



Snake River Skies

*The Newsletter of the Magic Valley Astronomical Society
October 2014*

Membership Meeting
Saturday, October. 11th 2014
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho.
Public Star Party Follows at the
Centennial Obs.

Club Officers:

Robert Mayer, President
mayerbrt@gmail.com
208-312-1203

Jim Hoggatt, Vice President
jhog@cableone.net
208-420-7690

Gary Leavitt, Secretary
leavittg@cableone.net
208-731-7476

Jim Tubbs, Treasurer / ALCOR
jtubbs015@msn.com
208-404-2999

David Olsen, Newsletter Editor
editor@mvasastro.org

Rick Widmer, Webmaster
rick@developersdesk.com



Magic Valley Astronomical Society
is a member of the
Astronomical League

Message from the President – Robert Mayer

Colleagues,

September provided plenty of opportunities to get out. There was the Idaho Star Party, another Three Creek Star Party, and the fall Craters of the Moon Star Party. This month will hopefully feature one more -- an MVAS-only party to be announced later this month.

The regular monthly meeting this October is a must. First, it'll be time for annual officer elections. If there's someone you want to nominate for office, please contact me via E-mail at mayerbrt@gmail.com.

Among those nominations should be a new vice-president. Jim Hoggatt has other matters come up, and will not be able to continue in that office. His time as vice-president has been invaluable to MVAS, but he'll still be around to help.

Secondly, October is also the regular MVAS Year In Pictures presentation. If you have any pictures you think would be great for the presentation show, please also send those to me, again at mayerbrt@gmail.com.

Clear Views,
Rob Mayer

President's Message / Board Member Contacts	Page 1
Celestial Events	Page 2
Calendar	Page 3
Planisphere	Page 4
Solar System at a Glance	Page 5
Club Announcements	Pages 6 - 7
Looking Through the Eyepiece Article	Pages 8 - 10
Observatories and Planetariums	Pages 11
About the Magic Valley Astronomical Society	Page 12

Celestial Trivia and Events

10/1 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 occur at 21:49 MST.
10/2 Mercury is at its greatest heliocentric latitude south today
10/4 Mercury is stationary.
10/5 Neptune is 5 degrees south of the Moon.
10/6 The Moon is at perigee, subtending 32'58" from a distance of 362,476 kilometers (225,233 miles).
10/7 Uranus (magnitude +5.7, apparent size 3.7") is at opposition.
10/8 Uranus is 1.2 degrees south of the Moon. The peak of the Draconid meteor shower (10 to 30 per hour).
10/12 The Moon is 1.4 degrees north of first-magnitude star Aldebaran (Alpha Tauri).
10/16 Mercury is in inferior conjunction
10/17 The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to occur at 0:11 MST
10/18 Jupiter is 5 degrees north of the Moon at 4:00; the Moon is at apogee, subtending 29'31" from a distance of 404,897 kilometers (251,590 miles).
10/19 Comet C/2013 A1 (Siding Spring) passes with 2 arc minutes of Mars today.
10/21 Mercury is at the ascending node today; the peak of the Orionid meteor shower (25 per hour)
10/23 Partial solar eclipse begins at 19:37 UT.
10/25 Mercury is at perihelion today; Mercury is stationary; Venus is in superior conjunction at 8:00; Saturn is 1.0 degree south of the Moon.
10/26 Asteroid 2 Pallas is in conjunction with the Sun.
10/28 Mars is 7 degrees south of the Moon.
10/30 The Lunar X is predicted to occur at 23:39

Ejnar Hertzsprung and Henry Norris Russell were born this month.

Giovanni Cassini discovered Saturn's odd satellite Iapetus on October 25, 1671. Two of the satellites of Uranus, Ariel and Umbriel, were discovered by William Lassell on October 24, 1851. Lassell discovered Triton, Neptune's brightest satellite, on October 10, 1846. Edwin Hubble discovered Cepheid variable stars in M31 (the Andromeda Galaxy) on October 5, 1923.

Notable carbon star for October: RZ Pegasi

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)




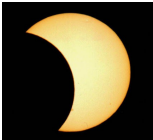

Top ten binocular deep-sky objects for October: M52, NGC 7209, NGC 7235, NGC 7243, NGC 7293, NGC 7510, NGC 7686, NGC 7789, NGC 7790, St12

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) (Pegasus)

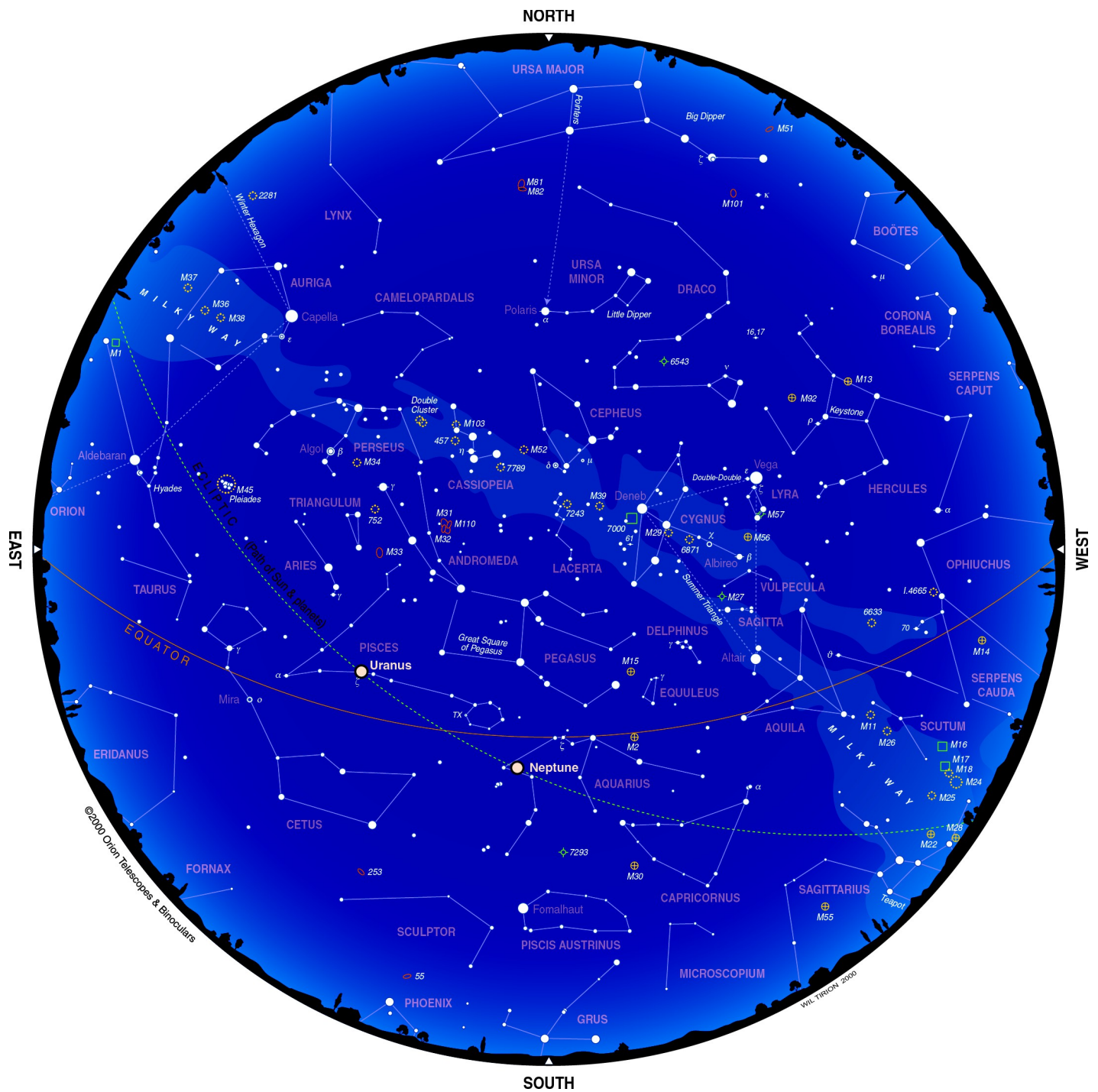
The objects listed above are located between 22:00 and 24:00 hours of right ascension.

Calendar - October 2014

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			<div>1</div>  <div>First Quarter Moon</div>	2	3	4
5	6	7	<div>8</div>  <div>Full Moon Total Lunar Eclipse Observatory Open</div>	9	10	<div>11</div> <div>MVAS Membership Meeting at the CSI Herrett Center Officer Elections</div>
12	13	14	<div>15</div>  <div>Last Quarter Moon 53% Visible</div>	16	17	18
19	20	21	22	<div>23</div>  <div>Partial Solar Eclipse New Moon 1% Visible</div>	24	25
26	27	28	29	30	<div>31</div>  <div>First quarter Visible: 55% ↑ Halloween</div>	

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month
 Snake River Skies is copyrighted, except where noted and credit is via permission of the respective author. Snake River Skies © 2014
 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.

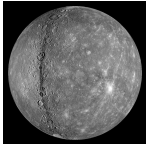





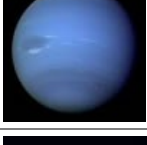



Planisphere



This Planisphere is available in a larger format online using this link:
http://www.telescope.com/assets/images/starcharts/2014-10-starchart_col.jpg

Be Safe – Get Out There – Explore Your Universe!

Solar System at a Glance

	Mercury disappears into the glare of the Sun as the month progresses. The speediest planet is at its greatest heliocentric latitude south on Oct. 2nd and is stationary on Oct. 4th and Oct. 25th. It is in inferior conjunction on Oct. 16th. Mercury reappears in morning twilight during the last week of the month.
	Venus is in superior conjunction on Oct. 25th when it will be approximately one degree north of the Sun and is not readily visible again until early December.
	Mars is about 15 degrees above the horizon an hour after sunset this month. It lies approximately four degrees from its rival, the first-magnitude star Antares (Alpha Scorpii), as Oct. begins. The Red Planet travels rapidly eastward this month. It exits Ophiuchus and enters Sagittarius on Oct. 21 st . Mars reaches its maximum southern declination for 2014 (-24°57') on Oct. 26 th . On Oct. 27 th , it passes 0.5 degree south of M8, the Lagoon Nebula. Mars is seven degrees south of the Moon on Oct. 28th.
	Jupiter rises about 2:30 a.m. DST as Oct. begins and about 1:00 a.m. DST as the month ends. It leaves Cancer and crosses into Leo at mid-month. Jupiter passes five degrees north of the waning crescent Moon on Oct. 18th. Click on http://www.skyandtel...watching-tools/ to determine transit times of the central meridian by the Great Red Spot.
	Saturn In early Oct. Saturn is just ten degrees above the horizon an hour after sunset. It is occulted by the Moon from some parts of the world on Oct. 25th. Saturn disappears into the evening twilight by the end of Oct.
	Uranus reaches opposition on Oct. 7th. At that time, the seventh planet shines at magnitude 5.7, subtends 3.7 arc seconds, and is 2.6 light-hours from the Earth. It is occulted by the Moon from some parts of the world on Oct. 8th. Uranus is located about three degrees south-southeast of the fourth-magnitude star Delta Piscium as Oct. begins and about the same distance south of that star at month's end.
	Neptune lies less than one degree west of the fifth-magnitude star Sigma Aquarii this month. It transits the meridian some 2.5 hours before Uranus does.
	Pluto The dwarf planet Pluto is located in northern Sagittarius but will be very low in the sky as darkness falls. A finder chart is available on pages 50 and 51 of the June issue of Sky & Telescope, page 243 of the RASC Observer's Handbook 2014, and at http://www.bluewater...2014_2_810K.jpg
	Asteroid Asteroid 37 Fides travels southwestward through southern Pisces this month. It passes less than one degree south of the fourth-magnitude star Epsilon Piscium on October 1st. During the second and third weeks of October, the 108-kilometer-sized asteroid lies within two degrees of Uranus.
	Comets C/2013 A1 (Siding Spring) travels northward through Ophiuchus this month. It passes within two arc minutes of Mars. Comet C/2012 K1 PanSTARRS can be seen in Puppis before dawn.

Idaho Skies

Idaho Skies is a column for beginning amateur astronomers and those interested in astronomy. Suggestions about the column are gladly accepted by the columnist, at nearsys@gmail.com

This month look for the star Algedi in the constellation of Capricornus. Astronomers know Algedi by its other name, Alpha Capricorni. This is one of a few examples where a constellation's alpha star is not its brightest.

No doubt, you've heard of the Tropic of Capricorn. This is the name geographers give the name of Earth's latitude at 23.5 degrees south of the equator. On the first day of the northern winter, the sun is located directly above this latitude. Over 2,000 years ago, the sun was located in Capricornus on the same day. This is why we given this latitude the name of the Tropic of Capricorn. In the 2,000 years since then, the sun's position on the first day of winter has drifted into neighboring Sagittarius.

Algedi is a double star wide enough to see with your naked eye. However, binoculars do a better job bringing out the pair. Unlike some double stars, these stars are not in orbit around each other. They are a chance alignment of stars that looks very close together from our perspective on Earth. Actually, they are hundreds of light years apart.

Look for Capricornus and Algedi in the low in the south after it gets dark. The moon passes through the constellation on the nights of October 3rd, 30th, and 31st. The constellation doesn't contain bright stars. So look for a pattern of average to faint stars that looks like a big grin.

October Overview

- The Zodiacal Light is visible more than an hour before sunrise during the first week of the month and once again the last week of the month.
- Idahoans get to see a total lunar eclipse on the morning of the 8th.
- We also get to see a partial solar eclipse on the afternoon of the 23rd.

October 1 – 7

The first quarter moon is located above Sagittarius on the evening of the 1st. This is a good time to learn how to identify this constellation. It has the shape of a teapot and in a dark sky, the Milky Way appears as steam coming from the teapot's spout. A little above and to the left of the teapot is a tiny teaspoon made up of five stars.

One of the four Royal Stars appears below the moon on the night of the 4th. The star is Fomalhaut, the Solitary One. Tonight Fomalhaut is the bright star below the moon and near the southeast horizon. The star is not very distant from us as far as the stars go. This 1st magnitude star is 25 light years away. Astronomers have determined that Fomalhaut emits excess infrared radiation, an indication that a disk of gas and dust surrounds it. Telescopes have even seen one planet forming from this circumstellar disk.

The 4th is also the 57th anniversary of the Space Age. On October 4, 1957, the Soviet Union launched the world's first satellite, Sputnik 1. The year 1957 was the beginning of the International Geophysical Year (IGY), an 18 month period where many nations of the world worked together to explore Earth and share their findings. In 1955, both the United States and the Soviet Union stated their plan to launch a satellite into orbit during IGY. However not many people took the Soviet Union claim seriously because they believed it to be a backwards country with little technical skill. So you can imagine our shock when we learned that the Soviet Union had launched Sputnik 1. The satellite's orbit wasn't very high and it only remained in orbit for 30 days before reentering the atmosphere and burning up.

October 8 – 14

We get to see a total lunar eclipse on the morning of the 8th. The event starts becoming noticeable around 2:45 AM, so you'll need to go outside pretty late at night to observe it. It will be worth your time however, as this is a total lunar eclipse. The moon reaches total around 5:00 AM and will appear very orange. There's a star about two lunar diameters away from the moon's left that you can easily see through binoculars. It's the planet Uranus.

Let the moon show you how to identify the constellation of Aries the Ram on the night of the 9th. Above the moon that night is a flat triangle of three stars about as wide as three of your outstretched fingers. That triangle represents the horns of Aries, the ram with the Golden Fleece that Jason and his Argonauts sought. Its brightest of its stars is named Hamal and it's on the left side of the constellation.

The 9th is the 410th anniversary of the last supernova known to have exploded in our galaxy. This is the supernova documented by the astronomer Johannes Kepler. The supernova was brighter than any other star or planet in the sky and remained visible to the unaided eye until March of 1606 (so for about 18 months). Since the invention of the telescope in 1609, there have been no other supernovas in our galaxy. We're about due for one.

Got binoculars? Go out side after 10:00 PM on the 10th for the chance to see the moon and the Pleiades with your binoculars. The moon will have recently risen, so look for them in the low east.

The Very Large Array (VLA) celebrates its 34th birthday on the 10th. VLA is a series of mobile radio dish antennas on a 40 mile long Y-shaped railroad track. Using several radio antennas spread out over a large distance lets astronomers create the equivalent of a single large antenna. It's a whole lot cheaper and easier to build lots of small antennas and lay 40 miles of railroad track than it is to build a single 40-mile wide antenna. The VLA is located west of Socorro, New Mexico and it's opened to the public.

Don't put away those binoculars just yet. On the evening of the 11th, the moon passes through the Hyades star cluster. Together they'll make a great target for your binoculars or spotting scope.

The moon is playing it dangerously on the morning of the 13th. If you look south at 5:00 AM that morning, you'll see that the moon is standing between Orion the Hunter and Taurus the Bull. Orion is protecting himself from the bull and if the moon doesn't get out of the way quickly, it's liable to get battered by Orion's club and Taurus horns.

October 15 – 21

There's a congregation of binocular objects on the morning of the 17th. First take a gander at the moon in low east at 3:00 AM. Then sweep your binoculars upward about 1½ fields of view to find a star cluster called the Beehive. It has a strong resemblance to a swarm of bees around a hive. After having your fill of this star cluster, turn your attention to the bright star to the moon's left. This is Jupiter and if you steady your binoculars against a stationary object, you'll be able to make out at least two of its largest satellites (all four if you use a spotting scope or larger telescope). At Jupiter's lower left is its satellite Callisto and at the upper right is Callisto. The satellites Io and Europa are located between Jupiter and Callisto.

Leo the Lion crouches on the Moon as you drive to work on the 19th. The brightest star between the moon and Jupiter is Leo's alpha star, Regulus.

October 22 – 31

The Orionid meteor shower peaks during the night of the 21st and morning of the 22nd. This is nice shower and since the moon is 28 days old (one day from new), its feeble light can't interfere with the shower. The best time to watch the shower is after midnight and its meteors will appear to originate from the east.

Two weeks after seeing this month's lunar eclipse, Idahoans get to see a partial solar eclipse. The eclipse begins at 2:50 PM on the 23rd. Maximum eclipse occurs at 3:15 when 60% of the sun is obscured by the moon. The moon fully uncovers the sun by 5:30. It's never safe to look at the sun without proper optical filtering. Therefore, use a sheet of dense welding glass or a projection method to observe the eclipse.

It's a tough sight, but Saturn and the moon appear very close together at dusk on the 25th. Search very close to the west-southwest horizon between 7:15 and 7:30 PM with your binoculars. There you might be able to see a very thin crescent moon only two days old. To the moon's lower right and even closer to the horizon is Saturn. Needless to say, you need a clear and flat western horizon. So observing this from Bogus Basin might be a good idea.

Earth is trying to race ahead of Mars, but Mars is not giving up very easily. The red planet remains low in the southwest and west until the end of the year. You can find this world on the 28th by looking for an orange-yellow star below the moon. To the left of Mars is a teapot-shaped arrangement of stars also known as Sagittarius.

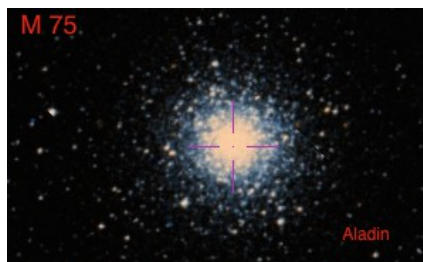
The Sea-Goat (Capricornus) surrounds the moon during Halloween. Look south in dark skies for what looks like a pumpkin lantern's smile about to chomp down on the moon like it was a piece of candy.

Looking through the Eyepiece

In the Goat's Neighborhood by Steve Bell

The constellation of Capricornus, *The Goat*, contains only one deep sky object of note for amateur telescopes, Messier 30, a nice globular cluster. There are, however, five other nice objects in the vicinity that lie just outside the somewhat illogical IAU constellation boundaries. All told, there are three globular clusters, two very nice planetary nebulae and a "Messier mistake" on this month's list.

CON	OBJECT	OTHER	TYPE	RA	DEC	MAG	SIZE
Sgr	M75	NGC6864	Globular	20 06 05	-21 55 19	9.5	6
Aqr	M72	NGC6981	Globular	20 53 28	-12 32 14	10	5.9
Aqr	M73	NGC6994	Open+Asterism	20 58 56	-12 38 07	9	3
Aqr	NGC7009	Saturn Nebula	P Neb	21 04 12	-11 22 00	8	1.7
Cap	M30	NGC7099	Globular	21 40 22	-23 10 45	8.5	11
Aqr	NGC7293	Helix Nebula	P Neb	22 29 36	-20 48 00		12.8



M75:

Starting with the westernmost object and working east, Messier 75, within the boundaries of Sagittarius, is our first target. M75 is a moderately bright and dense globular cluster and, since it is "in the middle of nowhere", can be a moderately difficult star hop. Through an 8" SCT at 156X it appeared small, but fairly bright. It had a broad, bright core with averted vision. It was a very compact, dense cluster.



M72:

Messier 72 is a fairly dim globular cluster NNE (about 5.5°) of Θ Cap. It is much less dense than M75, but is readily visible. Through an 8" SCT at 156X, it appeared grainy with averted vision and slightly denser at the center. It was small, about 1/14 FOV in the SCT. It was pretty dim under suburban skies, but much more obvious under dark skies.



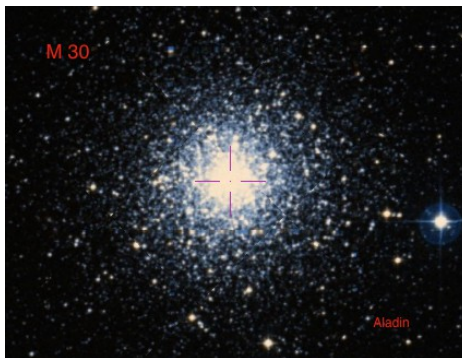
M73:

Messier 73 was a "Messier mistake". It is an asterism (not even an open cluster) of four stars about 1.3° slightly south of west from M72. There isn't much to see here. At 107X in an 8" SCT, this object appears as a triangle of moderately bright stars with one extra off the western vertex. Even though Messier noted nebulosity, there is none.



NGC7009:

NGC 7009 is a bright planetary nebula with “ears”. The ears become visible at magnification around 100X and it actually mimics an out of focus of Saturn; hence its moniker of *Saturn Nebula*. This PN lies about 3° WNW of M72. Through an 8” SCT this PN is bright and obvious without a filter, although small. Increase magnification to greater than 100X. Through larger apertures with narrow band or OIII filters internal detail becomes visible. This PN is strikingly blue (or green, depending on individual color perception).



M30:

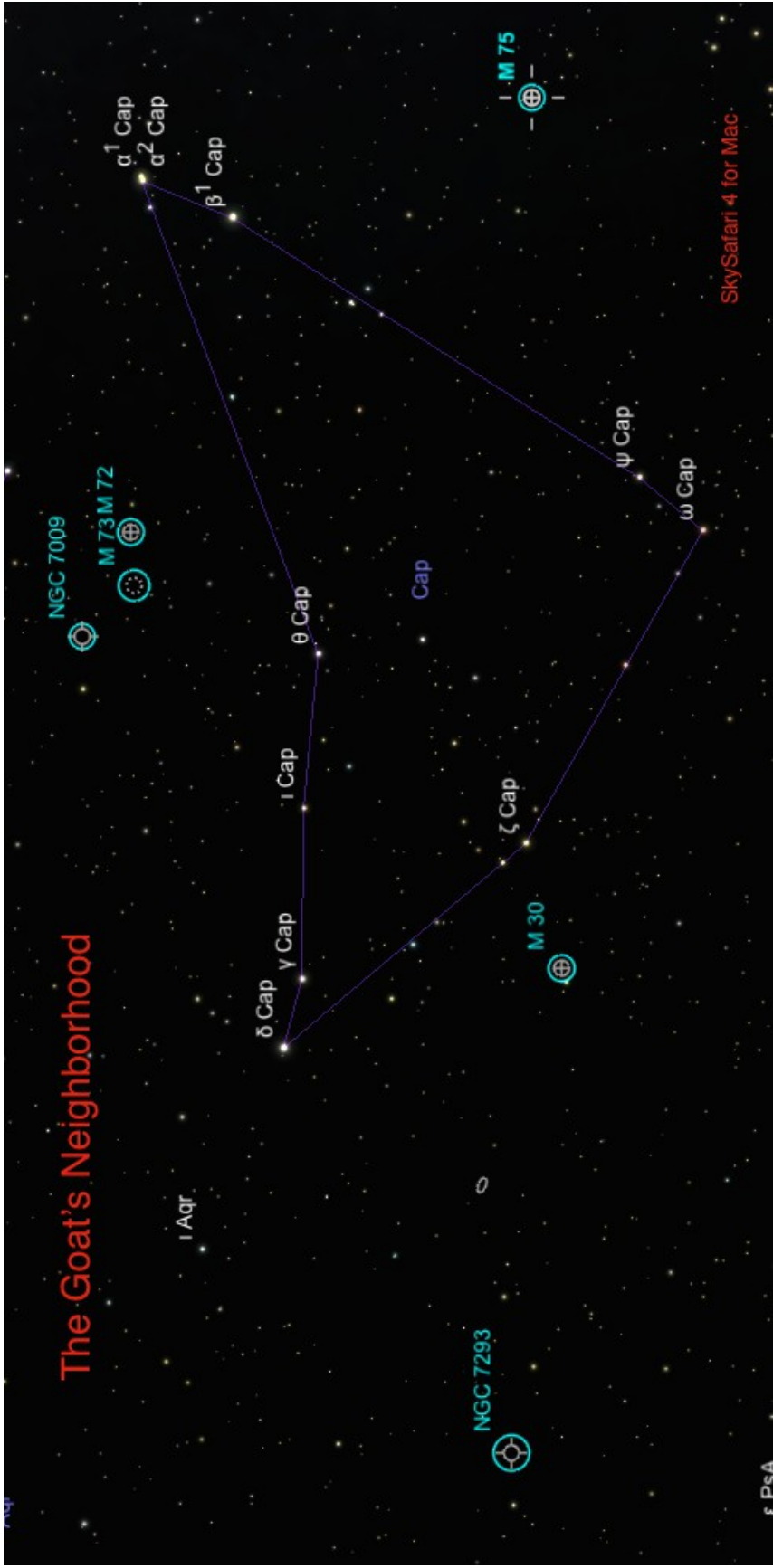
Messier 30, the one object this month that actually is in the boundary of Capricorn, is a bright, relatively large globular cluster that lies about 3.2° ESE of ζ Cap. Through an 8” SCT at 156X this globular appeared fairly large and was grainy with a broad, relatively bright core.



NGC7293:

NGC 7293, the *Helix Nebula*, is the largest planetary nebula in the sky and perhaps the closest to the Sun at 900 light years. It is “ghostly” and ephemeral in amateur class apertures, although under dark skies it can be identified in 80mm binoculars. It will not be as distinct or obvious as the Aladin photograph above. It lies in an area of the sky without bright stars, so it can be a difficult star hop.

Through an 8” SCT at 83X, it was readily visible without a filter, but was greatly enhanced with a narrow band filter, occupying about 1/3 the FOV. Larger apertures bring out more detail. Through a 14” f/4.5 Newtonian at 114X with a narrow band filter, it was about ½ FOV with a larger dark hole in the middle. The gas regions were very mottled. The central star is mag 13.5 and was coming and going with averted vision. This observation was made under very good sky conditions.



Centennial Observatory & Faulkner Planetarium Schedule

Event	Place	Date	Time	Admission
Astronomy Talk Night Telescope Viewing	Centennial Observatory	Thursday, September 25 th , 2014	8:30 to 9:30 PM	\$1.50 (Children 6 & under free) Free to all with paid astronomy talk or planetarium admission
Pre-dawn Total Lunar Eclipse	Centennial Observatory	Wednesday, October 8 th , 2014	2:15 to 7:30 AM	FREE
Monthly Free Star Party	Centennial Observatory	Saturday, October 11 th , 2014	8:00 PM to midnight	FREE
Partial Solar Eclipse	Centennial Observatory	Thursday, October 23 rd , 2014	2:30 to 5:45 PM	FREE

Faulkner Planetarium Show Schedule October 3rd – November 25th

SHOWS

Dynamic Earth: Exploring Earth's Climate Engine (Dyn Earth)ⁱ

Flight of the Butterflies (Butterflies)

One World, One Sky: Big Bird's Adventure (Sesame Street)

Pink Floyd: Dark Side of the Moon (PF Dark Side)

Sea Monsters: A Prehistoric Adventure (S Monsters)

Two Small Pieces of Glass: The Amazing Telescope (TSPOG)ⁱ

Tuesday

7:00

8:00

(Dyn Earth)ⁱ

(Butterflies)

Friday

7:00

8:00

(Butterflies)

(PF Dark Side)

Saturday

1:30

2:30

3:30

4:30

7:00

8:00

(TSPOG)ⁱ

(Dyn Earth)ⁱ

(Sesame Street)

(Butterflies)

(Dyn Earth)ⁱ

(S Monsters)



Herrett Center

About the Magic Valley Astronomical Society

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

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. M-51 (On this page) was imaged with the Shotwell Camera and the Herrett Telescope at the Centennial Observatory by club members Rick Widmer & Ken Thomason. Unless otherwise stated all photos appear in the public domain and are courtesy of NASA.



Membership Benefits:

Sky and Telescope group rates. Subscriptions to this excellent periodical are available at a reduced price of \$32.95. Astronomy Magazine group rates. Subscriptions to this excellent periodical are available at a reduced price of \$34.00. Receive 10% discounts on other selected Astronomy Publications.

For periodical info. and subscriptions Contact Jim Tubbs, Treasurer

Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others. Contact President Robert Mayer, for more information.