Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, October 13th 2018
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho.

Public Star Party follows at the Centennial Observatory

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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

October 2018

Routines are something we all appreciate or dislike or simply fall into. They give us the little milestones for our workday or mark our calendars with holidays and planned events. The one overriding routine we all enjoy is the change of the seasons and the night sky. I'm musing on this as I think of the observing habits we all have, in particular the preparations for a night outside. This time of year in Idaho we would make sure we have cooler weather gear and perhaps a thermos of warm beverage before aligning our scopes and locating our first target for the night. Here in Florida the routine is quite a bit different.

I can't remember ever observing in shorts, sandals and a light, short-sleeved shirt. Nor making sure I am covered with insect repellent and have a rain jacket and tarp nearby, even though the sky is clear. Standing at a telescope, feeling sand between my toes and hearing the surf crashing were also new observing experiences.

However, the same thrill of seeing into our universe was there, as well as the phases of the moon and Venus, the moons of Jupiter and the ruddy face of Mars. Saturn is still a big crowd pleaser and more than once I heard exclamations of surprise and joy as someone's first look through a telescope rewarded them with a real view of what they might have only seen in photos. Star parties, regardless of the location, are always capable of bringing wonder to us.

On a broader scale, one of the main functions of any astronomy group is to bring the universe to people. The North East Florida Astronomical Society does this with monthly public observing sessions at a popular beach area where families gather for seaside outings. For us, it might be a foray to Hagerman, Castle Rocks or the newly instituted sidewalk astronomy evenings in Twin Falls. The important thing is that we provide the public with the opportunity to look up at the sky and look out from their daily routines and into the universe. These moments of literally seeing the "bigger picture" provide perspective on our lives and give us a chance to reflect on how small some of our problems really are.

With all this in mind, enjoy this month's Hagerman star party at the Oregon Trail Overlook on the 6th, our meeting on the 13th where we will see the year in pictures and have our elections for next year's officers. Also, do take a moment to appreciate what a wonderful place we live in.

Good seeing to you all,

Tim

Calendar

October 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Last Quarter Visible 50% ↓ Age: 22.24 Days 	3	4	5	6 Hagerman Star Party see pg. 7 for details.
7	8 Columbus Day Thanksgiving Day – Canada 	9	10	11	12	13 MVAS Meeting at 7:00pm at the Herrett Center Faulkner Planetarium Public Star Centennial Obs.
14	15	16 First Quarter 48% Visible ↑ Age: 7.16 Days 	17	18	19	20 International Observe the Moon Night Details pg. 8 
21	22	23 Full Moon 100% Visible Thunder Moon 	24	25	26	27
28	29	30	31 Halloween Last Quarter  			

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month.
 Full Moon names follow the traditional Algonquin First Nation history.

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

Celestial Events Calendar

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

10/1 The Moon is 3.5 degrees south of the bright open cluster M35 in Gemini at 22:00
10/2 Last Quarter Moon occurs at 9:45
10/3 The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to be visible at 7:00; the Moon is 7.5 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 11:00
10/4 The Moon is at the ascending node (longitude 123.5 degrees) at 3:11; the Moon is 1.2 degrees south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 10:00
10/5 Venus is stationary in right ascension, with retrograde (westward) motion to commence, at 4:00; Mercury is 2.0 degrees north of the first-magnitude star Spica (Alpha Virginis) at 18:00; Venus is stationary in longitude at 19:00; the Moon is at perigee, subtending 32' 37" from a distance of 366,392 kilometers (227,666 miles), at 22:27; the Moon is 1.8 degrees north-northeast of the first-magnitude star Regulus (Alpha Leonis) at 23:00
10/6 Mercury is at the descending node through the ecliptic at 0:00; 9 Mercury (magnitude -0.6) is 2.0 degrees north-northeast of Spica at 9:00
10/7 The dwarf planet/asteroid 1 Ceres is in conjunction with the Sun at 10:00
10/8 The peak of the Draconid meteor shower (10 to 30 per hour) occurs at 15:00
10/9 New Moon occurs (lunation 1185) at 3:47; the Moon is 7.0 degrees north-northeast of Spica at 18:00
10/10 The Moon is 5.5 degrees north-northeast of Mercury at 4:00
10/11 The Moon is 3.9 degrees north-northeast of Jupiter at 23:00
10/13 The Moon is 8.6 degrees north of Antares (Alpha Scorpii) at 6:00
10/15 The Moon 1.8 degrees north of Saturn at 3:00; the winter solstice occurs in the northern hemisphere of Mars at 21:00
10/16 Venus (magnitude -4.3) is 6.2 degrees south-southwest of Mercury (magnitude -0.3) at 3:00; Mercury is at aphelion (0.4667 a.u. from the Sun) at 9:00; asteroid 3 Juno is stationary at 18:00; First Quarter Moon occurs at 18:02: the Lunar X, also known as the Purbach or Werner Cross, an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 19:22
10/17 Moon at descending node (longitude 302.2 degrees) at 12:08; the Moon is at apogee, subtending 29' 34" from a distance of 404,227 kilometers (251,175 miles), at 19:16
10/18 The Moon is 1.9 degrees north-northwest of Mars at 12:00
10/20 Saturn is at greatest declination south (-22.8 degrees) at 20:00; the Moon is 3.0 degrees south of Neptune at 22:00
10/21 The peak of the Orionid meteor shower (15 per hour) occurs at 18:00
10/24 Uranus is at opposition (magnitude +5.7, apparent size 3.7") at 1:00; the Moon is 4.4 degrees south-southeast of Uranus at 16:00; Full Moon, known as the Blood or Sanguine Moon and this year's Harvest Moon, occurs at 16:45
10/25 Pluto is at the descending node through the ecliptic plane at 20:00
10/26 Venus is in inferior conjunction with the Sun (0.272 a.u. from the Earth and 6.26 degrees south of the Sun) at 14:00; the Moon is 8.4 degrees south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 21:00
10/27 The Moon is 1.6 degrees north of Aldebaran (Alpha Tauri) at 13:00
10/29 The Moon is 3.3 degrees south of M35 at 4:00; Mercury (magnitude -0.2) is 3.1 degrees south-southwest of Jupiter (magnitude -1.7) at 7:00
10/30 The Moon is 7.3 degrees south of Pollux at 17:00
10/31 The Moon at ascending node (longitude 120.6 degrees) at 3:46; the Sun enters Libra (longitude 217.80 degrees on the ecliptic) at 7:00; the Moon is 0.68 degree south of M44 (the Beehive Cluster or Praesepe) at 16:00; Last Quarter Moon occurs at 16:41; the Moon is at perigee, subtending 32' 17" from a distance of 370,204 kilometers (230,034 miles), at 20:23

Ejnar Hertzsprung and Henry Norris Russell were born this month.

The first recorded solar eclipse took place on October 22, 2136 BCE. Supernova SN 1604 (Kepler's Supernova) became visible to the naked-eye on October 9, 1604. Giovanni Cassini discovered Saturn's odd satellite Iapetus on October 25, 1671. M51a (the Whirlpool Galaxy) was discovered by Charles Messier on October 13, 1773. William Lassell discovered Triton, Neptune's brightest satellite, on October 10, 1846. Marie Mitchell discovered Comet C/1847 T1 (Miss Mitchell's Comet) on October 1, 1847. Asteroid 8 Flora was discovered by John Russell Hind on October 18, 1847. Two of the satellites of Uranus, Ariel and Umbriel, were discovered by William Lassell on October 24, 1851. Edwin Hubble discovered Cepheid variable stars in M31 (the Andromeda Galaxy) on October 5, 1923. Charles Kowal discovered 2060 Chiron, the first Centaur asteroid, on October 18, 1977. Michel Mayor and Didier Queloz announced the discovery of the exoplanet 51 Pegasi b (Dimidium) on October 6, 1995.

The Sun, the Moon, & the Planets

The Moon is 21.1 days old, subtends 31.5 arc minutes, is illuminated 67.5%, and is located in Pisces on October 1st at 0:00 UT. The Moon reaches its greatest northern declination (+21.3 degrees) on October 30th and its greatest southern declination (-20.9 degrees) on October 15th. Longitudinal libration is at a maximum of +6.1 degrees on October 12th and a minimum of -4.8 degrees on October 24th. Latitudinal libration is at a maximum of +6.6 degrees on October 25th and a minimum of -6.5 degrees on October 10th. New Moon occurs on October 9th. The Moon is at apogee (a distance of 63.38 Earth-radii) on October 17th and at perigee (a distance of 57.45 Earth-radii) on October 5th and again (a distance of 58.05 Earth-radii) on October 31st. Consult http://www.lunar-occ...ets/planets.htm and http://www.lunar-occ...bstar/bstar.htm for further information on lunar occultation events. Visit http://saberdoesthes...does-the-stars/ for tips on spotting extreme crescent Moons and http://www.curtrenz.com/moon06.html for Full Moon data. Times and dates for the lunar light rays predicted to occur in October are available at http://www.lunar-occ...o/rays/rays.htm

Mercury reenters the evening sky low in the southwest in late October. Southern hemisphere observers are favored. Mercury is at the descending node on October 6th and reaches aphelion on October 16th.

At 40 degrees north latitude, **Venus** is just two degrees high 30 minutes after the Sun sets. Venus is stationary on October 5th and retrogrades sunward afterwards. The brightest planet passes six degrees south of the Sun when it achieves inferior conjunction on October 26th. Just prior to that Venus will appear as an extremely thin crescent and will subtend more one arc minute. Venus enters the morning sky in early November.

Mars fades from magnitude -1.3 to magnitude -0.6 and decreases in apparent size from 15.8 to 12.0 arc seconds this month. This is about half of its angular diameter when it achieved opposition in late July. Mars reaches culmination around 9:00 p.m. local daylight time at the start of the month. Mare Cimmerium is the most prominent albedo feature as October begins, followed by Mare Sirenum at the end of the first week. In mid-October, look for Solis Lacus (the Eye of Mars). Sinus Meridian and Sinus Sabaeus stand out a week later. During the final week of October, the bright Hellas basin and Syrtis Major make an appearance. The waxing gibbous Moon passes 1.9 degrees north of the Red Planet on October 18th. The eastward motion of Mars carries it from southwestern to northeastern Capricornus by the end of October. Martian surface feature simulators are available at https://is.gd/marsprofiler and https://www.calsky.c...cgi/Planets/5/1

On October 1st, **Jupiter** is ten degrees above the horizon one hour after the Sun sets. It loses approximately three degrees of altitude each week. The waxing crescent Moon passes four degrees south of Mars on October 11th.

Saturn is low in the south in early evening in early October and sets around 11:00 p.m. local daylight time. By the end of the month, it sets after 9:00 p.m. Saturn lies 1.8 degrees south of the waxing crescent Moon on the evening of October 14th in the Americas. The Ringed Planet's disk is some 16 arc seconds in angular diameter in mid-October. Its rings measure 37 arc seconds and are inclined 27 degrees. Twelfth-magnitude Enceladus reaches greatest eastern elongation on the night of October 1st.

Uranus reaches opposition on October 24th. At that time, the seventh planet is located at a declination of +11.0 degrees (the highest it has been at opposition since February 1962), shines at magnitude +5.7, and subtends 3.7 arc seconds. The ice giant is located 2.8 degrees northeast of the fourth-magnitude star Omicron Piscium for several nights around the time of opposition. Browse http://www.bluewater...anus_2018_1.pdf for a finder chart.

Neptune is located midway between the fourth-magnitude stars Lambda and Phi Aquarii in early October. The eighth planet's retrograde (westward) motion takes it closer to Lambda over the course of the month. Its position is 2.1 degrees east of that star on October 31st. A finder chart is posted http://www.bluewater...une_2018_1.pdf

The dwarf planet **Pluto** is located in northeastern Sagittarius near the Teaspoon asterism. Finder charts for Pluto are available on pages 48 and 49 of the July 2018 issue of Sky & Telescope and page 243 of the RASC Observer's Handbook 2018. A finder chart is posted online at http://www.bluewater...018-Mar2019.jpg

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://nineplanets.org/ and http://www.curtrenz.com/astronomy.html

Various events taking place within our solar system are discussed at http://www.bluewater...ed-4/index.html

Asteroids

Asteroid **4 Vesta** shines at eighth magnitude as it travels eastward through Sagittarius this month. It lies 2.1 degrees to the west of Lambda Sagittarii (magnitude +2.8) on October 1st and within one degree of that star from October 5th to October 9th. Vesta passes 20 arc minutes south of Lambda Sagittarii on October 7th. It lies within one degree north of Sigma Sagittarii (magnitude +2.1) from October 21st to October 24th, passing just 40 arc minutes from that star on October 23rd. The second largest of the main belt asteroids glides south of three globular clusters during October. It lies within one degree of M28 and NGC 6638 during the first ten days of the month and within two degrees of M22 during the second week of October. Two asteroids brighter than magnitude +11.0 reach opposition this month, namely 63 Ausonia on October 7th and 346 Hermentaria on October 16th. The main belt asteroid 216 Kleopatra occults the star TYC 765-506-1 (magnitude +11.1) in northern Canis Major on the morning of October 28th. For information on this and other upcoming asteroid occultation events and on the bright asteroids, consult http://asteroidoccultation.com/ and http://www.curtrenz.com/asteroids.html respectively

Carbon Star

Notable carbon star for October: **RZ Pegasi** | Right Ascension $22^h\ 05^m\ 52^s$ | Declination +33° 30’ 24”

Comets

Comet **21P/Giacobini-Zinner** should shine at eighth magnitude as it dives southeastward through Monoceros and Puppis this month. The periodic comet passes just north of the open cluster M50 on October 7th. Click on https://theskylive.com/21p-info and http://www.cometwatch.co.uk/comet-21p/ for additional information. Another periodic comet, Comet 38P/Stephan-Oterma, may shine at tenth magnitude as it heads northeastward through northeastern Orion and southeastern Gemini. It passes approximately five degrees north of the first-magnitude star Betelgeuse on the morning of October 1st and just over one degree south of the fourth-magnitude star Xi Orionis on the morning of October 8th. A finder chart appears on page 48 of the October 2018 issue of Sky & Telescope. Browse http://cometchasing.skyhound.com/ and http://www.aerith.ne...t/future-n.html for further information on comets visible this month. Other sources of information include https://theskylive.com/comets and http://www.shopplaza...mets/comets.htm and http://britastro.org...arts_comet.html

Meteors

The Draconid (formerly the Giacobinid) meteor shower peaks on the night of October 8th/9th. The Draconids are quite variable and have produced meteor storms in 1933 and 1946. Comet 21P/Giacobini-Zimmer is the parent comet of the Draconids. Since this periodic comet reached perihelion in September, an outburst may be possible. Consult http://earthsky.org/...d-meteor-shower for additional information on the Draconid meteor shower. The Southern Taurid shower, debris from Comet 2P/Encke, may produce five meteors per hour when it peaks on October 10th. The Orionid meteor shower peaks on the night of October 21st but is compromised by a 91%-illuminated waxing gibbous Moon. However, there will be a two-hour window of darkness before morning twilight begins. Orionid meteors are fragments of Comet 1P/Halley. Browse http://www.timeandda...er/orionid.html or http://earthsky.org/...d-meteor-shower for more on the Orionids.

Orbiting Earth

Information on Iridium flares and passes of the ISS, the Tiangong-2, the USAF's X-37B, the HST, and other satellites can be found at http://www.heavens-above.com/

The Deep Sky

Seventy-five deep-sky objects for October: NGC 7640, NGC 7662, NGC 7686 (Andromeda); NGC 7180, NGC 7183, NGC 7184, NGC 7293, NGC 7392, NGC 7585, NGC 7606, NGC 7721, NGC 7723, NGC 7727 (Aquarius); Cz43, K12, M52, NGC 7635, NGC 7788, NGC 7789, NGC 7790, St12 (Cassiopeia); B171, B173-4, IC 1454, IC 1470, K10, Mrk50, NGC 7235, NGC 7261, NGC 7354, NGC 7380, NGC 7419, NGC 7510 (Cepheus); IC 1434, IC 5217, NGC 7209, NGC 7223, NGC 7243, NGC 7245 (Lacerta); NGC 7177, NGC 7217, NGC 7320 (the brightest galaxy in Stephan's Quintet), NGC 7331, NGC 7332, NGC 7339, NGC 7448, NGC 7454, NGC 7479, NGC 7619 (the brightest member of Pegasus I), NGC 7626, NGC 7678, NGC 7742, NGC 7769 (Pegasus); NGC 7541, NGC 7562, NGC 7611 (Pisces); IC 5156, IC 5269, IC 5271, NGC 7172, NGC 7173, NGC 7174, NGC 7176, NGC 7201, NGC 7203, NGC 7214, NGC 7221, NGC 7229, NGC 7314, NGC 7361 (Piscis Austrinus); NGC 7507, NGC 7513, NGC 7713, NGC 7755, NGC 7793 (Sculptor)

Top ten binocular deep-sky objects for October: M52, NGC 7209, NGC 7235, NGC 7243, NGC 7293, NGC 7510, NGC 7686, NGC 7789, NGC 7790, St12

Top ten deep-sky objects for October: K12, M52, NGC 7209, NGC 7293, NGC 7331, NGC 7332, NGC 7339, NGC 7640, NGC 7662, NGC 7789

Challenge deep-sky object for October: **Jones 1 (PK104-29.1)** Planetary Nebula in Pegasus Right Ascension: 23h 35m 53.5s Declination: +30° 28' 01 Mag: 15, Size: 5.5'(3.5 ly), Distance: 2300 ly

Freeware sky atlases can be downloaded at http://www.deepskywatch.com/files/deepsky-atlas/Deep-Sky-Hunter-atlas-full.pdf and http://astro.mxd120.com/free-star-atlases

Free star charts for the month can be downloaded at http://www.skymaps.com/downloads.html and https://www.telescop...thly-Star-Chart

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...k110BestNGC.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

The multiple star 36 Ophiuchi consists of three orange dwarf stars. For more on this interesting system, see https://stardate.org...orange-triplets and http://www.solstatio...rs/36ophiu3.htm

The zodiacal light may be visible in the pre-dawn eastern sky from a dark site, assuming that there is no moonlight present. Articles on the zodiacal light appear at http://www.atoptics....ighsky/zod1.htm and http://earthsky.org/...t-or-false-dawn

The objects listed above are located between 22:00 and 24:00 hours of right ascension.

5th annual

Hagerman Fossil Beds Fall Star Party

See cosmic light as old as the Hagerman Horse

Saturday, Oct. 6th, 2018

★8:00 PM-12:00 AM+ — **Star party** (telescope viewing), Oregon Trail Overlook, Bell Rapids Rd., Hagerman Fossil Beds NM

Telescopes provided. Free admission.

Hosted by: Hagerman Fossil Beds National Monument, Magic Valley Astronomical Society, and the College of Southern Idaho's Centennial Observatory.

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Observe the Moon

By Jane Houston Jones and Jessica Stoller-Conrad

This year's International Observe the Moon Night is on Oct. 20. Look for astronomy clubs and science centers in your area inviting you to view the Moon at their star parties that evening!

On Oct. 20, the 11-day-old waxing gibbous Moon will rise in the late afternoon and set before dawn. Sunlight will reveal most of the lunar surface and the Moon will be visible all night long. You can observe the Moon's features whether you're observing with the unaided eye, through binoculars or through a telescope.

Here are a few of the Moon's features you might spot on the evening of October 20:

Sinus Iridum—Latin for "Bay of Rainbows"—is the little half circle visible on the western side of the Moon near the lunar terminator—the line between light and dark. Another feature, the Jura Mountains, ring the Moon's western edge. You can see them catch the morning Sun.

Just south of the Sinus Iridum you can see a large, flat plain called the Mare Imbrium. This feature is called a mare—Latin for "sea"—because early astronomers mistook it for a sea on Moon's surface. Because the Moon will be approaching full, the large craters Copernicus and Tycho will also take center stage.

Copernicus is 58 miles (93 kilometers) across. Although its impact crater rays—seen as lines leading out from the crater—will be much more visible at Full Moon, you will still be able to see them on October 20. Tycho, on the other hand, lies in a field of craters near the southern edge of the visible surface of the Moon. At 53 miles (85 kilometers) across, it's a little smaller than Copernicus. However, its massive ray system spans more than 932 miles (1500 kilometers)!

And if you're very observant on the 20th, you'll be able to check off all six of the Apollo lunar landing site locations, too!

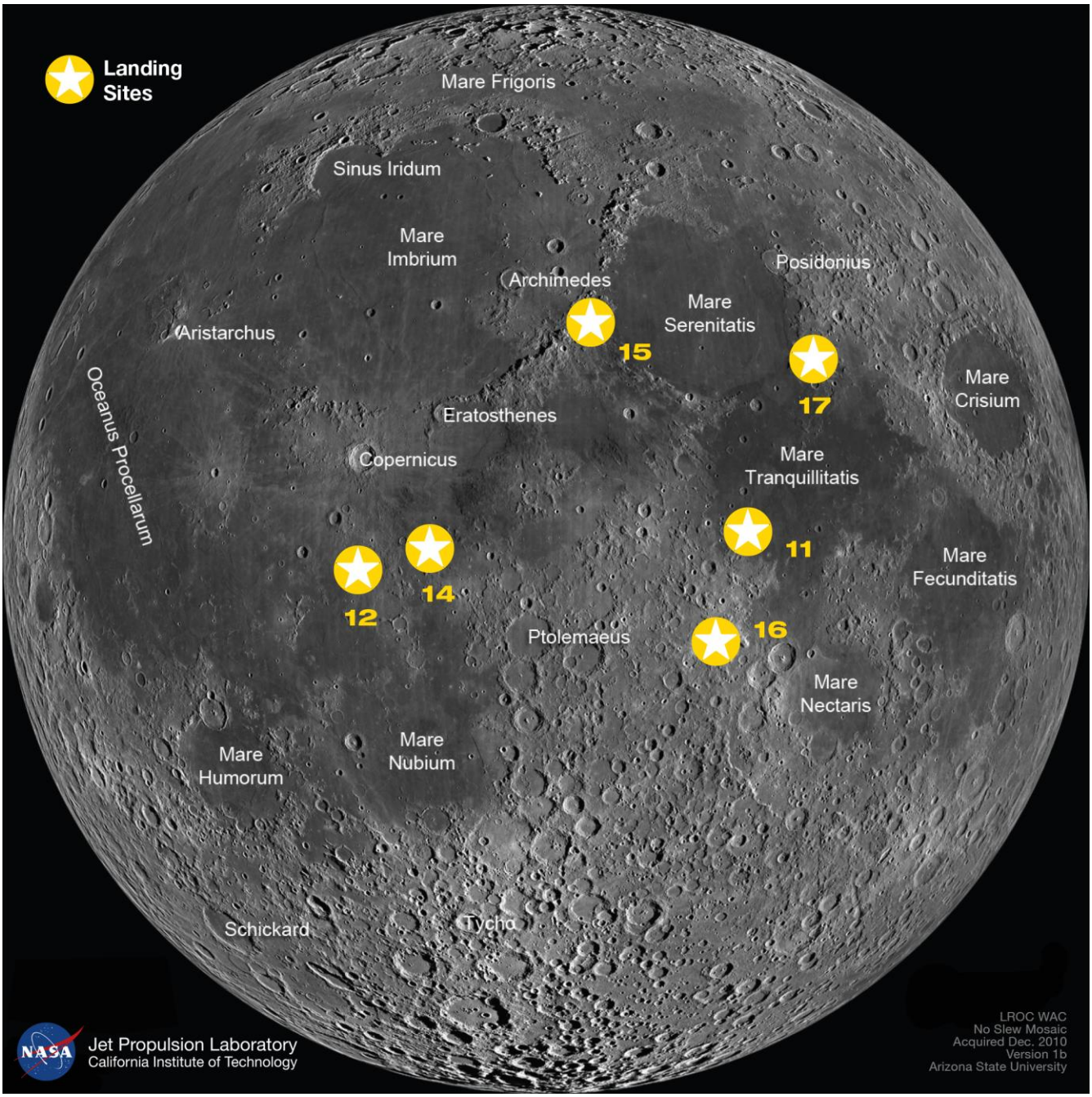
In addition to the Moon, we'll be able to observe two meteor showers this month: the Orionids and the Southern Taurids. Although both will have low rates of meteors, they'll be visible in the same part of the sky.

The Orionids peak on Oct. 21, but they are active from Oct. 16 to Oct. 30. Start looking at about 10 p.m. and you can continue to look until 5 a.m. With the bright moonlight you may see only five to 10 swift and faint Orionids per hour.

If you see a slow, bright meteor, that's from the Taurid meteor shower. The Taurids radiate from the nearby constellation Taurus, the Bull. Taurids are active from Sept. 10 through Nov. 20, so you may see both a slow Taurid and a fast Orionid piercing your sky this month. You'll be lucky to see five Taurids per hour on the peak night of Oct. 10.

You can also still catch the great lineup of bright planets in October, with Jupiter, Saturn and Mars lining up with the Moon again this month. And early birds can even catch Venus just before dawn!

You can find out more about International Observe the Moon Night at https://moon.nasa.gov/observe.



Caption: This image shows some of the features you might see if you closely observe the Moon. The stars represent the six Apollo landing sites on the Moon.
Credit: NASA/GSFC/Arizona State University (modified by NASA/JPL-Caltech)

Cosmic Challenge – Einstein's Cross

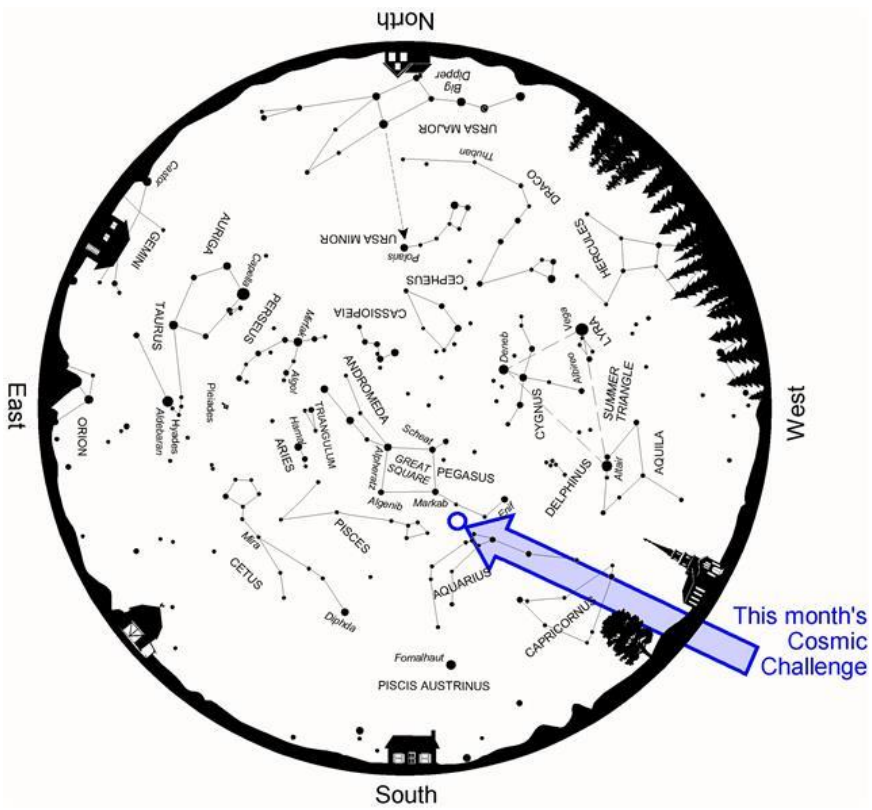
This month's suggested aperture range monster scopes
15-inch (38cm) and larger

Target	Type	RA	DEC	Const.	Mag.	Size
Einstein's Cross	Gravitational lens	22 40.5	+03 21.5	Pegasus	15.1p	1.1'x0.5'

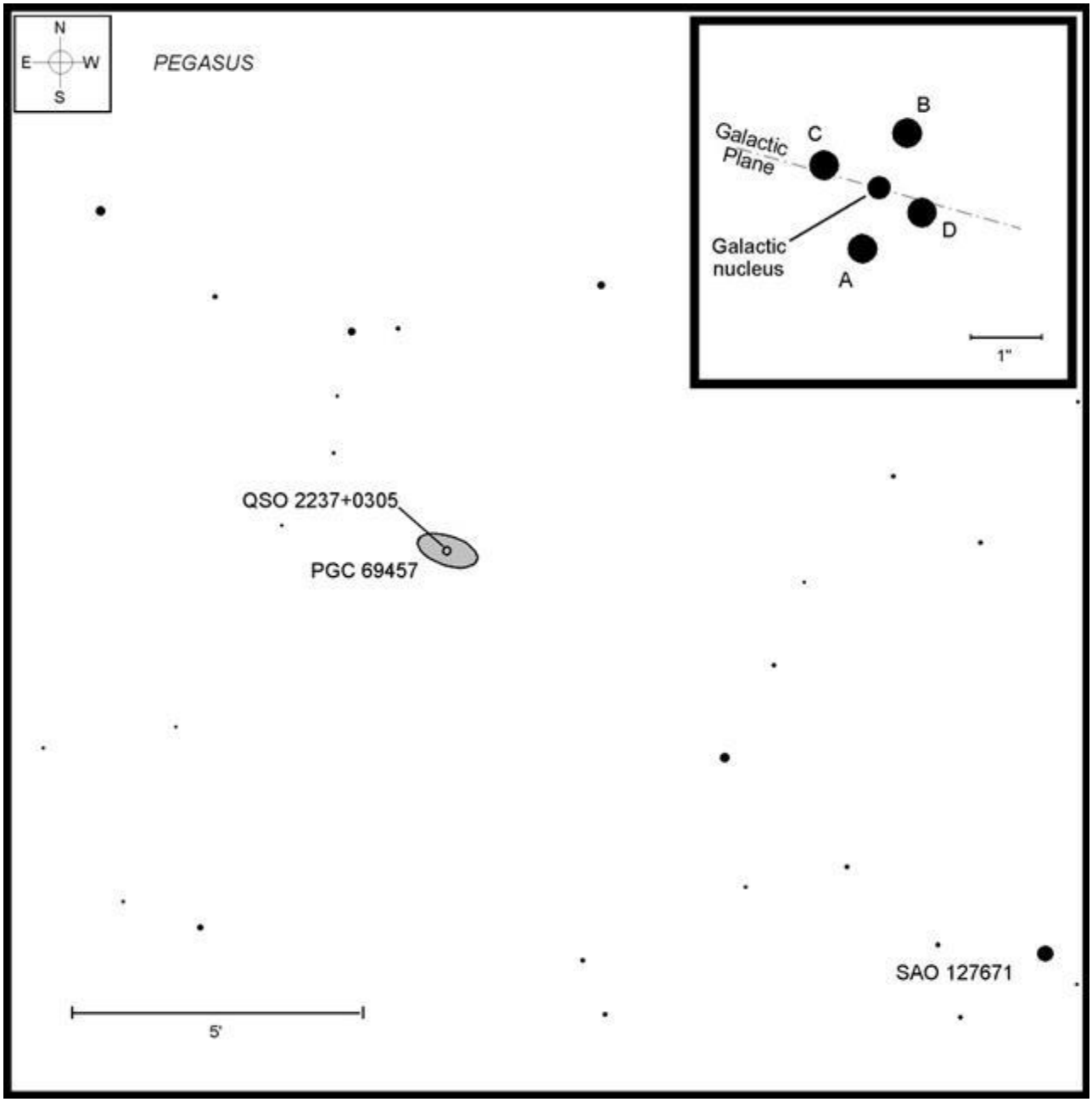
Last month, I challenged you with a naked-eye test. This month, we have the polar opposite: Einstein's cross.

One of the predictions of Albert Einstein's 1916 General Theory of Relativity was that the light from a bright, far-off source of energy would be warped, or "bent," around a massive object lying between that source and an observer. In the process, the time it takes the light to reach an observer would be altered, causing the background object to appear magnified and distorted.

That was what Einstein's theory said, but how could it be put to the test? The most massive nearby objects known at the time, such as the Sun, were also very bright. Anything that happens to lie beyond would be so faint by comparison that it would be rendered invisible. Sir Arthur Stanley Eddington, Britain's leading astrophysicist at the time, came up with the solution: use the Sun anyway. Not just the Sun on any given day, however, but rather during the total phase of a solar eclipse, when the Moon's disk completely blocks the blinding photosphere. The upcoming eclipse of May 29, 1919 would be perfect. Not only was totality unusually long, the Sun would be located right in front of Taurus's Hyades star cluster. There would be plenty of stars in the Sun's vicinity to test Einstein's theory. Although his expedition was touch and go because of everything from clouds and rain to the clouds of World War I, Eddington's observations recorded stars beside the Sun that should actually have been positioned behind its edge at the time. Einstein was right; gravity could warp light.



*Above: Autumn star map from **Star Watch** by Phil Harrington.*

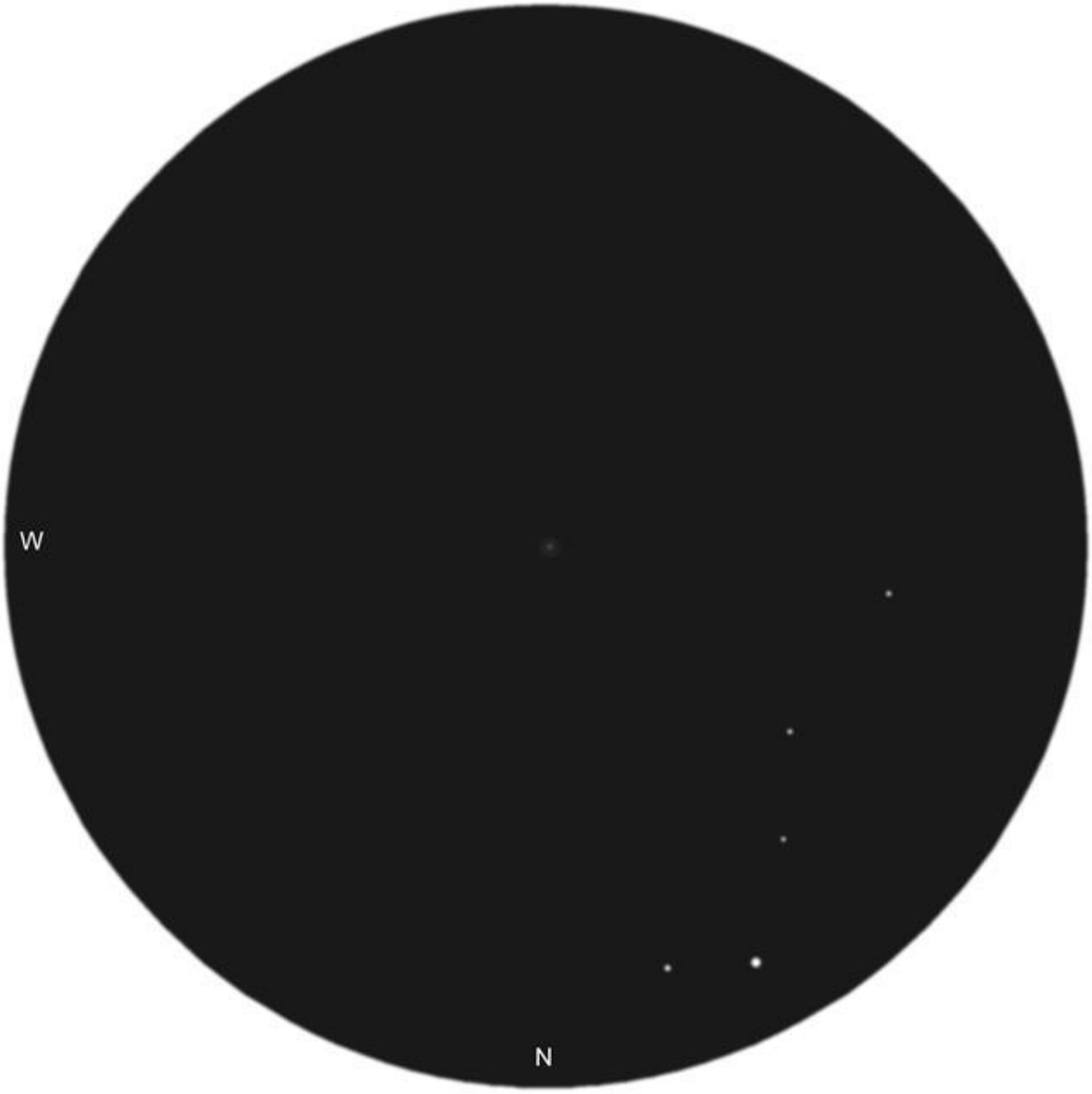


Above: Finder chart for this month's Cosmic Challenge.
*Chart adapted from **Cosmic Challenge** by Phil Harrington.*
Click on the chart to open a printable PDF version in a new window.

This warping effect is known today as gravitational lensing. Photographs taken with the Hubble Space Telescope, as well as with many Earth-based instruments, show the effect well, with ghostly images of far-off quasars and galaxies floating beside foreground galaxies. Rather than creating a single image of the distant quasar, however, a gravitational lens creates multiple images. Depending on the shape of the gravitational lens (that is, the gravitational influence on the distant light), the refracted image may be distended and bent into all sorts of odd contortions. Or, if the galaxy is positioned perfectly in line between the quasar and the Earth, then we would see a symmetrical ring of quasars.

From an aesthetic perspective, the most perfect gravitational lens is Einstein's Cross, formed by the galaxy PGC 69457 (cross- cataloged as CGCG 378-15) and the quasar QSO 2237+0305 in Pegasus. PGC 69457 is also known informally as Huchra's Lens after its discoverer, John Huchra, professor of cosmology Harvard University. Current estimates place this small, otherwise unspectacular spiral galaxy at 400 million light years away. The quasar lurks far behind at an incredible distance of 8 billion light-years. Were it not for gravitational lensing, the quasar would remain hidden by the galaxy, as the two are nearly in-line as seen from Earth. But as it is, Huchra's lens fractures the ancient light from the quasar into four separate paths that slide around the galaxy just as water flows around a rock in a stream. The end result is not one, but four ghostly images of QSO 2237+0305 surrounding the nucleus of PGC 69457 in a practically perfect diamond pattern.

Einstein's Cross lies to the south of the Flying Horse's "head" and "neck" and due west of the Circlet of Pisces. To find it, begin at the star Biham [Theta (θ) Pegasi] and slide 5° southeast to a triangle formed by 34, 35, and 37 Pegasi. Extending a line from 35 Peg through 37 Peg five times (2½°) farther southeast will bring you to the orangish 8th-magnitude star SAO 127671. Centering there, look for an 11th-magnitude star 6' to the northeast. This field star is very handy for gauging distance, as Einstein's Cross is found another 6' farther to its northeast.



Above: A sketch of Einstein's Cross through the author's 18-inch (46cm) reflector at 411x.

Although Einstein's Cross is rated at 15th magnitude, I have seen it with difficulty with my 18-inch reflector from my suburban observing site (naked-eye limiting magnitude 5.0) by using averted vision. But try as I might, even at 411x in those rare moments when seeing briefly permitted such extravagance, all I could see was the faint, nearly stellar object seen in the rendering above. I have never been able to separate the four quasar images from the galaxy; instead, all five remain blurred into a single object. Some other observers have reported success seeing one or two of the lobes while viewing through larger apertures under undoubtedly superior skies. High magnification, and therefore, steady seeing are absolutely required, since the Cross has an angular size of only 1.6 arc-seconds.

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. Remember, half of the fun is the thrill of the hunt. Game on!

 Phil Harrington offers an excellent freeware planetarium program for binocular observers known as TUBA (Touring the Universe through

Observatories and Planetarium

Binoculars Atlas), which also includes information on purchasing binoculars, at http://www.philharrington.net/tuba.htm

CSI Centennial Observatory / Faulkner Planetarium Herrett Center

Event	Place	Date	Time	Admission
Monthly Free Star Party	Centennial Observatory	Saturday, October 13th, 2018	8:00 PM to midnight	FREE
International Observe the Moon Night	Centennial Observatory	Saturday, October 20th, 2018	7:00 to 9:00 PM	FREE

College of Southern Idaho Campus Twin Falls, ID
Faulkner Planetarium / Show Times
http://herrett.csi.edu/astronomy/planetarium/showtimes.asp

Now Showing

The Bruneau Dunes Observatory will be closing on Saturday, October 13th for the 2018 season.

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.