

Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, June 10th 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
mayerbrt@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,

Here come the warmer temperatures -- and apparently, the clear skies!

After having spent May hunting for galaxies in Virgo, colleagues are now hunting down Comet Johnson, and there are early reports of success. One can only image what else will come our way as summer draws nearer. We look forward to hearing from you.

On June 24th, we'll meet up for a public outreach event at the Hagerman Fossil Beds National Monument. This is one of the smaller events of the year for us, but it is also one of the more underrated. We will have more details after this month's board meeting.

The board meeting will be the same day as the regular monthly meeting, Saturday, June 10. Last month's meeting with Dr. Liz Montgomery was a great way to not only learn about constellations in other cultures, but also gave us an insight as to how cultures generate constellations in the first place.








This month's subject is still up in the air, as final details are being worked out. It will either be planetary occultation or DIY radio astronomy. More details will be announced as they become available.

Until then, please get out and enjoy the night skies.

Clear Views,

Rob Mayer

Calendar for June

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				<div>1</div> <div>First Quarter 50% Visible ↑</div> 	<div>2</div>	<div>3</div>
<div>4</div>	<div>5</div>	<div>6</div>	<div>7</div>	<div>8</div>	<div>9</div> <div>Full Moon 100% Visible Age: 14.7 Days Strawberry Moon</div> 	<div>10</div> <div>MVAS Meeting at 7:00pm at the Herrett Center</div> <div>Public Star Party Centennial Obs.</div>
<div>11</div>	<div>12</div>	<div>13</div>	<div>14</div> <div>Flag Day</div> 	<div>15</div>	<div>16</div>	<div>17</div> <div>Last Quarter Visible 50% ↓ Age: 22.17 Days</div> 
<div>18</div> <div>Father's Day</div> 	<div>19</div>	<div>20</div>	<div>21</div> <div>Summer Solstice</div> 	<div>22</div>	<div>23</div>	<div>24</div> <div>New Moon Lunation 1169 1% Visible ↓ Age: 29.15 Day</div> 
<div>25</div>	<div>26</div>	<div>27</div>	<div>28</div>	<div>29</div>	<div>30</div>	

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month.
 Snake River Skies © 2017 by David Olsen for the Magic Valley Astronomical Society, All Rights Reserved. Images used in this
 newsletter, unless otherwise noted, are in the public domain and are courtesy of NASA, Wikimedia, or from MVAS File Photos. Full
 Moon names follow the traditional Algonquin First Nation history.

Be Safe – Get Out There – Explore Your Universe

Celestial Calendar for May

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

- 6/1** The Purbach Cross or Lunar X, an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to occur at 1:36;
- 6/2** A double Galilean satellite shadow transit occurs at 7:42
- 6/3** Venus (magnitude -4.3) is 1.7 degrees south-southeast of Uranus (magnitude +5.9) at 5:00; Venus is at greatest western elongation (45.9 degrees) at 12:00
- 6/4** Jupiter is 2.2 degrees south-southwest of the Moon at 1:00; a double Galilean satellite shadow transit occurs at 2:21; Venus is at theoretical dichotomy (50% illuminated) at 6:00; Neptune is at western quadrature at 16:00; the Moon is 6.3 degrees north-northeast of the first-magnitude star Spica (Alpha Virginis) at 22:00;
- 6/5** A double Galilean satellite shadow transit occurs at 20:49
- 6/6** Asteroid 1 Ceres is in conjunction with the Sun at 0:00; Mars is at greatest declination north (24.3 degrees) at 7:00
- 6/7** Mercury is 5.5 degrees south-southeast of the bright open cluster M45 (the Pleiades or Subaru) at 8:00
- 6/8** Mars is 0.01 degree north-northwest of the bright open cluster M35 in Gemini at 1:00; the Moon is at apogee, subtending 29' 24" from a distance of 406,400 kilometers (252,526 miles), at 22:21
- 6/9** A double Galilean satellite shadow transit occurs at 10:09.
- 6/10** Saturn is 3.1 degrees south of the Moon at 2:00; Jupiter is stationary in right ascension at 4:00
- 6/11** Mercury is 4.9 degrees north-northwest of the first-magnitude star Aldebaran (Alpha Tauri) at 21:00
- 6/12** Pluto is 2.3 degrees south of the Moon at 2:00; Comet C/2015 V2 (Johnson) is at perihelion (1.637 astronomical units from the Sun) at 8:00; Venus is at aphelion (0.7282 astronomical units from the Sun) at 21:00; the equation of time - the difference between apparent time and mean time - is 0 at 22:00; a double Galilean satellite shadow transit occurs at 23:27
- 6/14** The earliest sunrise of the year at latitude 40 degrees north occurs at 8:31 (4:31 a.m. EDT); Mercury is at the ascending node through the ecliptic plane at 21:00
- 6/15** The Moon is at the descending node (longitude 326.0°) at 2:40; Saturn (angular size 18.4", magnitude 0.0) is at opposition at 10:00
- 6/16** A double Galilean satellite shadow transit occurs at 12:46; Neptune is 0.7 degree north-northwest of the Moon, with an occultation occurring in the southern half of South America and western Antarctica at 13:00; Neptune is stationary in right ascension at 23:00
- 6/17** The earliest morning twilight of the year at latitude 40 degrees north occurs today
- 6/18** The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to occur at 0:40
- 6/19** Mercury is at perihelion (0.3075 astronomical units from the Sun) at 13:00; Uranus is 3.9 degrees north-northwest of the Moon at 18:00
- 6/20** A double Galilean satellite shadow transit occurs at 2:04; Venus is 2.3 degrees north-northwest of the Moon at 22:00
- 6/21** Summer solstice in the northern hemisphere occurs at 4:24; Mercury is in superior conjunction with the Sun at 14:00; the Sun enters Gemini (longitude 90.41degrees on the ecliptic) at 15:00
- 6/22** The Moon is 0.54 degree north of the first-magnitude star Aldebaran (Alpha Tauri), with an occultation taking place in northwestern Africa, most of Europe, the Azores, southern Greenland, and most of North America, at 15:00
- 6/23** The Moon is at perigee, subtending 33' 23" from a distance of 357,938 kilometers (222,412 miles), at 10:52; asteroid 40 Harmonia (magnitude +9.3) is at opposition at 11:00; a double Galilean satellite shadow transit occurs at 15:24
- 6/24** The latest evening twilight of the year at latitude 40 degrees north occurs today; Mercury is at its greatest declination north (24.7 degrees) at 8:00; Mercury is 5.3 degrees north of the Moon at 9:00; Mars is 4.4 degrees north of the Moon at 20:00
- 6/25** The Moon is 9.4 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 13:00
- 6/26** The Moon is 2.8 degrees south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 11:00
- 6/27** The Moon is at the ascending node (longitude 145.2 degrees) at 16:27; the latest sunset of the year at latitude 40 degrees north occurs at 23:33 (5:33 p.m. MDT)
- 6/28** The Moon is 0.04 degree southwest of the first-magnitude star Regulus (Alpha Leonis). Mercury is 0.77 degree north of Mars at 19:00
- 6/29** Mercury is at its greatest latitude north of the ecliptic plane (7.0 degrees) at 18:00



The Sun, the Moon, & the Planets



The Moon is 6.2 days old, is illuminated 44.6%, subtends 31.7 arc minutes, and is located in Leo on June 1st at 0:00 UT. The Moon is at its greatest northern declination of +19.3 degrees on June 24th and at its greatest southern declination of -19.4 degrees on June 11th. Longitudinal libration is at a maximum of +7.5 degrees on June 1st and +7.4 degrees on June 29th and a minimum of -7.6 degrees on June 17th. Latitudinal libration is at a maximum of +6.6 degrees on June 22nd and a minimum of -6.6 degrees on June 8th. New Moon occurs on June 24th UT. Large tides will take place for several days thereafter. The First Quarter Moon occults the binary star Rho Leonis (magnitude +3.8) from most of the United States and Canada on the morning of June 1st. The Moon lies approximately three degrees to the upper left of the second-magnitude star Acrab (Beta Scorpii) at dusk on June 7th. From certain parts of the world, the Moon occults Neptune on June 16th, Aldebaran on June 22nd, and Regulus on June 28th. It also occults the third-magnitude star Gamma Leonis for much of North America on the night of June 30th (July 1st UT). See <http://www.lunar-occ...ota/iotandx.htm> for information on lunar occultations taking place this month.

The Sun is located in Taurus on June 1st. It enters Gemini on June 21st. The Sun reaches its farthest position north for the year on June 20th. There are 15 hours and one minute of daylight at latitude 40 degrees north on the day of the summer solstice. At latitude 40 degrees north, the earliest sunrise occurs on June 14th and the latest sunset on June 27th. Mars is in the northwest, Jupiter is in the southwest, and Saturn is in the southeast in the evening sky. At midnight, Jupiter lies in the southwest and Saturn lies in the south. Mercury, Venus, and Uranus can be found in the east, Saturn in the southwest, and Neptune in the southeast at dawn.

Mercury can be seen with difficulty prior to dawn in early June. On June 1st, it is four degrees above the east-northeastern horizon 30 minutes before the Sun rises. The speediest planet is at perihelion on June 19th and is in superior conjunction on June 21st.

Venus is at greatest western elongation on June 3rd. On that date, it rises two hours before sunup and is greater than ten degrees above the eastern horizon an hour before the Sun rises. Venus departs Pisces and enters Aries on June 10th. A waning crescent Moon passes close to the brightest planet on the mornings of June 20th and June 21st. Venus passes into Taurus on June 28th and is situated some eight degrees from the Pleiades on June 30th.

Mars moves into Gemini on June 5th. During the second week of June, the Red Planet disappears into the glare of the Sun.

Jupiter decreases in angular diameter from 40.7 to 37.5 arc seconds and dims from magnitude -2.2 to magnitude -2.1 this month. The gas giant is located three degrees southeast of the third-magnitude star Gamma Virginis and sets around 3:00 a.m. as June begins. It ends retrograde (westward) motion on June 9th. Double Galilean satellite shadow transits take place on June 2nd, June 4th, June 5th, June 9th, June 12th, June 16th, June 20th, and June 23rd UT. Shadows precede the Galilean satellites before Jupiter reaches opposition and follow them after opposition. Browse <http://www.skyandtel...watching-tools/> or http://www.projectpl...om/jeve_grs.htm in order to determine transit times of Jupiter's central meridian by the Great Red Spot.

Saturn reaches opposition on June 15th. At midmonth, the Ringed Planet shines at magnitude +0.0 and spans 18.4 arc seconds. Its rings subtend 41.7 arc seconds and are inclined by 27 degrees, the most since 2003. Eighth-magnitude Titan is positioned north of Saturn on June 8th and June 24th. At 11:30 p.m. EDT on the night of opposition, Titan lies to the south of the planet, Dione is to the west, and Tethys, Enceladus, and Rhea are to the east.

During June, **Uranus** is low in the east as twilight ends. It lies 2.4 degrees northeast of Venus on June 1st and 1.8 degrees north of Venus on June 2nd. Uranus remains within two degrees of Venus through June 4th. The ice giant planet rises earlier with each passing night and is located one degree northwest of the fourth-magnitude star Omicron Piscium on June 30th. Visit <http://bluewaterastr...-chart-2017.png> for a finder chart.

By month's end, **Neptune** is positioned in the southeast at an altitude of about 40 degrees as morning twilight begins. The eighth planet lies between the fourth-magnitude stars Lambda and Phi Aquarii, about 15 arc minutes east of the sixth-magnitude star 81 Aquarii. Browse <http://bluewaterastr...-chart-2017.png> for a finder chart.

Pluto resides in northern Sagittarius. A finder chart appears on page 243 of the RASC Observer's Handbook 2017. (If you do not have one of these fine books you may purchase one at the Herrett Center Store.)

Mars Landers

Opportunity is on the western rim of "Endeavor Crater", the 14 mile wide crater located on "Meridiani Planum", the plain where the rover landed in January of 2004. Between Sol 4711 (April 25, 2017) and Sol 4738 (May 22, 2017), the rover imaged a few small "fresh" craters as it approached "Perseverance Valley" which cuts through the rim and descends to the bottom of the 984' deep crater. Since Sol 4720 (May 4, 2017), after arrival at the top of the wide spillway that tapers downhill into the channel at the center of the valley, Opportunity maneuvered around the top of the spillway to obtain wide-baseline stereo down-valley images for a detailed map revealing valley topography. The map is for planning a route down the valley to the floor of the crater. Solar array energy production averaged 394 watt-hours per sol and the rover has traveled 27.86 miles (44.8 kilometers) on Mars since 2004.

After scooping numerous samples of Bagnold Dune sand at the end of March, Curiosity moved farther through the dune field characterized by dark rock slabs with intervening sand patches and arrived at a position in front of the interesting "Moosehead Lake" outcrop with lots of veins and grey patches on Sol 1668-70 (April 14, 2017). The outcrop was examined with the Chemcam, Mastcam, and MAHLI cameras and the Science Laboratory moved to a curb of Murray bedrock for further observation on Sol 1674 (April 21, 2017). After studying another rock outcrop on Sol 1679 (April 26, 2017), the rover continued upward, testing bedrock composition at vertical intervals of 5 feet, toward Vera Rubin Ridge (initially called Hematite Ridge due to spectral hematite signatures obtained from orbit).

Summer Solstice

The Summer Solstice is on June 21st at 12:24AM, slightly less than 3 days before New Moon. Since the axis of the Earth is inclined directly toward the Sun on the solstice, the Sun appears to be overhead at 23.5° north latitude at noon during the day of the solstice. At 45° north latitude the noon position of the Sun is 68.5° above the south point on the horizon (90° - 45° + 23.5°). The night of the solstice is the shortest night of the year, the day is the longest. The Sun shines directly on the northern hemisphere of the Earth and less directly on the southern hemisphere causing northern hemisphere summer and southern hemisphere winter. The Earth is farthest from the Sun in early July which tends to moderate northern hemisphere summers and exaggerate winter in the southern hemisphere. This effect on average temperatures is counterbalanced by the moderating influence of widespread southern hemisphere oceans and the exaggerating effect of large northern hemisphere continents.

Planet Plotting

Morning planets include Mercury (-0.2 to -2.2 to -1.3) which moves through Aries and Taurus during June, and arrives in Gemini at month's end. Venus (-4.3 to -4.1) tracks through Pisces and Aries, moving into Taurus in June. Uranus (+5.9) is in Pisces, and Neptune (+7.9) is in Aquarius. Mercury is on the other side of the Sun and is at Superior Conjunction on the 21st, then it moves to the evening sky. It pairs with the waxing crescent Moon on the 24th. Mercury will be separated from Mars by less than 1° in Gemini after sunset on the 28th. They might be visible in the west in the Sun's glow. Venus is within 2° of Uranus on the 3rd and reaches maximum western elongation 7 hours later when it is 45.9° from the Sun in the morning sky. It is next to the Moon on the 20th. Saturn (+0.2 to -0.1 to +0.2) is in Ophiuchus in June. Adjacent to the Moon on the 9th, it brightens when approaching opposition on June 15th, then will dim slightly toward month's end. Uranus and Neptune rise after midnight and are in the southern sky before dawn. The Moon is adjacent to Neptune on the 16th and Uranus on the 19th. Evening planets in June include Mars (+1.9) in Taurus and Gemini. It is within 20° of the setting Sun on the 1st and closes to less than 10° by the 30th as it nears conjunction in July. It is near the waxing crescent Moon on the 24th. Jupiter (-2.2 to -2.0) in Virgo is in the south after sunset and sets after midnight.

Planet	Constellation	Magnitude	Planet Passages
Sun	Taurus, Gemini	-26.8	New Moon, 6/23 10:32PM EDT
Mercury	Aries Taurus Gemini	-0.2 to -2.2 to -1.3	Superior Conjunction, 9:55AM EDT, 6/21 Mars, 0.77°S, 6/28, 3PM EDT
Venus	Pisces Aries Taurus	-4.3 to -4.1	Uranus, 1.7°NNW 6/3, 1AM EDT Max. W. Elong. (45.9°), 6/3, 8AM EDT
Mars	Taurus, Gemini	+1.9	Mercury, 0.77°N, 6/28, 3PM EDT
Jupiter	Virgo	-2.2 to -2.0	
Saturn	Ophiuchus	+0.2 to -0.1 to +0.2	Opposition, 6/15, 5:15AM EDT
Uranus	Pisces	+5.8	Venus, 1.7°SSE 6/3, 1AM EDT
Neptune	Aquarius	+7.9	

For more on the planets and how to locate them, browse <http://www.nakedeyeplanets.com/>

Asteroids



Asteroid 12 Victoria glides northeastward through Virgo, remaining within 2.5 degrees of the first-magnitude star Spica (Alpha Virginis) for the entire month. The 112-kilometer-wide asteroid passes just southeast of the seventh-magnitude star 56 Virginis on the nights of June 7th and June 8th. During June, 12 Victoria decreases in brightness from magnitude +10.5 to magnitude +11.0. Asteroid 324 Bamberga (magnitude +10.3) is at opposition on June 23rd. Asteroid 10 Hygiea (magnitude +9.1) is at opposition on June 30th. Information on asteroid occultations taking place this month is available at http://www.asteroido.../2017_06_si.htm

Comets



Comet C/2015 V2 (Johnson) may shine at sixth magnitude as it heads southwestward through Boötes and into Virgo. It passes to the east of the first-magnitude star Arcturus on the nights of June 3rd and June 4th. The comet's closest approach to the Earth occurs on June 5th. Comet Johnson is at perihelion on June 12th. Ninth-magnitude Comet

41P/Tuttle–Giacobini–Kresák travels southward through Ophiuchus near the constellation's eastern border. Comet C/2015 ER61 (PanSTARRS) may reach seventh magnitude as it heads eastward through Pisces. Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.net/future-n.html> for additional information on these and other comets visible during June.

Meteors



The usually minor June **Boötids Class III** meteor shower may peak on the morning of June 24th. June Boötids are the slowest of all meteors, travelling at 18 kilometers (11 miles) per second. Browse http://www.popastro.....php?id_pag=485 for additional information.

Comet 7P Pons-Winneke which orbits the Sun every 6 years and was last at perihelion in 2016. Since the showers seem to occur when the comet is close to perihelion, there may not be much of a show by the relatively slow moving meteors.

Carbon Star



Carbon Star for June: V Coronae Borealis: Right Ascension; 15^h 49^m 31.31093^s / Declination; +39° 34' 17.9111"

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/>

The Deep Sky



Fifty deep-sky objects for June: NGC 5466, NGC 5676, NGC 5689 (Bootes); M102 (NGC 5866), NGC 5678, NGC 5879, NGC 5905, NGC 5907, NGC 5908, NGC 5949, NGC 5963, NGC 5965, NGC 5982, NGC 5985, NGC 6015 (Draco); NGC 5694 (Hydra); NGC 5728, NGC 5791, NGC 5796, NGC 5812, NGC 5861, NGC 5878, NGC 5897 (Libra); M5, NGC 5921, NGC 5957, NGC 5962, NGC 5970, NGC 5984 (Serpens Caput); M101, NGC 5473, NGC 5474, NGC 5485, NGC 5585, NGC 5631 (Ursa Major); NGC 5566, NGC 5634, NGC 5701, NGC 5713, NGC 5746, NGC 5750, NGC 5775, NGC 5806, NGC 5813, NGC 5831, NGC 5838, NGC 5846, NGC 5850, NGC 5854, NGC 5864 (Virgo)

Top ten deep-sky objects for June: M5, M101, M102, NGC 5566, NGC 5585, NGC 5689, NGC 5746, NGC 5813, NGC 5838, NGC 5907

Top five deep-sky binocular objects for June: M5, M101, M102, NGC 5466, NGC 5907

Challenge deep-sky object for June: Abell 2065.

The objects listed above are located between 14:00 and 16:00 hours of right ascension.

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

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

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

Giovanni Cassini (1625-1712), Charles Messier (1730-1817), George Ellery Hale (1868-1938), and Carolyn Shoemaker (1929) were born this month. The French astronomer Nicolas Louis de Lacaille discovered the globular cluster M55 on June 16, 1752. The French astronomer Charles Messier discovered M20 (the Trifid Nebula) on June 5, 1764. Charles Messier discovered the open cluster M23 on June 20, 1764. The French astronomer Pierre Méchain discovered the spiral galaxy M63 (the Sunflower Galaxy) on June 14, 1779. The Italian astronomer Giovanni Battista Donati discovered Comet C/1858 L1 (Donati), the first comet to be photographed, on June 2, 1858.

Native American Astronomical Fact: The Pawnee of the central plains (Nebraska and Kansas) did not view Venus as the morning star. Mars was their actual morning star and a ritual to the morning star was performed every 4-years.

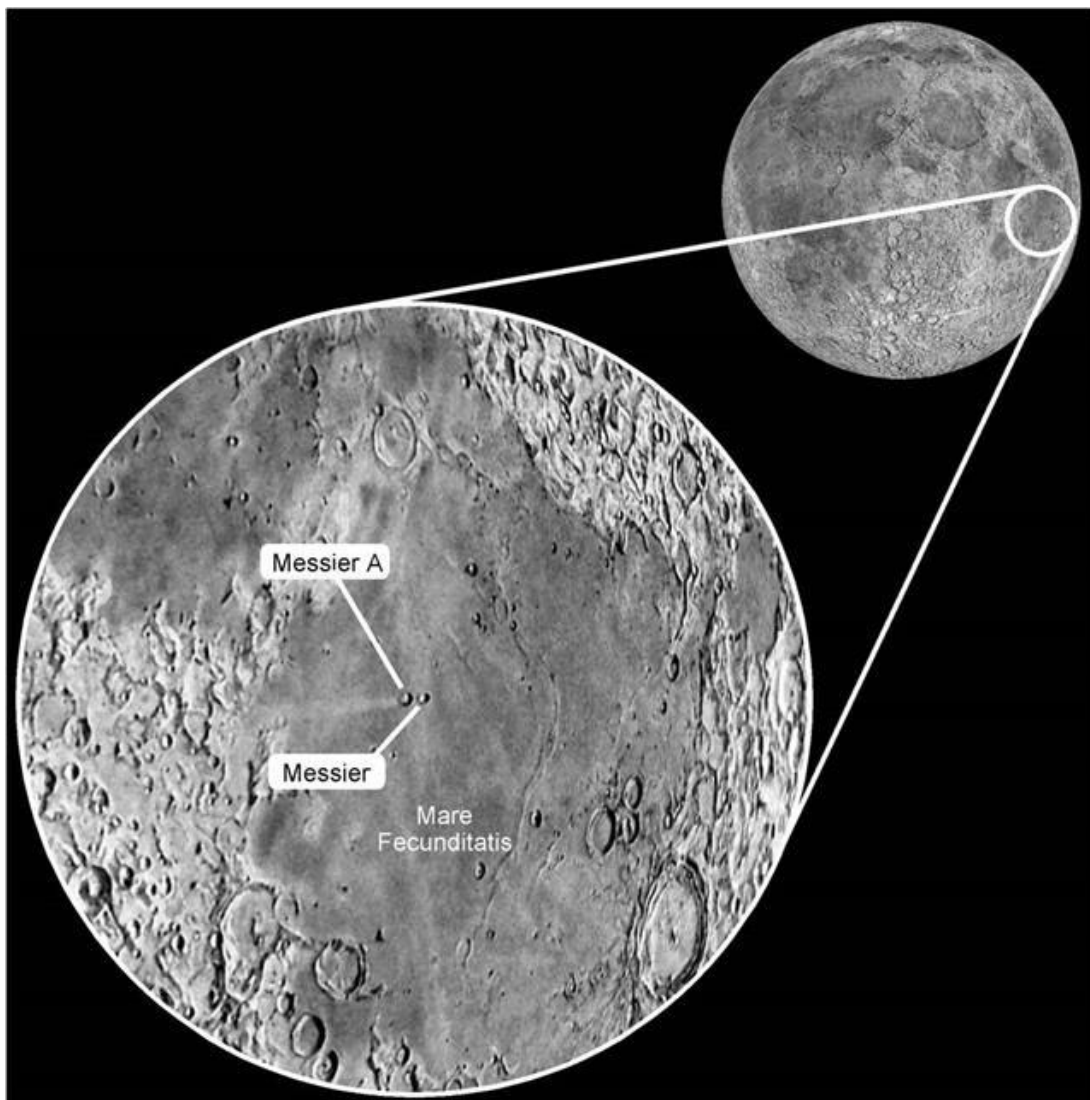


Abell 2065 By David Chifiriuc - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=57811466>

Cosmic Challenge

Target	Best lunar phases (days after New Moon)
Moon: Messier/Messier A	Days 4-8 and 15-16
Suggested aperture range	Giant binoculars and 3- to 5-inch (75-127mm) telescopes

Summer is in the offing here in the Northern Hemisphere and the longest day of the year is at hand. While many of us enjoy the warmer weather, the dark of night comes late in the evening and leaves all too early the following morning. So while deep-sky observing is limited, we can still enjoy viewing our Moon even if the sky is still bright. Yes, observing challenges await us on our nearest neighbor in space. This month, I thought I'd highlight one of my favorite lunar ports-of-call, the unusual pair of craters, Messier and Messier A. The best viewing nights this month are June 10 to 12, and again from June 27 to July 1. The double craters Messier and Messier A have a story to tell. Named for the famed French comet hunter, these craters are separated from one another by less than 4 miles (6 km). Both are nearly the same diameter and noticeably oval. Messier spans 5 miles by 7 miles (8 km by 11 km), while Messier A is a little larger, 7 miles by 8 miles (11 km by 13 km) across.



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 addition to their similar appearance, both craters also share a common origin. A billion or so years ago, a meteoroid slammed into Mare Fecunditatis (the Sea of Fertility). The meteoroid itself was not necessarily special. What was unique, however, was the narrow angle in which it struck the surface.

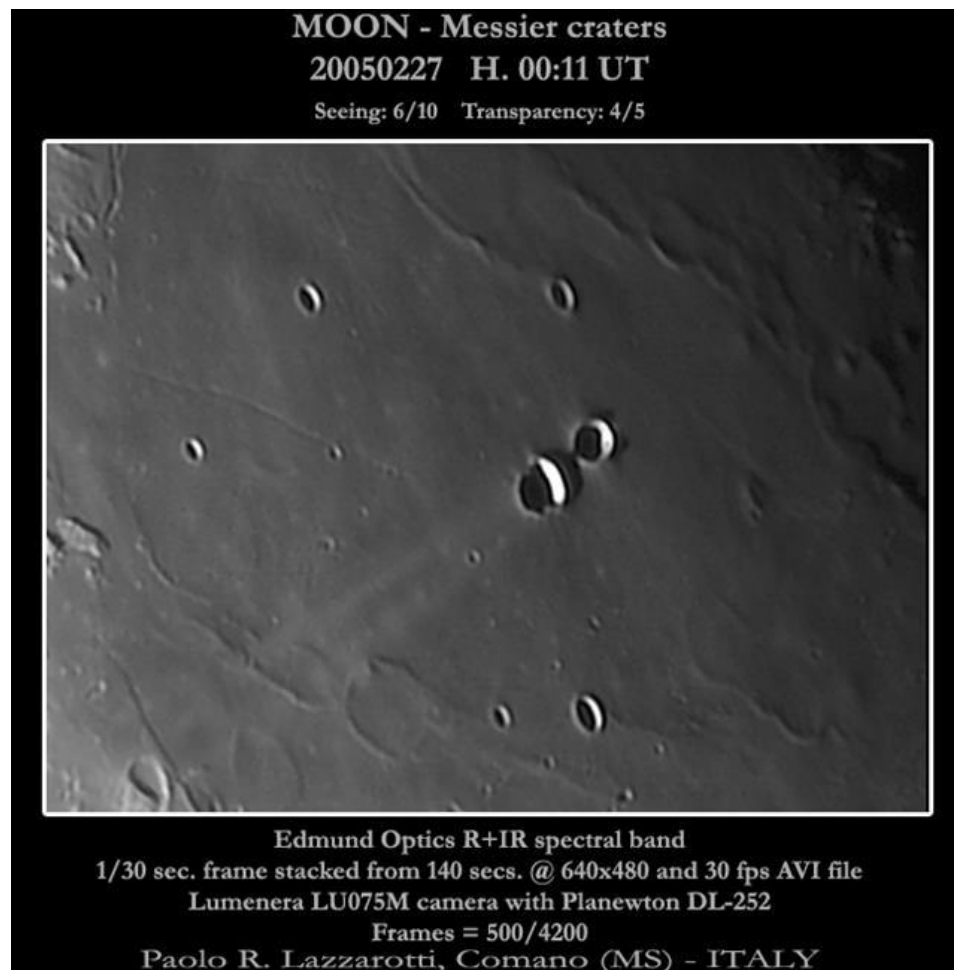
Tests conducted by Don Gault of NASA's Ames Research Center and John Wedekind of Caltech in 1978 suggest that the impact angle was probably less than 5°. The initial impact created the crater Messier, the western member of the duet. But then, just as a flat stone skips when it strikes a pond at a narrow angle, the meteoroid fractured. A large fragment skipped and was propelled another 4 miles (6 km) downrange, until it struck the surface to create Messier A. An ejecta field from that second impact threw twin rays of bright material further downrange. This unique pair of rays, looking almost like twin comet tails, immediately calls attention to the two craters. The twin parallel rays extend westward some 90 miles (145 km), nearly the full breadth of the mare.

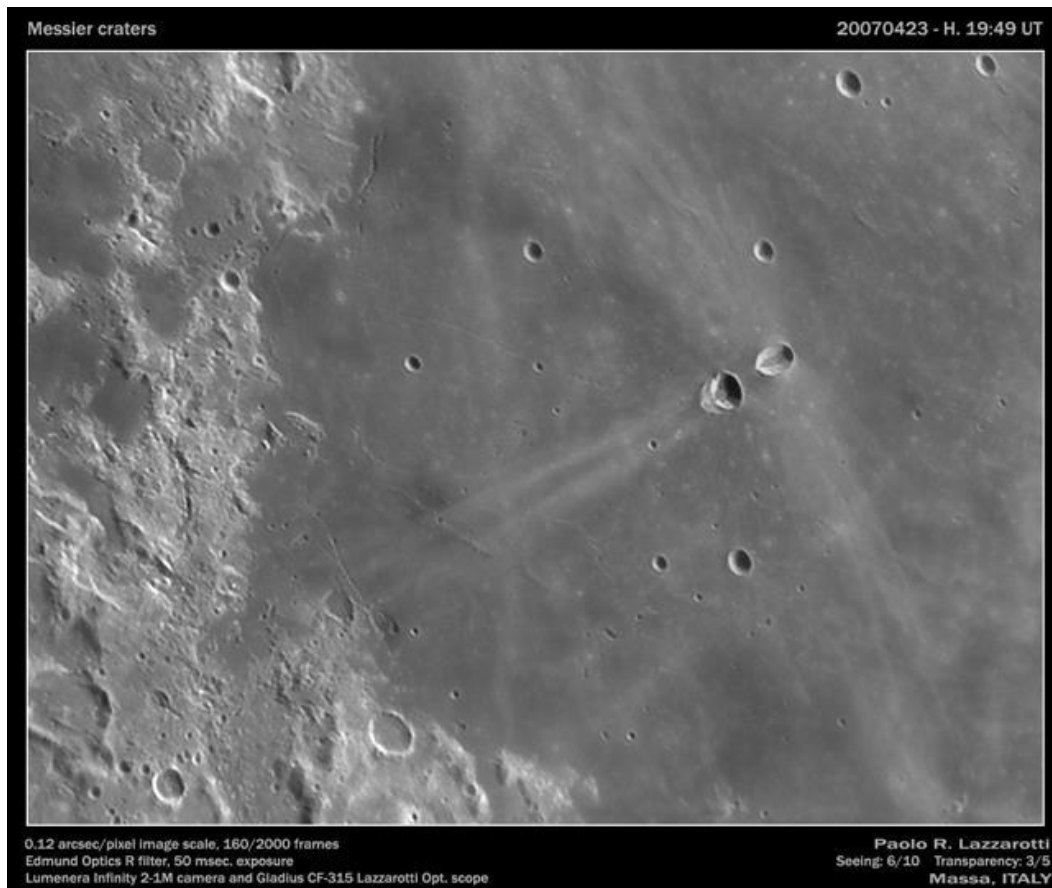
Isn't it wonderfully ironic that a crater with Messier's name attached looks like a comet!

Take a close look at Messier A. Notice how its western rim appears distended and partially upraised, almost as if there is a second rim? Some believe this may be the result of the meteoroid creating Messier A fracturing and ricocheting again either before or upon impact. Nowadays, however, most prefer the theory that a newer impact occurred almost directly on top of an earlier impact, resulting a newer crater almost erasing an older crater.

Although not nearly as obvious as those sweeping westward from Messier A, crater Messier also has a system of ejecta rays. Curiously, the ejecta blanket surrounding Messier fans out to the north and south of the crater itself, perpendicular to the impact. Those same tests conducted in 1978 show that not only is this possible, but is actually very likely during a compound impact. If the lighting is right, the overall appearance of Messier, Messier A, and the craters' respective ejecta fields looks like a parrot in flight, with the fainter rays from Messier posing as the bird's outstretched wings and the twin searchlight-like beacons from Messier A its long tail feathers.

Here are a pair of photos of the pair of craters taken by Paolo Lazzarotti, an exceptional photographer from Italy. His name is likely familiar to those who frequent the Lunar Picture of the Day (LPD) web site. And if you enjoy these two perspectives of Messier and Messier A, be sure to visit Paolo's [web site](#) to view his solar system portfolio.



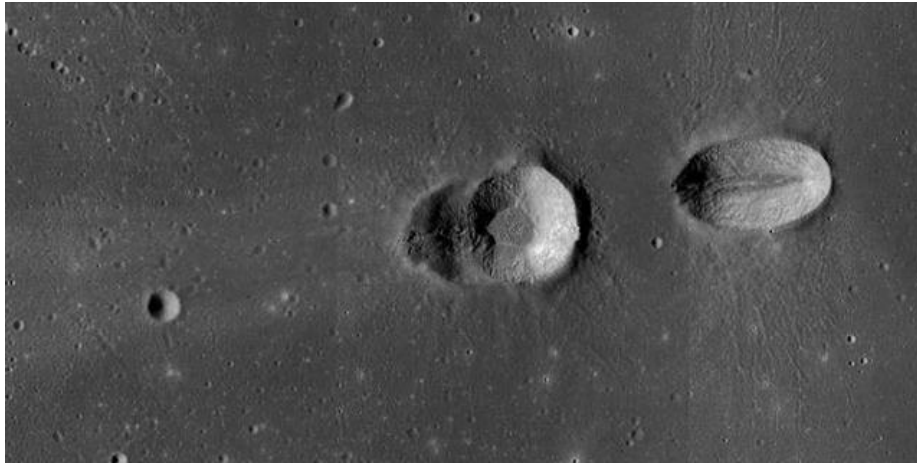


Above: Two perspectives of the unusual impact craters Messier (right) and Messier A (left). The top image was taken on 27 February 2005, when the Moon was 19 days past New. Notice how the low angle of the setting accentuates the craters' rims, but extinguishes the unique ejecta fields. The bottom image was taken on 23 April 2007, 6 days after New. With the Sun higher in the craters' sky, the perpendicular ejecta fields become much more evident. **Credit:** Paolo Lazzarotti

The image below was taken from a much closer vantage point, in lunar orbit aboard Apollo 15 in 1971. The steep angle of sunlight at the time the photo was taken offers no shadow relief, but highlights the crater's bright floors, including Messier's strange "coffee bean" appearance.

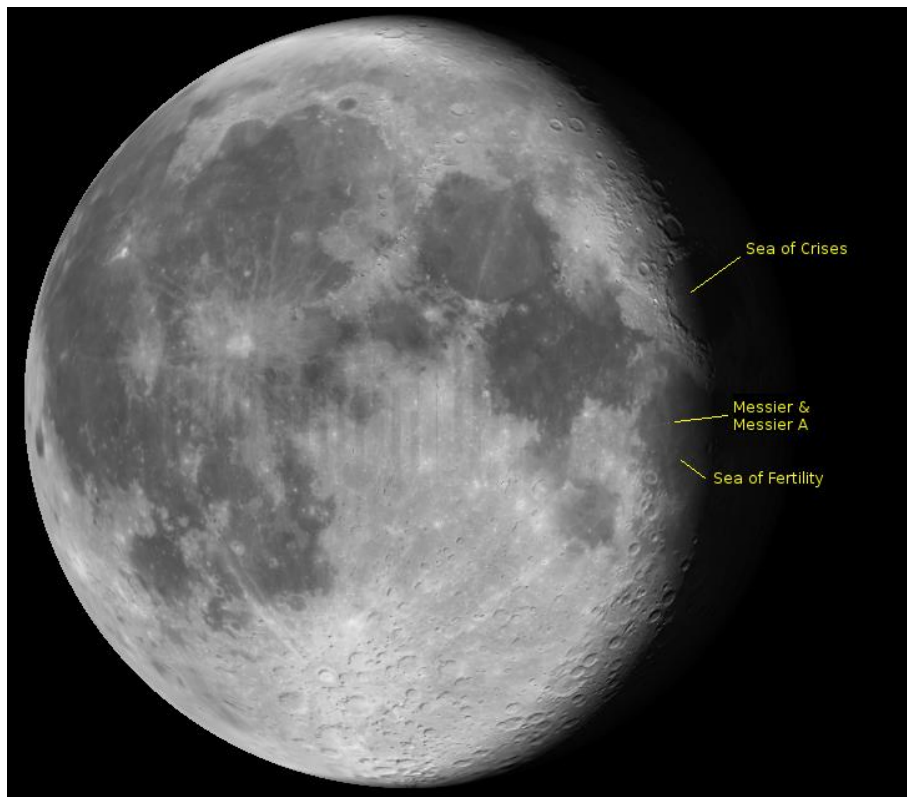


Above: Close-up image of the unusual impact craters Messier (right) and Messier A (left) taken by Apollo 15 in 1971. **Credit:** NASA/JSC/Arizona State University



Above: As mentioned earlier, Messier A appears to be a double crater itself. This image, taken by the Lunar Reconnaissance Orbiter, shows that effect beautifully. The smaller, older crater appears partial exposed to the lower left of the newer, superimposed crater.

Credit: NASA/JSC/Arizona State University



Finally, on an historical footnote to you old timers, some of you may recall that Messier A was originally named Pickering, after the Harvard astronomer William H. Pickering. The name was changed to Messier A in 1964 after the International Astronomical Union ruled at the time that Pickering's bizarre ideas about plant life on the Moon, notably in the crater Eratosthenes, made him an inappropriate choice for a crater named in his honor. You will still find a crater named Pickering near the crater Hipparchus, but that is technically for Edward Pickering, William's older brother. You can read the [first of his six-part thesis](#) in this Google Books compilation of [Popular Astronomy](#) magazine from 1919. Three years later, Elizabeth Smith wrote more about the subject in an article entitled [Is there life on the moon?](#) (Publication of the Pomona College Astronomical Society, vol. 7, pp.49-51).

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

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

Phil Harrington's Cosmic Challenge is copyright 2017 by Philip S. Harrington. All rights reserved. Reproduction and use in this newsletter is permitted with written permission of the copyright holder.

The Fizzy Seas of Titan

By Marcus Woo

With clouds, rain, seas, lakes and a nitrogen-filled atmosphere, Saturn's moon Titan appears to be one of the worlds most similar to Earth in the solar system. But it's still alien; its seas and lakes are full not of water but liquid methane and ethane. At the temperatures and pressures found on Titan's surface, methane can evaporate and fall back down as rain, just like water on Earth. The methane rain flows into rivers and channels, filling lakes and seas.

Nitrogen makes up a larger portion of the atmosphere on Titan than on Earth. The gas also dissolves in methane, just like carbon dioxide in soda. And similar to when you shake an open soda bottle, disturbing a Titan lake can make the nitrogen bubble out.

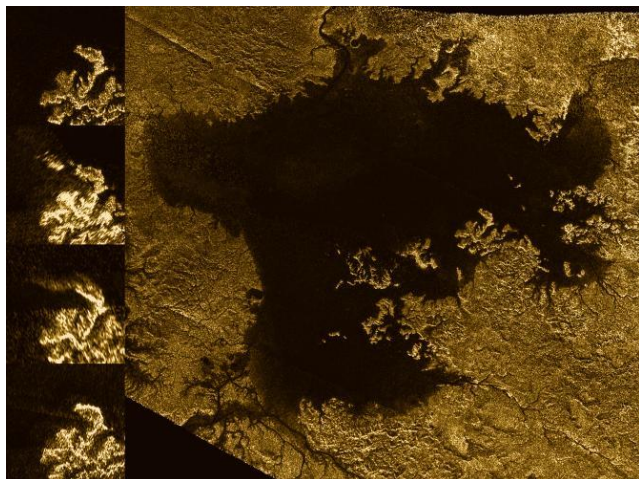
But now it turns out the seas and lakes might be fizzier than previously thought. Researchers at NASA's Jet Propulsion Laboratory recently experimented with dissolved nitrogen in mixtures of liquid methane and ethane under a variety of temperatures and pressures that would exist on Titan. They measured how different conditions would trigger nitrogen bubbles. A fizzy lake, they found, would be a common sight.

On Titan, the liquid methane always contains dissolved nitrogen. So when it rains, a methane-nitrogen solution pours into the seas and lakes, either directly from rain or via stream runoff. But if the lake also contains some ethane—which doesn't dissolve nitrogen as well as methane does—mixing the liquids will force some of the nitrogen out of solution, and the lake will effervesce. "It will be a big frothy mess," says Michael Malaska of JPL. "It's neat because it makes Earth look really boring by comparison."

Bubbles could also arise from a lake that contains more ethane than methane. The two will normally mix, but a less-dense layer of methane with dissolved nitrogen—from a gentle rain, for example—could settle on top of an ethane layer. In this case, any disturbance—even a breeze—could mix the methane with dissolved nitrogen and the ethane below. The nitrogen would become less soluble and bubbles of gas would fizz out.

Heat, the researchers found, can also cause nitrogen to bubble out of solution while cold will coax more nitrogen to dissolve. As the seasons and climate change on Titan, the seas and lakes will inhale and exhale nitrogen. But such warmth-induced bubbles could pose a challenge for future sea-faring spacecraft, which will have an energy source, and thus heat. "You may have this spacecraft sitting there, and it's just going to be fizzing the whole time," Malaska says. "That may actually be a problem for stability control or sampling."

Bubbles might also explain the so-called magic islands discovered by NASA's Cassini spacecraft in the last few years. Radar images revealed island-like features that appear and disappear over time. Scientists still aren't sure what the islands are, but nitrogen bubbles seem increasingly likely. To know for sure, though, there will have to be a new mission. Cassini is entering its final phase, having finished its last flyby of Titan on April 21. Scientists are already sketching out potential spacecraft—maybe a buoy or even a submarine—to explore Titan's seas, bubbles and all.



Caption: Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this "magic island" is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell.

Centennial Observatory and Faulkner Planetarium

Event	Place	Date	Time	Admission
Summer Solar Session #2	Centennial Observatory	Wednesday, June 7 th , 2017	1:30 to 3:30 PM	FREE
Monthly Free Star Party	Centennial Observatory	Saturday, June 10 th , 2017	9:45 PM to midnight	FREE
Summer Solar Session #3	Centennial Observatory	Wednesday, June 14 th , 2017	1:30 to 3:30 PM	FREE
Summer Solar Session #4	Centennial Observatory	Wednesday, June 21 st , 2017	1:30 to 3:30 PM	FREE
Hagerman Star Party (4 th annual)	Hagerman Fossil Beds National Monument	Saturday, June 24 th , 2017	1:00 PM to 12:00 AM	FREE
Summer Solar Session #5	Centennial Observatory	Wednesday, June 28 th , 2017	1:30 to 3:30 PM	FREE



CSI Centennial Observatory / Faulkner Planetarium Herrett Center
College of Southern Idaho Campus Twin Falls, ID
Faulkner Planetarium / Show Times

<http://herrett.csi.edu/astronomy/planetarium/showtimes.asp>

[Now Showing](#)



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, \$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.