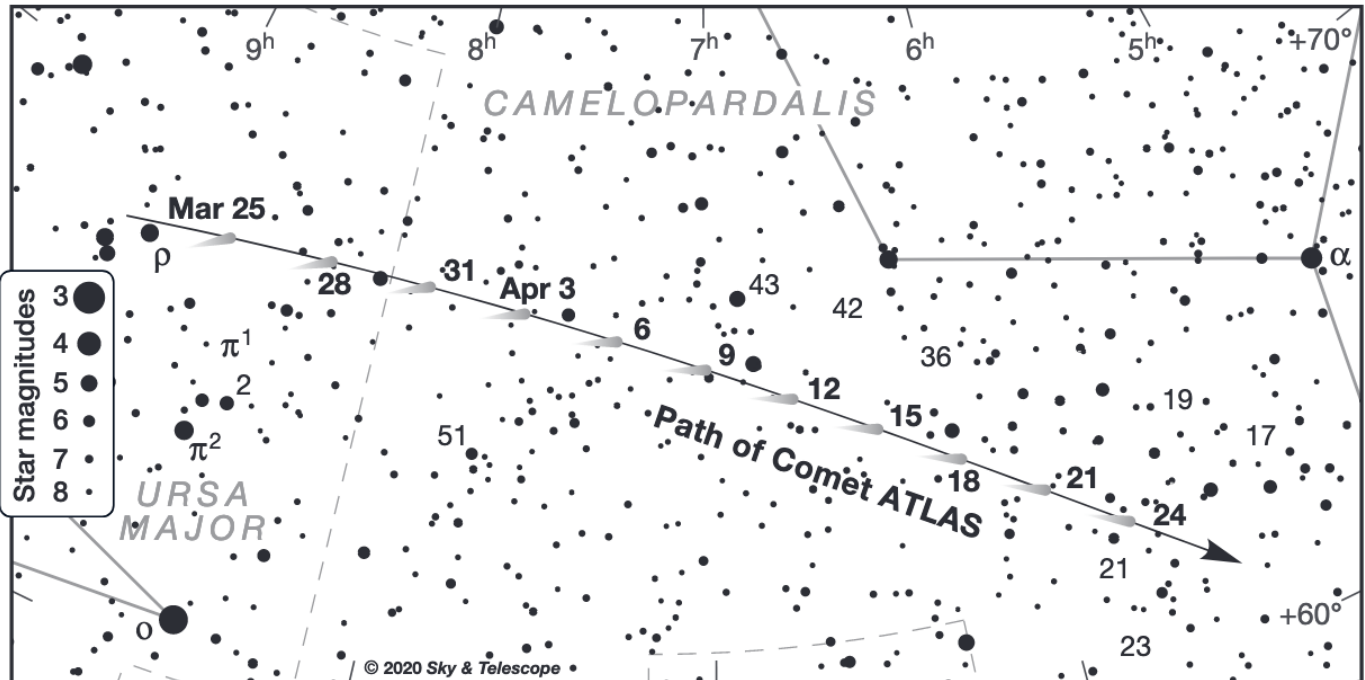
Asteroid 4 Vesta shines at magnitude +8.5 as it travels northeastward through Taurus this month. On April 7th, the main belt asteroid passes 3.7 degrees north of the fourth-magnitude star Prima Hyadum (Gamma Tauri) in Melotte 25 (the Hyades); on April 12th, it passes 30 arc minutes north of the fourth-magnitude star Ain (Epsilon Tauri), another member of the Hyades. Four days later it lies several degrees north of the first-magnitude star Aldebaran (Alpha Tauri). Vesta passes somewhat less than two degrees north of the open cluster NGC 1647 on April 23rd. Asteroid 3 Juno (magnitude +9.5) is at opposition in Virgo on April 2nd. It passes one half degree south of the third-magnitude star Minelauva (Delta Virginis) on the nights of April 9th and 10th. A finder chart can be found on page 50 of the April 2020 issue of Sky & Telescope. Asteroids brighter than magnitude +11.0 reaching opposition this month include 6 Hebe (magnitude +10.1) on April 4th, 40 Harmonia (magnitude +9.8) on April 23rd, and 23 Thalia (magnitude +10.0) on April 24th. Click on http://www.asteroido.../2020_04_si.htm for information on asteroid occultations taking place this month. See <https://www.curtrenz.../asteroids.html> for additional current information on a number of asteroids.

Comets



Comet C/2019 Y4 (ATLAS) is the brightest comet visible this month. It can be found in Camelopardalis. See <http://www.cometwate...eye-brightness/> and <https://skyandtelesco...ked-eye-object/> for more on this comet, which could brighten to naked-eye visibility by May. Comet C/2017 T2 (PanSTARRS) travels northeastward through Camelopardalis. The eighth-magnitude comet passes several degrees north of the spiral galaxy IC 342 on April 9th.

Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.ne...ly/current.html> for information on this month's comets.



Meteor Showers



The major meteor showers that will occur this year are discussed at <https://www.skyandtelescope.com/meteor-showers-in-2020/>.

Orbiting Earth



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

Deep Sky



The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on April 3rd, 6th, 9th, 12th, 15th, 17th, 20th, 23rd, 26th, and 29th. Favorable dates for observing Algol at mid-eclipse from the eastern United States occur on April 12th at 12:14 a.m. EDT (4:14 UT) and April 14th at 9:03 p.m. EDT (1:03 UT on April 15th). Consult <http://www.skyandtelescope.com/watching-tools/> and page 49 of the April 2020 issue of Sky & Telescope for the times of the eclipses. For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> & <http://www.solstation.com/stars/algol3.htm>

Seventy-five binary and multiple stars for April: h4481 (Corvus); Aitken 1774, Gamma Crateris, Jacob 16, Struve 3072, h4456, Burnham 1078 (Crater); h4311, Burnham 219, N Hydrae, h4455, h4465 (Hydra); 31 Leonis, Alpha Leonis (Regulus), h2520, Struve 1417, 39 Leonis, Struve 1421, Gamma Leonis (Algieba), Otto Struve 216, 45 Leonis, Struve 1442, Struve 1447, 49 Leonis, Struve 1482, 54 Leonis, Struve 1506, Chi Leonis, 65 Leonis, Struve 1521, Struve 1527, Struve 1529, Iota Leonis, 81 Leonis, 83 Leonis, Tau Leonis, 88 Leonis, 90 Leonis, Struve 1565, Struve 1566, 93 Leonis, h1201, S Leonis (Leo); h2517, Struve 1405, Struve 1432, 33 Leo Minoris, Struve 1459, 40 Leo Minoris, Struve 1492 (Leo Minor); Struve 1401, Struve 1441, Struve 1456, Struve 1464, 35 Sextantis, 40 Sextantis, 41 Sextantis (Sextans); Struve 1402, Struve 1415, Struve 1427, Struve 1462, Struve 1486, Struve 1495, Struve 1510, Struve 1520, Xi Ursae Majoris, Nu Ursae Majoris, Struve 1541, 57 Ursae Majoris, Struve 1544, Struve 1553, Struve 1561, Struve 1563, 65 Ursae Majoris, Otto Struve 241 (Ursa Major)

One hundred deep-sky objects for April: NGC 4024, NGC 4027 (Corvus); NGC 3511, NGC 3513, NGC 3672, NGC 3887, NGC 3892, NGC 3955, NGC 3962, NGC 3981 (Crater); NGC 3091, NGC 3109, NGC 3145, NGC 3203, NGC 3242, NGC 3309, NGC 3585, NGC 3621, NGC 3717, NGC 3904, NGC 3936 (Hydra); M65, M66, M95, M96, M105, NGC 3098, NGC 3162, NGC 3177, NGC 3185, NGC 3190, NGC 3226, NGC 3227, NGC 3300, NGC 3346, NGC 3367, NGC 3377, NGC 3384, NGC 3389, NGC 3412, NGC 3437, NGC 3489, NGC 3495, NGC 3507, NGC 3521, NGC 3593, NGC 3607, NGC 3608, NGC 3626, NGC 3628, NGC 3630, NGC 3640, NGC 3646, NGC 3655, NGC 3681, NGC 3684, NGC 3686, NGC 3691, NGC 3810, NGC 3842, NGC 3872, NGC 3900, NGC 4008 (Leo); NGC 3245, NGC 3254, NGC 3277, NGC 3294, NGC 3344, NGC 3414, NGC 3432, NGC 3486, NGC 3504 (Leo Minor); NGC 2990, NGC 3044, NGC 3055, NGC 3115, NGC 3156, NGC 3166, NGC 3169, NGC 3246, NGC 3423 (Sextans); IC 750, M97, M108, M109, NGC 3079, NGC 3184, NGC 3198, NGC 3310, NGC 3359, NGC 3610, NGC 3665, NGC 3675, NGC 3738, NGC 3877, NGC 3898, NGC 3941, NGC 3953, NGC 3998, NGC 4026 (Ursa Major)

Top ten deep-sky objects for April: M65, M66, M95, M96, M97, M105, M108, NGC 3115, NGC 3242, NGC 3628

Top ten binocular deep-sky objects for April: M65, M66, M95, M96, M97, M105, M108, M109, NGC 3115, NGC 3242

Challenge **deep-sky** object for April: Leo I (Leo)

The objects listed above are located between 10:00 and 12:00 hours of right ascension

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

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

The fifth-magnitude G-type main-sequence star 61 Virginis - <http://www.solstatio...rs/61vir2co.jpg> - is a sun-like star at a distance of 28 light years. It hosts three exoplanets and is visible to the naked-eye.

Data on current supernovae can be found at <http://www.rochester...y.org/snimages/>

Finder charts for the Messier objects and other deep-sky objects are posted at <https://freestarcharts.com/messier> and <https://freestarcharts.com/ngc-ic> and <http://www.cambridge... april-june.htm>

Telrad finder charts for the Messier Catalog and the SAC's 110 Best of the NGC are posted at <http://www.astro-tom...charts/map1.pdf> and <http://www.saguaroas...o110BestNGC.pdf> respectively.

Information pertaining to observing some of the more prominent Messier galaxies can be found at <http://www.cloudynig...ur-astronomers/>

Stellarium and Cartes du Ciel are two excellent 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 <http://tonightssky.com/MainPage.php>

Freeware sky atlases can be downloaded at <http://www.deepskywa...-atlas-full.pdf> and <http://astro.mxd120...ee-star-atlases>

MVAS Astrophotography

The following are pictures from members of the Pleiades (M45) taken at the beginning of this month.



Rick Greenawald, Faulkner Planetarium Manager, Herrett Center, College of Southern Idaho.
Canon EOS 6D camera with a 200 mm Canon lens (actually an 80 - 200 mm zoom lens). The exposure is 2 sec. at f/4,
ISO-1600.

Trivia about Venus

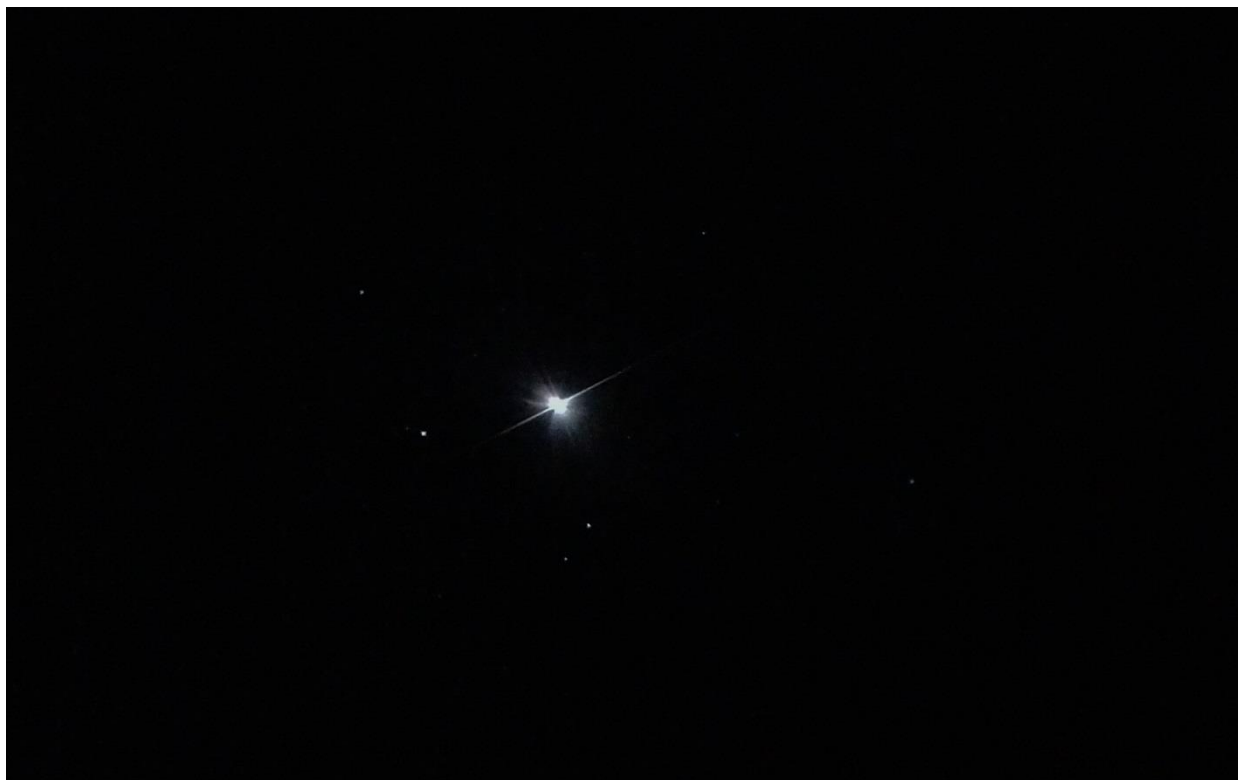
Due to the coincidence that Venus completes 13 orbits in almost exactly the same time that Earth completes 8 orbits (i.e. 8 years), Venus returns to almost the exact place in the sky every 8 years, to the day.

So, Venus skimmed by the Pleiades on April 3, 2012, and will again on April 3, 2028. But, eight years from now, it will go right through the middle of the Seven Sisters, and again on April 3, 2036.

Information source: Chris Anderson, Planetarium Production Specialist / Observatory Manager, Herrett Center, College of Southern Idaho.



Tim Frazier, Member MVAS, Bellevue, ID area. I shot this one early this evening using a tripod, no drive, and a 300mm lens on medium format camera. The exposure was 1/3 sec., f/4.5, ISO 6400.



Robert Mayer, MVAS President, Twin Falls, ID The shot with the flare is with smartphone, 5600 ISO, 0.2 second through 3" f/6 Newtonian and a 40mm eyepiece. Better shot (below) is with Olympus E510, ISO 1600, 210mm zoom lens and I think somewhere around 1/2 a second.





Gary Leavitt using his Travel Adventurer tracker, full frame DSLR camera, a 300mm lens at f/4 and ISO 1600 (probably should have dropped it down to 800) and 6 sec exposures.

Overall some nice photos have been taken and posted by our club members. Keep up the good work everyone and thanks as these really help with the newsletter. David , Editor

NASA's Perseverance Mars Rover Gets Its Wheels and Air Brakes

Three of the six flight wheels that will travel to Mars can be seen attached to NASA's Perseverance rover (which is inverted on a handling fixture) on March 30, 2020 at the Kennedy Space Center in Florida. The protective antistatic foil covering the wheels will be removed before launch this summer.

After the rover was shipped from JPL to Kennedy Space Center, the team is getting closer to finalizing the spacecraft for launch later this summer.

Final assembly and testing of NASA's Perseverance rover continues at Kennedy Space Center in Florida as the July launch window approaches. In some of the last steps required prior to stacking the spacecraft components in the configuration they'll be in atop the Atlas V rocket, the rover's wheels and parachute have been installed.

Perseverance received its six [flight wheels](#) on March 30, 2020. While the rover took a test [drive last December](#), it was on "flight spares" that wouldn't be making the trip to Mars. Designed for the kind of off-roading Perseverance will perform on the Red Planet, [the wheels](#) are re-engineered versions of the ones NASA's Curiosity has been using on its traverses of Mount Sharp.



Illustrated here, the aluminum wheels of NASA's Curiosity (left) and Perseverance rovers. Slightly larger in diameter and narrower, 20.7 inches (52.6 centimeters) versus 20 inches (50.8 centimeters), Perseverance's wheels have twice as many treads, and are gently curved instead of chevron-patterned. Credit: NASA/JPL-Caltech

Machined out of a block of flight-grade aluminum and equipped with titanium spokes, each wheel is slightly larger in diameter and narrower than Curiosity's, with skins that are almost a millimeter thicker. They also feature new treads, or grousers: In place of Curiosity's 24 [chevron-pattern treads](#) are 48 gently curved ones. Extensive testing in the Mars Yard at NASA's Jet Propulsion Laboratory, which built the rover and manages operations, has shown these treads better withstand the [pressure from sharp rocks](#) and grip just as well or better than Curiosity's when driving on sand.

The Parachute

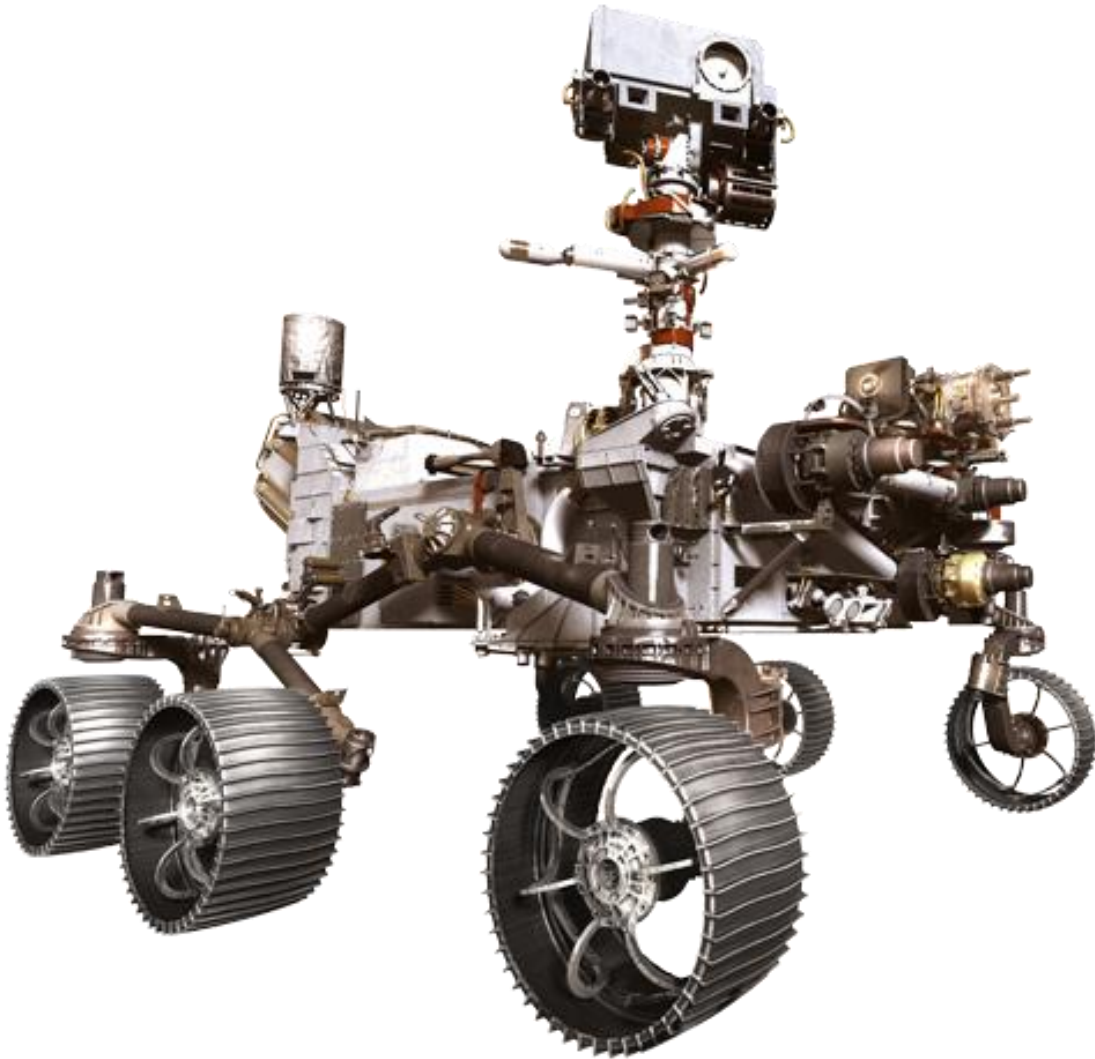
The job of adding Perseverance's parachute to the back shell, where the rover will be stowed on the journey to the Red Planet, took several days and was finished on March 26. Tasked with slowing the heaviest payload in the history of Mars exploration from Mach 1.7 to about 200 mph (320 kph) during the rover's landing on Feb., 18, 2021, the 194 pounds (88 kilograms) of nylon, Technora and Kevlar fibers are packed so tightly into a 20-inch-wide (50-centimeter-wide) aluminum cylinder that it is as dense as oak wood. When deployed at about 7 miles (11 kilometers) above the Martian surface, the chute will take about a half-second to fully inflate its 70.5-foot-wide (21.5-meter-wide) canopy.

The Perseverance rover is a robotic scientist weighing 2,260 pounds (1,025 kilograms). It will search for signs of past microbial life, characterize the planet's climate and geology, collect samples for future return to Earth, and pave the way for human exploration of the Red Planet. No matter what day Perseverance launches during its July 17-Aug. 5 launch period, it will land on Mars' Jezero Crater on Feb. 18, 2021.

Perseverance is part of a larger program that includes missions to the Moon as a way to prepare for human exploration of the Red Planet. Charged with returning astronauts to the Moon by 2024, NASA will establish a sustained human presence on and around the Moon by 2028 through NASA's [Artemis lunar exploration plans](#).

For more information about the mission, go to: <https://mars.nasa.gov/mars2020/>

For more about NASA's Moon to Mars plans, visit: <https://www.nasa.gov/topics/moon-to-mars>



Phil Harrington's Cosmic Challenge

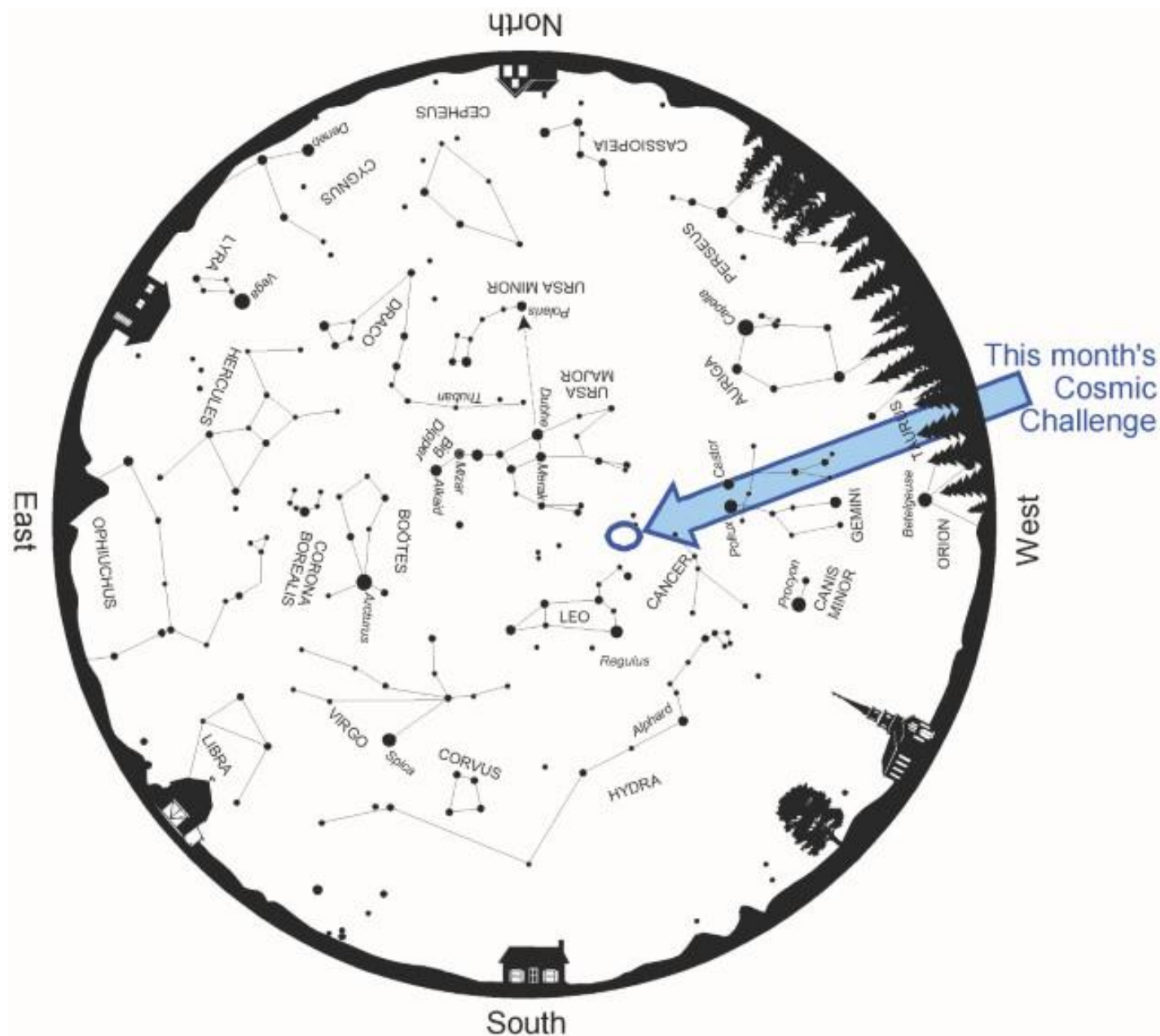
Leo 2



This month's suggested aperture range:
6- to 9.25-inch (15-24cm) telescopes

Target	Type	RA	DEC	Const.	Mag	Size
NGC 2535	Galaxy pair	08h 11.2m	+25° 12.4'	Cancer	13.3	3.3'x1.8'
NGC 2536		08h 11.3m	+25° 10.8'		14.7	0.9'x0.7'

You have undoubtedly heard of the Leo Trio, made up of M65, M66, and NGC 3628. But how about the Leo Trio 2? The Leo Trio 2 are tucked snugly into the constellation's northernmost quadrant, some 7° north of the Leo "sickle."



Above: Evening star map. Credit: Map adapted from [Star Watch](#) by Phil Harrington

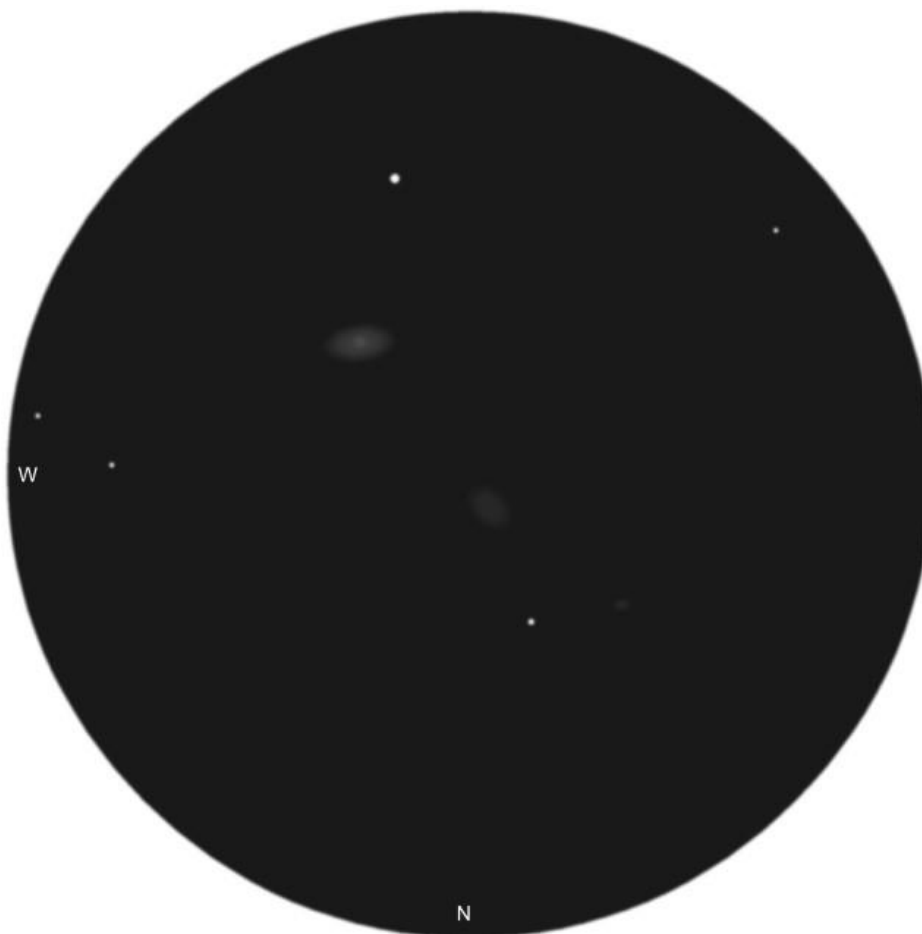
Begin at Rasalas [Mu (μ) Leonis], the orangish star at the pointy northern tip of Leo's sickle-shaped mane. Looking through your finderscope, scan about 5° to the northwest for the 6th-magnitude 15 Leonis. Look for a 7th-magnitude companion star just $13'$ to its northwest, which helps 15 stand out from the crowd. Can you also spot a fainter, slightly orangish point (SAO 61633) about $1\frac{1}{4}^\circ$ further to the north-northwest? If so, hop to it through your finder, and then switch to your telescope, widest-field eyepiece in place. Offset that star toward the southwestern edge of the eyepiece field until a rectangle of four 9th- and 10th-magnitude stars is centered in the field. NGC 2964, the leader of this small galactic pack, is the same distance northeast of the rectangle as the orangish reference star is to its southwest.

The table below lists the three members of the Leo Trio 2.

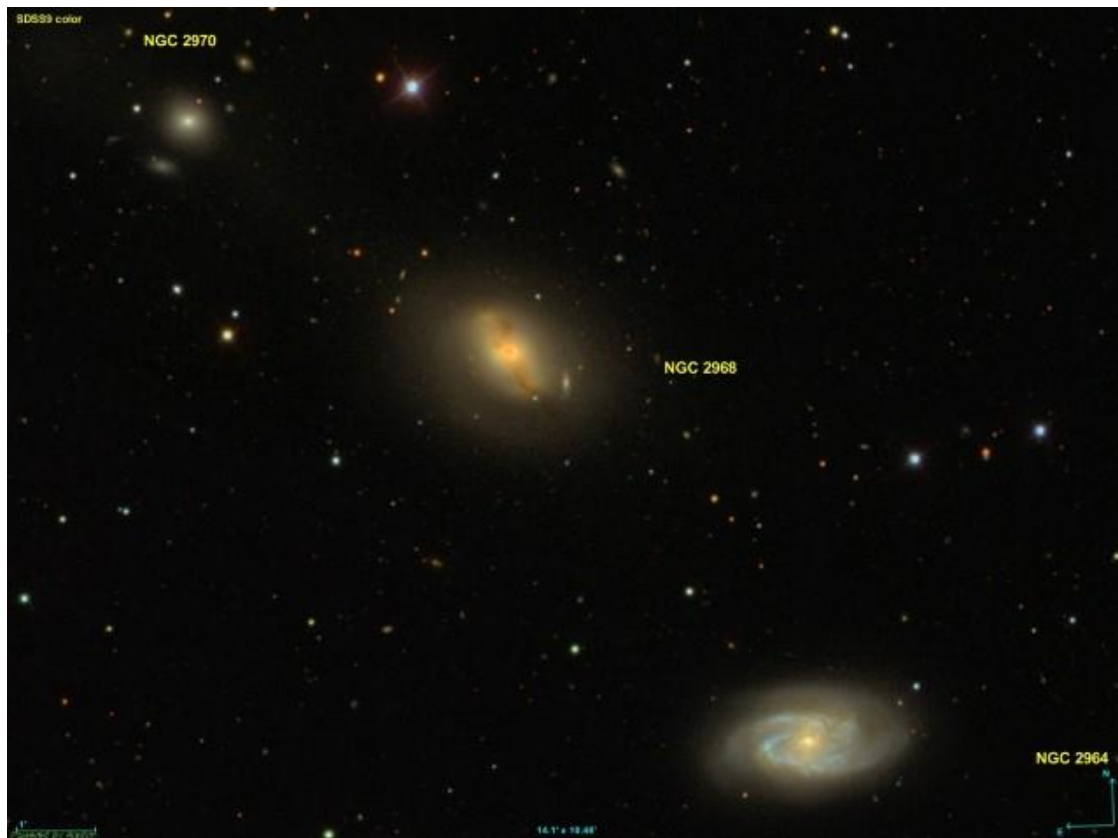
Members of Leo Trio 2

Target	Type	RA	DEC	Magnitude	Size
NGC 2964	Galaxy	09 42.9	+31 50.8	12.0b	2.9'x1.5'
NGC 2968	Galaxy	09 43.2	+31 55.7	12.8b	2.2'x1.5'
NGC 2970	Galaxy	09 43.5	+31 58.6	14.4b	0.6'x0.4'

Even though it is the brightest of the three, **NGC 2964** is still a dim target in 6- to 9.25-inch scopes. Photographs reveal it to be a spiral galaxy inclined to our view some 50° . At 112x through my 8-inch (20cm) reflector, NGC 2964 shows off a pale, oval glow elongated approximately east-west and surrounding a very faint, round core. I usually need averted vision to see the full span of the oval halo, but found little benefit from increasing the magnification. It lies some 60 million light years away and measures about 60,000 light years across. Studies show that a transparent bridge of hydrogen extends from NGC 2964 to our next target found not quite 6 arc-minutes to its northeast.



Above: Leo Trio 2 as seen through the author's 8-inch (20cm) reflector.



Above: Image of the Leo Trio 2 pack. (North is up) Credit: [Donald Pelletier / Wikimedia Commons](#)

NGC **2968** is a tougher catch, although it is visible through my 8-inch from under suburban skies by using averted vision. My records recall a small, very dim, featureless oval glow oriented approximately northeast-southwest. The lack of any distinguishable centralized nucleus adds to its obscurity. Although photographs record it as nearly as large as NGC 2964, it strikes my eye as perhaps only half the size. Those same photos reveal that NGC 2968, an irregular galaxy, has a pair of odd, dark, S-shaped lanes protruding from the galactic center and extending along the galaxy's major axis. Although I can see no sign of them even in my 18-inch reflector, I wonder if these lanes might be visible through larger amateur scopes. And that hydrogen bridge connecting NGC 2964 and 2968? According to a 2016 paper published in *The Astronomical Journal* entitled [Global Properties of Neutral Hydrogen in Compact Groups](#), it actually extends farther still, toward our final quest.

The third and faintest member of this galactic trilogy is **NGC 2970**, just 5' northeast of NGC 2968. It shines a magnitude dimmer still, and so poses a real test for medium apertures. My 8-inch can't pull it out from my light-polluted backyard but was able to offer up a very dim glimmer from darker, rural skies. Even under the best conditions, it looks just like a very faint star. Don't feel too badly if you can't nab this last galaxy, however. William Herschel missed it as well when he discovered NGC 2964 and 2968 using an 18.7-inch reflector in 1785. It took the more youthful eyes of his son, John, viewing through the same aperture in 1828 to spot it.

Finally, I should point out that calling this the "Leo Trio 2" is selling the group a little short. There are plenty of backup members, as well. In reality, NGC 2964 is believed to be gravitationally associated with no fewer than three more galaxies in the general area: NGC 3003, NGC 3011, NGC 3021. And that's not all. Other nearby galaxies include NGC 3118, NGC 3067, NGC 3032, and NGC 3026. This trio, it turns out, is a galactic *delectet*.

Good luck with this month's Cosmic Challenge! And be sure to post your results in this column's discussion forum.

Until next month, 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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This article is distributed by NASA Night Sky Network

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Hubble at 30: Three Decades of Cosmic Discovery

David Prosper

The **Hubble Space Telescope** celebrates its 30th birthday in orbit around Earth this month! It's hard to believe how much this telescope has changed the face of astronomy in just three decades. It had a rough start -- an 8-foot mirror just slightly out of focus in the most famous case of spherical aberration of all time. But subsequent repairs and upgrades by space shuttle astronauts made Hubble a symbol of the ingenuity of human spaceflight and one of the most important scientific instruments ever created. Beginning as a twinkle in the eye of the late Nancy Grace Roman, the Hubble Space Telescope's work over the past thirty years changed the way we view the universe, and more is yet to come!

We've all seen the amazing images created by Hubble and its team of scientists, but have you seen Hubble yourself? You actually can! Hubble's orbit -- around 330 miles overhead -- is close enough to Earth that you can see it at night. The best times are within an hour after sunset or before sunrise, when its solar panels are angled best to reflect the light of the Sun back down to Earth. You can't see the structure of the telescope, but you can identify it as a bright star-like point, moving silently across the night sky. It's not as bright as the Space Station, which is much larger and whose orbit is closer to Earth (about 220 miles), but it's still very noticeable as a single steady dot of light, speeding across the sky. Hubble's orbit brings it directly overhead for observers located near tropical latitudes; observers further north and south can see it closer to the horizon. You can find sighting opportunities using satellite tracking apps for your smartphone or tablet, and dedicated satellite tracking websites. These resources can also help you identify other satellites that you may see passing overhead during your stargazing sessions.

NASA has a dedicated site for Hubble's 30th's anniversary at bit.ly/NASAHubble30. The Night Sky Network's "Why Do We Put Telescopes in Space?" activity can help you and your audiences discover why we launch telescopes into orbit, high above the interference of Earth's atmosphere, at bit.ly/TelescopesInSpace. Amateur astronomers may especially enjoy Hubble's images of the beautiful objects found in both the Caldwell and Messier catalogs, at bit.ly/HubbleCaldwell and bit.ly/HubbleMessier. As we celebrate Hubble's legacy, we look forward to the future, as there is another telescope ramping up that promises to further revolutionize our understanding of the early universe: the James Webb Space Telescope!

Discover more about the history and future of Hubble and space telescopes at nasa.gov.

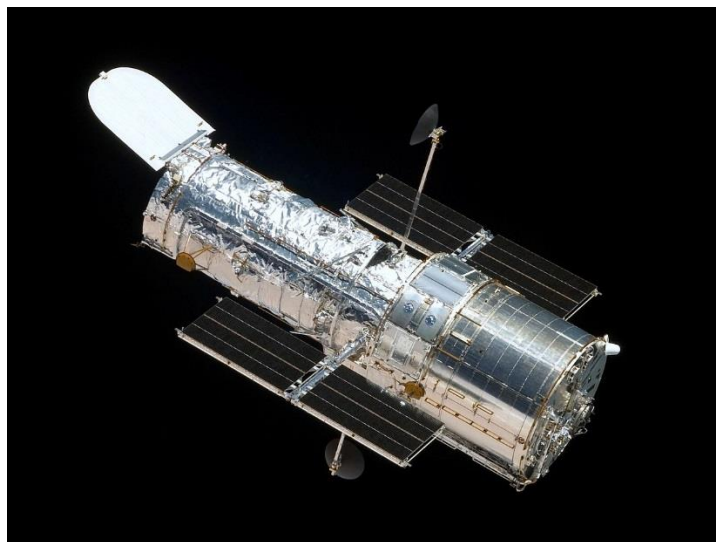
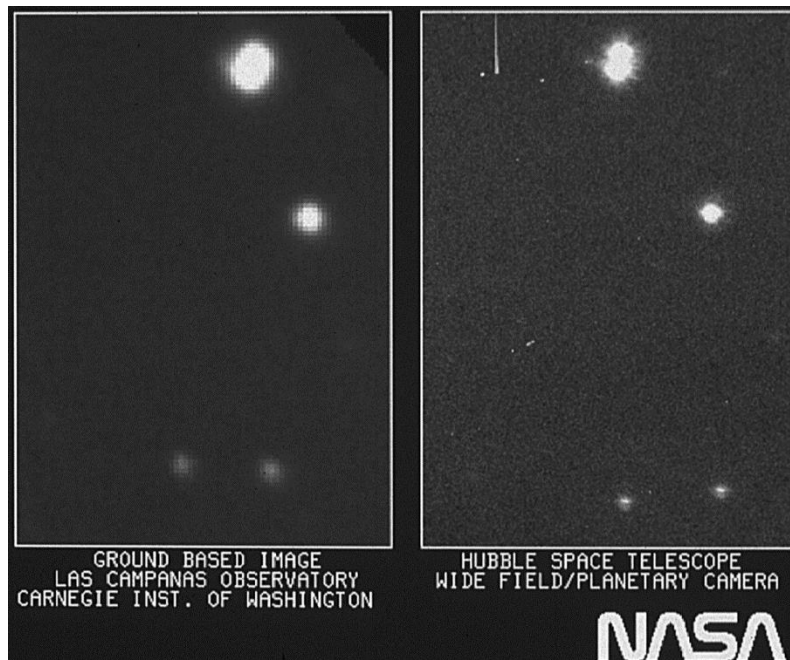




Image Credit: NASA



Hubble's "first light" image. Even with the not-yet-corrected imperfections in its mirror, its images were generally sharper compared to photos taken by ground-based telescopes at the time. Image Credit: NASA

Observatory and Planetarium



CSI Centennial Observatory / Faulkner Planetarium Herrett Center

All events at the Herrett Center for Arts and Science are cancelled until further notice. Visit <https://herrett.csi.edu/> for more information.



College of Southern Idaho Campus Twin Falls, ID Faulkner Planetarium / Show Times



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.