Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, April 9th 2016
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
using the Herrett Telescope / Shotwell Camera at the Centennial Observatory.

President's Message

Colleagues,

The scientific community had some great observations in 2016: It's announced Gravitational Waves* had been detected and supernova shockwaves, and has even been spotted the binary companion in a Type Ia supernova.

The last two discoveries came in March; while those observers were able to get access to the stars, unfortunately, MVAS members didn't get to see anything at Castle Rocks State Park in March from their viewpoint in the lodge, but that won't discourage us – and should make use even more eager for April.

We'll open up matters with the Messier Marathon at the Jerome Gun Club. Due a scheduling conflict, that event has been moved to Saturday, April 2, with Friday, April 8 set as a back-up date. Bring a scope and even bring a friend. Those who need a scope should contact me as soon as possible to check out a club scope. We're looking forward to hear about what you've seen.

Then, on Saturday, April 9, is the regular club meeting. This month's meeting will feature guest speaker Tom Davis, a widely published astrophotographer. Davis's images have been published extensively in several respected magazines, books, and newspapers, and has also been featured in NASA's Astronomy Photo of Day. Davis has spoken at the Idaho Star Party as well as at astroimaging conferences. Expect a screen full of spectacular images.

Clear Views,
Robert Mayer

* Editor's Note: The Gravitational Waves were actually detected first in September 2015, but announced in February. Science works like this. See the announcement here: https://www.ligo.caltech.edu/news/ligo20160211

Calendars for March

Event Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				Last Quarter On March 31 	1 Herrett Center Camp-In and Telescope Viewing	2 MVAS Messier Marathon 
3	4	5	6	7 New Moon Lunation 1154 	8	9 General Membership mtg. at the Herrett Center 7:00p Public Star Party at the Observatory
10	11	12 Yuri's Night 	13 First Quarter 	14	15	16
17	18	19	20	21 Full Moon Pink Moon 	22	23
24	25	26	27	28	29	30

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month.

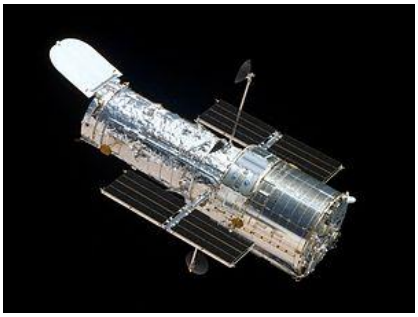
Celestial Events

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

4/1 Mercury is at the ascending node at 1:00; Pluto is 3.3 degrees south of the Moon at 3:00; the Curtiss Cross, an X-shaped clair-obscure illumination effect located between the craters Parry and Gambart, is predicted to begin at 4:20; a double Galilean satellite shadow transit begins at 20:18
4/2 Asteroid 18 Melpomene is 1.1 degrees north-northwest of the Moon at 2:00
4/3 A double Galilean satellite shadow transit begins at 15:11
4/5 Neptune is 1.8 degrees south-southeast of the Moon at 0:00; a double Galilean satellite shadow transit begins at 9:37; Mercury is at perihelion at 17:00; the Moon is at the descending node at 17:26
4/6 Venus is 0.66 degree south-southeast of the Moon, with an occultation occurring in northwestern Asia, the northern Middle East, Europe, and northern Africa at 8:00
4/7 Uranus is 1.9 degrees north-northwest of the Moon at 15:00; the Moon is at perigee, subtending 33' 28" from a distance of 357,163 kilometers (221,931 miles), at 18:00
4/8 A double Galilean satellite shadow transit begins at 22:55
4/9 Uranus is in conjunction with the Sun at 21:00
4/10 The Moon is 0.3 degree north of the first-magnitude star Aldebaran (Alpha Tauri), with an occultation occurring in the Azores, the northern Caribbean, southern Canada, the contiguous United States, northern Mexico, and Hawaii, at 22:00
4/11 Venus is at its greatest heliocentric latitude south at 18:00
4/12 The Moon is 6.0 degrees south of the bright open cluster M35 in Gemini at 12:00; the periodic comet 9P/Tempel 1 is closest to the Earth at 23:00. Yuri's night https://yurisnight.net/
4/14 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 begin at 13:39
4/15 The equation of time equals zero at 4:00; the Moon is 4.9 degrees south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 5:00; Mercury is at its greatest heliocentric latitude north at 22:00
4/17 The Moon is 2.4 degrees south-southwest of the first-magnitude star Regulus (Alpha Leonis) at 0:00; Mars is stationary in right ascension at 2:00
4/18 Jupiter is 2.1 degrees north-northeast of the Moon at 3:00; Pluto is stationary in right ascension at 4:00; Mercury is at greatest eastern elongation (19.9 degrees) at 14:00; the Sun enters the constellation of Aries at 16:00; the Moon is at the ascending node at 18:05
4/20 Mars (magnitude -1.1) is 7.2 degrees west of Saturn (magnitude +0.3) at 4:00
4/21 The Moon is 4.8 degrees north-northeast of the first-magnitude star Spica (Alpha Virginis) at 12:00; the Moon is at apogee, subtending 29' 25" from a distance of 406,351 kilometers (252,495 miles), at 16:00
4/22 Venus (magnitude -3.9) is 0.81degree south-southeast of Uranus (magnitude +5.9) at 21:00
4/25 Mars is 4.9 degrees south of the Moon at 6:00; the Moon is 9.6 degrees north of the first-magnitude star Antares (Alpha Scorpii) at 8:00; Saturn is 3.3 degrees south of the Moon at 20:00
4/26 Mars is 4.9 degrees north of the first-magnitude star Antares (Alpha Scorpii) at 21:00
4/27 Asteroid 3 Juno (magnitude +10.0) is at opposition at 3:00
4/28 Mercury is 6.8 degrees west-southwest of the bright open cluster M45 (the Pleiades) in Taurus at 9:00; Pluto is 3.1 degrees south of the moon at 10:00; Mars is at the descending node at 20:00
4/29 Mercury is stationary in right ascension at 4:00

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

The first photograph of the Sun was taken on April 2, 1845. The Hubble Space Telescope was placed in orbit on April 25, 1990. The Compton Gamma Ray Observatory achieved orbit on April 7, 1991.



The Hubble Space Telescope as seen from the departing Space Shuttle *Atlantis*.

The Sun, the Moon, & the Planets

The Moon is 22.9 days old, is illuminated 46.5%, subtends 30.4', and is located in Sagittarius at 0:00 UT on April 1st. It's at its greatest northern declination of +18.2 degrees on April 13th and its greatest southern declination of -18.4 degrees on April 27th. Latitudinal libration is at a maximum of +6.7 degrees on April 12th and a minimum of -6.7 degrees on April 26th. Longitudinal libration is at a maximum of +7.6 degrees on April 14th and -7.7 degrees on April 2nd and -7.4 degrees on April 30th. New Moon occurs on April 7th. Very large tides occur from April 8th through April 11th. The 17% illuminated Moon occults Aldebaran on the afternoon of April 10th. Times & dates for the lunar light rays predicted to occur this month http://www.lunar-occultations.com/rlo/rays/rays.htm

The Sun is located in Pisces on April 1.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on April 1: Mercury (-1.5 magnitude, 5.3", 94% illuminated, 1.27 a.u., Pisces), Venus (-3.8, 10.3", 96% illuminated, 1.62 a.u., Aquarius), Mars (-0.5 magnitude, 11.8", 93% illuminated, 0.79 a.u., Scorpius), Jupiter (-2.4 magnitude, 43.6", 100% illuminated, 4.52 a.u., Leo), Saturn (+0.3 magnitude, 17.4", 100% illuminated, 9.55 a.u., Ophiuchus), Uranus (+5.9 magnitude, 3.4", 100% illuminated, 20.96 a.u. on April 16th, Pisces), Neptune (+7.9 magnitude, 2.2", 100% illuminated, 30.66 a.u. on April 16th, Aquarius), and Pluto (+14.2 magnitude, 0.1", 100% illuminated, 32.91 a.u. on April 16th, Sagittarius).

Mercury is located in the west and Jupiter in the southeast in the evening. At midnight, Mars is in the southeast, Jupiter is in the southwest, and Saturn is in the southeast. Venus can be found in the east, Mars in the southwest, Saturn in the south, and Neptune in the east in the morning sky.

At midmonth, Mercury can be seen during morning twilight, Venus rises at 6:00 a.m., Mars rises at 11:00 p.m. and transits the meridian at 4:00 a.m., Jupiter transits the meridian at 10:00 p.m. and sets at 5:00 a.m., and Saturn rises at midnight and transits the meridian at 4:00 a.m. local daylight time for observers at latitude 40 degrees north.

Mars, Saturn, the waning gibbous Moon, and Antares are in quasi-conjunction on the morning of April 25th. The four celestial objects fit within a circle ten degrees in diameter. The Moon lies north of Mars and Saturn and Antares is south of the two planets and the Moon.

Mercury is at perihelion on April 5th. A waxing crescent Moon passes within eight degrees of the planet on April 8th. Mercury reaches greatest eastern elongation on April 18th, when it will shine at magnitude 0 and attain a sunset altitude of 19 degrees at latitude 40 degrees north. Mercury is illuminated approximately 38% and subtends approximately 7.5 arc seconds on that date. It is still 10 degrees above the west-northwestern horizon 45 minutes after sunset. Due to the tilt of tilt of the ecliptic in the spring, this will be the finest apparition of the planet of 2016 for those living in mid-northern latitudes.

Venus heads sunward as the month progresses. It rises less than 30 minutes before the Sun in early April. The brightest planet is occulted by the Moon on April 6th. Venus decreases slightly in apparent size from 10.3 to 9.8 arc seconds, while remaining fairly constant in illumination and brightness, over the course of the month.

Mars brightens from magnitude -0.5 to magnitude -1.4 and grows in apparent size from 11.8 arc seconds to 16.0 arc seconds, the biggest it has appeared in a decade, this month. It exits Scorpius and enters Ophiuchus on April 3rd. On April 16th, the apparent brightness of Mars exceeds magnitude -1.0. The next day, April 17th, the Red Planet is stationary and starts its retrograde opposition loop, as the Earth passes between Mars and the Sun. Saturn and Mars will be seven degrees apart on that date. Mars is greater than 15 arc seconds in apparent diameter on April 23rd. On April 28th, the Red Planet passes the descending node and is south of the ecliptic. The waning gibbous Moon passes five degrees north of Mars on the morning of April 25th. Mars departs Ophiuchus and reenters Scorpius on April 30th. An article on observing the Mars during its 2016 apparition can be found on pages 48-50 of the April issue of Sky & Telescope.

Jupiter retrogrades through Leo this month. It passes two degrees north of the Moon on April 18th. Jupiter shrinks in apparent diameter from 43.6 to 40.9 arc seconds and decreases in brightness from magnitude -2.4 to magnitude -2.3 during the course of the month. The gas giant passes seven arc minutes north of the fifth-magnitude star Chi Leonis, which may be mistaken for a Galilean satellite, on April 8th.

A number of Galilean satellite events take place on the night of April 6th/7th. Io begins a transit of Jupiter at 9:52 p.m. EDT on April 6th. Io's shadow falls on the planet at 10:32 p.m. EDT. At 10:48 p.m. EDT, Europa is occulted by Jupiter. A transit by Ganymede commences at 1:01 a.m. EDT on April 7th. Europa reappears from eclipse by Jupiter's shadow at 2:54 a.m. EDT. A shadow transit by Ganymede commences at 3:45 a.m. EDT. Data on other Galilean satellite events is available at http://www.skyandtel...watching-tools/ and page 51 of the April issue of Sky & Telescope. For information on transits of Jupiter's central meridian by the Great Red Spot, consult and page 51 of the April issue of Sky & Telescope.

Saturn brightens to magnitude +0.2 this month. Its rings span 40 arc seconds and are tilted 26 degrees with respect to the Earth. The waning gibbous Moon passes three degrees north of the Ringed Planet on April 25th. Titan, Saturn's largest satellite, is due north of the planet on April 3rd and April 19th and due south of it on April 11th and April 27th. Iapetus shines at tenth magnitude and lies nine arc minutes from the planet at greatest western elongation on April 5th. By April 25th, the peculiar satellite has dimmed to eleventh magnitude as it passes two arc minutes north of Saturn. For further information on Saturn's satellites, browse http://www.skyandtel...watching-tools/

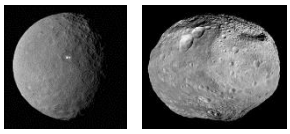
Uranus is in conjunction with the Sun on April 9th and consequently is not observable from the northern hemisphere this month.

Neptune lies in the east at dawn. Southern hemisphere observers have a more favorable view due to the angle of ecliptic.

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/

Asteroids



Asteroid 6 Hebe glides northwestward through the constellation of Leo this month. The tenth magnitude asteroid passes less than three degrees north of the second-magnitude star Denebola (Beta Leonis). On April 27th, asteroid 3 Juno (magnitude +10.0) reaches opposition in Virgo.

Comets

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

Meteors

The Lyrid meteor shower peaks on the night of April 22nd / April 23rd but is severely compromised by a Full Moon. A typical zenithal hourly rate is about 20 meteors per hour but short outbursts have occurred occasionally. The radiant lies between the Keystone of Hercules and Lyra.

Carbon Star

Notable carbon star for April: V Hydrae (Hydra). Right Ascension: 10^{h} 51^{m} 37.3^{s} / Declination: -21° 15' 0"

The Deep Sky

A wealth of current information on solar system celestial bodies is posted at http://www.curtrenz.com/astronomical and http://nineplanets.org/

A free star map for April can be downloaded at http://www.skymaps.com/downloads.html and http://www.telescope...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.

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on April 2nd, 5th, 7th, 10th, 13th, 16th, 19th, 22nd, 25th, 27th, and 30th. For more on Algol, see http://stars.astro.i.../sow/Algol.html and http://www.solstatio...ars2/algol3.htm

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 (in Leo). Right Ascension: $10^h\ 08^m\ 27.4^s$ / Declination: +12° 18' 27"

Leo I appears as a faint patch
to the right of the bright star, Regulus.

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

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/

Be Safe - Go Outside - Explore Your Universe

Observatories and Planetariums

Bruneau Dunes Observatory – Bruneau, ID

You're invited to star gaze at the Bruneau Dunes Observatory! Opening April 1st

CSI Centennial Observatory

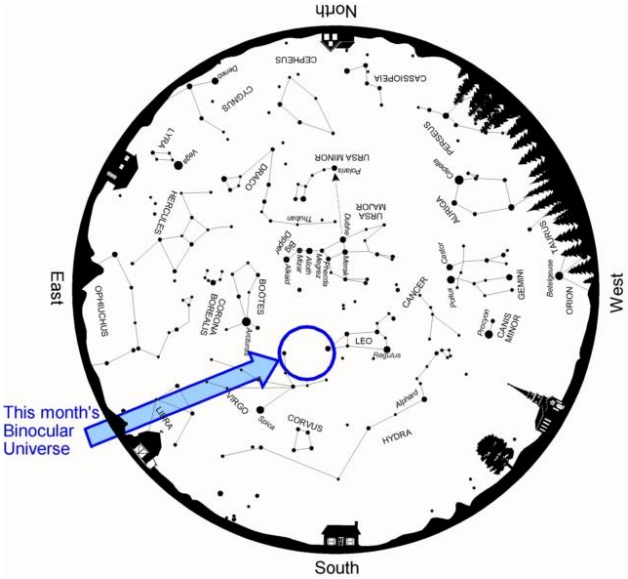
Event	Place	Date	Time	Admission
Telescope Tuesday	Centennial Observatory	Tuesday, March 23rd, 2016	7:15 to 9:00 PM	$1.50 or free with Faulkner Planetarium admission
Monthly Free Star Party	Centennial Observatory	Saturday, March 12th, 2016	7:45 PM to 12:00 AM	FREE
"Earth Hour" Telescope Viewing	Centennial Observatory	Saturday, March 26th, 2016	8:30 to 9:30 PM	FREE

Faulkner Planetarium Show Times (through Memorial Day)	
Tuesdays	7:00 PM
Fridays	7:00 PM 8:00 PM
Saturdays	1:30 PM 2:30 PM 3:30 PM 4:30 PM 7:00 PM 8:00 PM

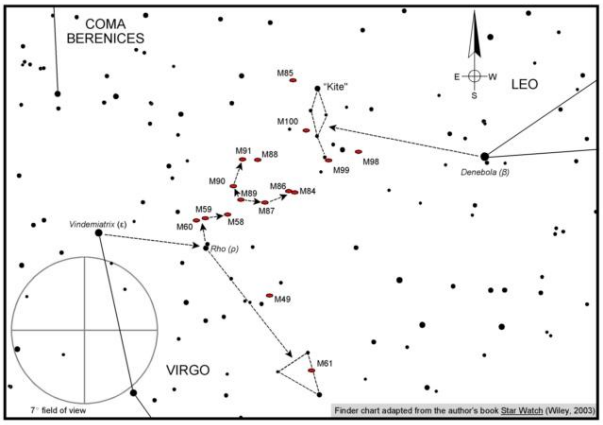
Now Showing

Phil Harrington's Binocular Universe

Bridging the constellations Coma Berenices and Virgo stands the Wild West for binocular astronomers, where only the brave trod. You may know it as the **Coma-Virgo Realm of Galaxies**. The Coma-Virgo galaxy cluster is the core of the Coma-Virgo supercluster, which embraces members far and wide. All of the galaxies within autumn's Sculptor galaxy cluster, as well as our Milky Way as well as the rest of the Local Group of galaxies, are counted among the multitude. Nowhere else in the sky are galaxies so tightly packed together over such an expansive stretch of sky as the *Realm of Galaxies*. There are 16 Messier objects within the Realm, as well as scores of other galaxies that are listed in the New General Catalog (NGC). All told, an estimated upwards of 2,000 separate galactic systems call this home.



Above: Spring star map from **Star Watch** *by Phil Harrington. Click the chart to open a printable PDF version in a new window.*



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

Most amateurs consider this to be telescope territory. But we know better! It is indeed possible to see all of the Messier galaxies in the Realm through 50-mm binoculars.

But to be successful, your binoculars should really be mounted on some sort of tripod or other support. This advice includes image-stabilized binoculars. True, their technology will help calm jitters, but it is much easier to be able to go back and forth between mounted binoculars and the chart here chart without having to re-aim every time.

Another key to making your way through is a slow, measured approach. Take your time going from one object to the next. I have always found it easier to attack them en masse, staging my assault in two waves: one entering the Realm from the west, the other from the east.

Okay, let's drive in. For the western attack, begin at the star Denebola (Beta Leonis) in the hind triangle of Leo the Lion. From there, move one field (about 7 degrees) due east to a kite-shaped asterism of faint stars. We can use the kite to find our first four Messier galaxies. Hopefully. Stop #1 is at **M98**, just west of the kite. Giant binoculars running at 15x and more may reveal its cigar-shaped profile surrounding circular core. Next, try for **M99**, just south of the kite's tail. It's not significantly easier to see, glowing dimly at 10th magnitude. Can you spot it, as well?

If you can, then try your luck with an even more challenging target. **M100** is rated a half magnitude brighter than M99, but that is misleading. Due to M100's larger apparent diameter, its surface brightness is quite low. Both targets may require 70-mm or larger binoculars to confirm.

If those proved too tough, take heart. The fourth galaxy here, **M85**, should prove a little less demanding. Though only faintly visible through my 10x50 glasses on dark nights, it's relatively easy to catch in my 16x70 binoculars even from light-polluted suburban skies. Look for a brighter stellar nucleus surrounded by a fainter halo.

The eastern campaign begins from the star Vindemiatrix (Epsilon Virginis), and is a bit more involved with several twists and turns. From Vindemiatrix, follow a path about one binocular field due west, where you will be greeted by a pair of suns, including 5th-magnitude Rho Virginis and a fainter 7th- magnitude star.

From Rho, follow a curve of stars to the south and west, to arrive at M49. The brightest member of the Realm, **M49** is seen as a nearly circular ball of fuzz, accented with a brighter core. As mentioned below, M49 is one of the largest galaxies in the Realm, spanning an estimated 150,000 light years. Next, looking through your binoculars, draw an imaginary line southwestward from Rho, past several stars and head southwest to a triangle of three suns.
About halfway along the triangle's western side, you'll find **M61**. M61suffers from a low surface brightness, which causes many new observers to pass right by. A slow, concentrated scan is your best chance at seeing its subtle glow.

Go back to Rho and then look just north to find **M59** and **M60**. M59, the western member of the team, is fairly obvious in all but the smallest backyard telescopes. M60 is both larger and brighter than M59, and in fact, is one of the brightest galaxies in the Realm. Look for a round sphere of distant starlight marked by an obvious stellar core.

Next, **M58** takes a good eye and lots of patience. Look for its soft glow west of M59 and M60. But don't confuse it with **M89** to its northwest. Both are faint, but should be individually discernible with patience. M89 looks almost perfectly circular, but at only 10th magnitude, it's a challenge through 50-mm binoculars.

M89 lies next to **M90**. In photographs, M90 reminds me of a miniaturized Andromeda Galaxy. Its spiral-arm halo is tilted almost due north-south, poised nearly edge-on to our line of sight.
Continue to arc toward the north-northeast to arrive at **M91**, a barred spiral. Careful examination with giant binoculars may show that the central core is actually oval, tilted northeast-southwest, lining up in the same the direction as the galaxy's bar.

Hop a little less than a degree to the east-southeast from M91 to arrive at **M88**. M88, set just southeast of a 9th-magnitude field star, displays a bright nucleus that appears offset within its spiral-arm halo. M88 is an Sbc spiral galaxy characterized by fairly loose arms. Binoculars reveal a moderately bright core engulfed by the spiral arms' faint, oval glow.

Now, retrace your steps along the arc back to M89, then continue toward the west to **M87**. Keep an eye out for M87's central core, which will look like a faint fuzzy "star" surrounded by a circular mist. In reality, this is a monstrous elliptical system perhaps 10 times more massive than our Milky Way. A luminous jet of material seen bursting from its core in photographs is powered by a supermassive black hole buried deep within. Both M49 and M87 are considered "super galaxies," two of the largest galaxies ever found.

We wrap up the Realm by heading east-northeast just a bit to **M84** and **M86**, which lie right at the heart of the Realm. Only a third of a degree separates them in our sky. Each of these elliptical galaxies shows a round or slightly oval disk in binoculars. Tiny stellar cores are also detectable with 12x or more. At a casual glance, both of these 9th-magnitude galaxies look identical. But a closer look shows M84 to be a little smaller and a little brighter than its neighbor.

So, how many of these galaxies -- and more -- can you find through your binoculars?

And if you have suggestions for future targets, by all means post them there, as well. Till next month, remember that two eyes are better than one!

About the Magic Valley Astronomical Society

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

The Magic Valley Astronomical Society (MVAS) was founded in 1976. The Society is a non-profit [501(c) 3] educational and scientific organization dedicated to bringing together people with an interest in astronomy.
In partnership with the Centennial Observatory, Herrett Center, College of Southern Idaho - Twin Falls; we hold regularly scheduled monthly meetings and observation sessions, at which we share information on current astronomical events, tools and techniques for observation, astrophotography, astronomical computer software, and other topics concerning general astronomy. Members enthusiastically share their telescopes and knowledge of the night sky with all who are interested. In addition to our monthly public star parties we hold members only star parties at various locations throughout the Magic Valley.

MVAS promotes the education of astronomy and the exploration of the night sky along with safe solar observing through our public outreach programs. We provide two types of outreach; public star parties and events open to anyone interested in astronomy, and outreach programs for individual groups and organizations (e.g. schools, churches, scout troops, company events, etc.), setting up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations. Donations enable us to continue and improve our public outreach programs.

Membership is not just about personal benefits. Your membership dues support the work that the Magic Valley Astronomical Society does in the community to promote the enjoyment and science of astronomy.
Speakers, public star parties, classes and support for astronomy in schoolrooms, and outreach programs just to name a few of the programs that your membership dues support.

Annual Membership dues will be:
$20.00 for individuals, families, $10.00 for students.
Contact Treasurer Jim Tubbs for dues information via e-mail: jtubbs015@msn.com

Donations to our club are always welcome and are even tax deductible. Please contact a board member for details.

Membership Benefits:
Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President Robert Mayer, for more information on these and other benefits.

Telescopes are an individual thing and not practical for public use. However, everyone should have the experience of a good look at the moon for at least 5 minutes in their life time. It is a dimension and feeling that is unexplainable. Pictures or TV can't give this feeling, awareness, or experience of true dimension. A person will not forget seeing our closest neighbor, the moon. Norman Herrett in a letter to Dr. J. L. Taylor, president of the College of Southern Idaho, Twin Falls, ID, USA circa 1980.