

Snake River Skies

The Newsletter of the Magic Valley Astronomical Society May 2014

Membership Meeting Astronomy Day Saturday May 10th 2014 7:00pm at the Herrett Center for Arts & Science College of Southern Idaho Public Star Party follows the General Mtg. at Centennial Obs.

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Magic Valley Astronomical Society is a member of the Astronomical League

Message from the President – Robert Mayer

Colleagues,

We have a busy month in front of us. Two big events of note are the regular Astronomy Day at the Herrett Center on May 10th, and the new Hagerman Fossil Beds National Monument Star Party on May 31. Astronomy Day is a regular highlight, with the chance to reach out to the public and stretch the minds and imaginations of both parent and child. If you have time to help out, contact Chris Anderson at 208-732-6663. This year's event starts at 11 a.m.

That night is also the regular MVAS meeting. Come in and take a deep breath from the busy day and get a chance to listen to Mark Daily of the College of Southern Idaho

Later in the month, the Hagerman Star Party is a brand new opportunity, and details are still being worked out. Anderson visited the site earlier this year, and saw the Zodiacal Light, which suggests great conditions. Please stay tuned for more information via E-mail on this.

Lastly, I do want to extend a nod of gratitude for all of you helping out. Not only do we have these two functions, but two small schools have asked for our help recently, Three Creek near Rogerson, and Deep Creek near Buhl. While the Deep Creek party will be rescheduled for later due to weather, Three Creek is about to be finalized for this month.

All that is a lot to ask from you, but whatever you can do helps. Our community benefits from you being out there. Having said that, we will try to keep working on the MVAS-only Star Parties.

Clear Views,

Robert Mayer

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May Overview

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

5/1 May Day or Beltane, a cross-quarter day; the Moon is 2 degrees north of the first-magnitude star Aldebaran (Alpha Tauri) at 16:00

5/2 Mercury is at perihelion today

5/4 Jupiter is 5 degrees north of the Moon at 14:00

5/6 The peak of the Eta Aquarid meteor shower (20 per hour for northern observers) occurs at 7:00; the Moon is at apogee, subtending 29' from a distance of 404,318 kilometers (231,232 miles), at 10:24; the Lunar X (also known as the Werner or Purbach Cross), an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to begin at 19:50

5/7 First Quarter Moon occurs at 3:15

5/10 Saturn (magnitude 0.0, apparent size 18.7") is at opposition at 18:00

5/11 Mars is 3 degrees north of the Moon at 14:00

5/12 The Moon is 1.7 degrees north of the first-magnitude star Spica (Alpha Virginis) at 13:00

5/13 Mercury is at its greatest heliocentric latitude north today; a double Galilean satellite shadow transit begins at 9:24; Mercury is 8 degrees north of the first-magnitude star Aldebaran (Alpha Tauri) at 16:00

5/14 Saturn is 0.6 degree north of the Moon, with an occultation occurring in Victoria Land (Antarctica), New Zealand, and southern Australia, at 16:00; Full Moon, known as the Milk or Planting Moon, occurs at 19:16

5/15 Venus is 1.3 degrees south of Uranus at 13:00; asteroid 9 Metis (magnitude 9.6) is at opposition at 14:00 5/16 Venus is at aphelion today

5/17 A double Galilean satellite shadow transit begins at 21:22

5/18 The Moon is at perigee, subtending 33' from a distance of 367,102 kilometers (228,107 miles), at 11:57

5/20 A double Galilean satellite shadow transit begins at 11:59

5/21 Mars is stationary at 9:00; Last Quarter Moon occurs at 12:59

5/22 Neptune is 5 degrees south of the Moon at 4:00; the Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to begin at 21:57

5/24 A possible new meteor shower associated with Comet 209P/LINEAR peaks at 7:00; Uranus is 1.9 degrees south of the Moon at 20:00

5/25 Mercury is at greatest eastern elongation (23 degrees) at 7:00; Venus is 2 degrees south of the Moon at 16:00 5/27 A double Galilean satellite shadow transit begins at 14:34

5/28 New Moon (lunation 1131) occurs at 18:40

5/31 Mercury is 6 degrees north of the Moon at 16:00; asteroid 15 Eunomia (magnitude 9.5) is at opposition at 18:00

Nicolas Lacaille (1713-1762) and Joseph Lockyer (1836-1920) were born this month.

Nereid, Neptune's third-largest satellite, was discovered on May 1, 1949 by Gerard Kuiper.

Calendar

May 2014

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7 First Quarter Moon 50% Visible	8	9	10 Astronomy Day Activities all Day at the Herrett Center
11 Mother's Day	12	13	14 Full Moon 100% Visible	15	16	17
18	19	20	21 Last Quarter Moon 50% Visible	22	23	24
25	26 Memorial Day	27	28 New Moon	29	30	31

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Be Safe – Get Out There – Explore Your Universe!

Idaho Skies April 2014 / Vol. 8 No. 4

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 <u>nearsys@gmail.com</u>

This month look for the star Denebola, the "Tail of the Lion". Denebola lies 36 light years away, so if you were born in 1978, then Denebola is your birthday star this year. Denebola is the 3rd brightest star in the Zodiac, so it's very visible from town.

Denebola is young in star years. At 400 million years old, it's less than 1/10th the sun's age. It's more massive than the sun and therefore hotter. Denebola has a surface temperature around 15,000 degrees F, making it white hot. The star is 1¹/₂ times larger in diameter and rotates faster than the sun to boot. Together, its increased temperature and size means Denebola emits 12 times as much energy as the Sun. Some of this energy is absorbed by a disk of dust surrounding the star and reemitted within the infrared region of the spectrum. We can't see the disk around Denebola, but the star's excess infrared radiation gives away its presence. Perhaps there are planets forming around Denebola or planets are battering each other to pieces.

May 1 – 7

The moon graces the Hyades star cluster on the evening of the 1st. You'll have to look for them just after it gets dark in order to see this pairing in the low western sky. Your best view is through binoculars.

The moon passes Jupiter on the night of the 3rd. The planet appears in the west as the bright star directly above the moon. You can tell Jupiter apart from other nearby stars because Jupiter is brighter and it doesn't twinkle like them. Point your binoculars or spotting scope at Jupiter and you will detect at least two of its four large Galilean satellites. Ganymede is the faint star to the upper left of Jupiter and Callisto is the faint star to the lower right. With additional magnification, you can see the remaining satellites, Io and Europa between Jupiter and Callisto. In this case however, since telescopes invert images, these two satellites will appear at the upper left of Jupiter.

A bright star appears to the lower left of the moon on the night of the 4th. This is the 8th brightest star and many people don't know its name. It's Procyon and it's the alpha star of the Canis Minor, the Little Dog. Procyon is a close star, only 11.5 light years away, which is one reason it appears so bright. Like its brighter neighbor, Sirius, a white dwarf companion star orbits Procyon. The white dwarf companion of Procyon is very difficult to observe and requires a very good telescope.

May's regularly scheduled meteor shower peaks on the night of the 6th and morning of the 7th. The dust making up the Eta Aquarids meteor shower originated in the tail of Halley's Comet. Unfortunately, this is not one of the best showers, with only 12 meteors visible on average per hour. However, the moon sets by 3:30 AM, so you will have several hours before sunrise to observe this shower before dawn.

You can easily find Leo the Lion on the night of the 7th. That night the moon is placed just below Regulus, the brightest star of Leo. If you follow the terminator of the moon straight up, you'll run right into Regulus.

May 8 – 14

Saturn reaches opposition on the 10th. This means Saturn rises at around sunset (8:40 PM) and shines it's brightest for the year. The planet's rings are tipped wide open and visible with modest optical aid beyond a pair of binoculars.

An easy way to find Mars is to wait until the moon passes on the night of the 10th. Mars is the yellowish-orange star to the moon's upper left that night. Just past Mars is a fainter star in Virgo named Porrima.

The moon's located to Spica's upper right on the night of the 11th. This is the brightest star in Virgo the Maiden. The star is 262 light years away, so the light you see from this star tonight left in the year 1752. The light you see from the moon left only left the moon 1.25 seconds ago. That means the moon is significantly closer to Earth than Spica.

Speaking of Saturn, after sunset on the 13th, the moon appears a scant four degrees from the ringed planet. Saturn is the creamy yellow-white star to the moon's left. A small telescope or spotting scope is enough to show its rings and largest satellite Titan.

While observing Saturn, take notice of a star closer to the moon, but on its right side. This is the wide double star Zubenelgenubi. A pair of binoculars, if held steady, shows that it's actually two stars. It's possible that those with good eyesight can see Zubenelgenubi as two stars without optical aid.

May 15 – 21

Do you want to learn how to identify the constellation of Scorpius the Scorpion? The moon passes close to the scorpion's northern claw on the morning of the 15th. The heart of Scorpius (Antares) is located to the moon's lower left. The rest of the scorpion's body is the curved chain of stars south and east of Antares. And please, the constellation is called Scorpius and not Scorpio.

Begin looking at Mercury on the evening of the 18^{th} . Over the next two weeks, the tiny planet remains well placed for observing above the western horizon. The best view occurs on the 25^{th} when Mercury is at its highest above the horizon. May 22 - 31

Jupiter is approaching the sun and will disappear from view by the end of June. As it approaches the horizon, it makes a close approach to Mercury on the evening of the 24th. That evening, look for bright Jupiter low in the west and fainter Mercury lower in the northwest. Mercury and Jupiter will be the brightest two stars between the west and northwest.

There's a possible new meteor shower in the offing! The reason is that Comet LINEAR 209P, which an automated telescope discovered in 2004, is passing through the inner solar system again this May. So there exists a chance that Earth will pass through the dust from its tail on May 24th. If this does indeed happen, meteors from this shower will appear from the north. The moon is a waning crescent that night, so it won't rise until 4:00 AM. Since the comet has recently past Earth, we might pass through a dense stream of rocky material left over from the comet. If so, this could be a shower wonderfully filled with streaking meteors.

The waning crescent moon forms a wonderful pair with brilliant Venus on the morning of the 25th. You'll need to go outside at 5:00 AM in order to see them in the low east-northeast. Their separation is less than 2 degrees, so they both fit neatly within the field of view of your binoculars.

Innermost planet Mercury reaches its greatest distance from the sun on the 25th. That evening the planet stands 23 degrees away from the sun. Unfortunately, the average path of the planets across the sky, which astronomers called the ecliptic, tilts towards the south. As a result of the tilting, Mercury only appears nine degrees above the west-northwest horizon at 10:00 PM. Still, this is the highest above the horizon and farthest from the sun Mercury appears this year. By the way, you'll have less than an hour to find Mercury before it sets. You can't miss it; Mercury is the brightest star just above the horizon.

A young moon, only two days old, passes between Mercury and Jupiter on the evening of the 30th. Look very low in the west just as its getting dark to find this trio. Jupiter will jump out first; it's the brightest star in the west. Mercury and the moon are located below Jupiter and slightly right. Jupiter and Mercury appear side by side with Mercury being the right partner.

The moon passes just below Jupiter on the evening of the 31st. The gap between them is just a bit greater than the field of view of most binoculars.

Nereid, Neptune's third-largest satellite, was discovered on May 1, 1949 by Gerard Kuiper.

This Month's Sources

Astronomical Events for 2014, http://www.universetoday.com/107259/101-astronomical-events-for-2014/ Comet LINEAR 209P, http://earthsky.org/space/comet-209p-linear-meteor-shower-storm-may-2014 Denebola: http://en.m.wikipedia.org/wiki/Denebola Night Sky Explorer Procyon, http://en.m.wikipedia.org/wiki/Procyon Space Calendar, http://www.jpl.nasa.gov/calendar/

Dark Skies and Bright Stars, Your Interstellar Guide

Solar System

	By the end of May's first week, Mercury re-emerges in the western evening sky after spending the last month in the glow of dawn. The tiny planet remains in view all month and reaches greatest elongation on the 25th, when it lies 23° east of the Sun.
	Venus is the bright "Morning Star", blazing low in the east before and during dawn. The planet loses a little of its altitude in May, but at magnitude -4 around mid-month you will not have any trouble distinguishing it.
	The Red Planet reached opposition and peak visibility in April, and remains impressive during May. It halts its retrograde (westward) motion on May 21, so it lingers the whole month near the fairly bright star Gamma Virginis, also known as Porrima. The best times to view are when Mars climbs highest in the south, from mid-evening until 2 A.M. local daylight time.
	As May begins, gas giant Jupiter rides above the western horizon, more than 40° high from mid-northern latitudes. The planet lies in Gemini, near the ecliptic's northernmost point, so it remains visible well after midnight despite being four months past opposition. By month's end, however, Jupiter is only half as high and sets around 11 P.M. local daylight time.
Į,	Saturn comes to opposition on May 10, when it rises at sunset, climbs highest in the south around 1 A.M. local daylight time, and sets as the Sun comes up. The planet shies in Libra the Balance, far to the lower left of Mars and Spica in the evening.
	You will want to wait until mid-May to start a search for Uranus through binoculars. The 6th-magnitude planet, having passed through conjunction with the Sun in early April, lurks only 10° above the eastern horizon by the onset of morning twilight. Telescopes show it less than 1.5° north of Venus on May 15 and 16.
	Seek out Neptune just before dawn, in central Aquarius, 2° northeast of the 5th-magnitude star Sigma Aquarii. The planet lies 2.8 billion miles (4.5 billion kilometers) from Earth and glows dimly at magnitude +7.9. A 4-inch diameter telescope is probably the minimum required to see the planet and resolve its disk, only 2.4 arc-seconds across.
*	Pluto drifts among the stars of the constellation Sagittarius and can be attempted with a fairly large telescope in the wee morning hours. A 10-inch instrument should catch the dwarf planet's 0.1 arc-second disk, shining at magnitude +14. Because Pluto looks just like millions of similarly faint stars, identifying it is an exercise in precision map work at the telescope.
	Ceres and Vesta loop nearly in parallel across the constellation Virgo, and show up easily in the same binocular field they lie some 2.5° apart and appear halfway up in the southeastern sky after darkness falls. Vesta, the brightest member of the pair, is just below the naked eye barrier. At magnitude +7.5, Ceres is well out of naked eye range, but shows up easily through binoculars.
	Comets – information will be found on the next page for all of the comets.
	Meteors - information will be found on the next page for all of the Meteors.

Comets and Meteors for May

Although never expected to become brighter than 14th-magnitude, in mid-October 2013 Comet **C/2012 X1 LINEAR** suddenly brightened some 150 times to magnitude +8. Something similar happened with comet 17P/Holmes in 2007, when the "icy mud ball" brightened over half a million times from an uber-faint 17th-magnitude to a naked eye brightness of +2.8. While cometary outbursts are common, their causes are unknown. One possibility is that a massive buildup of gas inside the comet fractures and breaks off a large size of the crust, releasing a huge cloud of dust and gas. Another possibility is that outbursts are triggered by impacts with bodies that have sizes in the range of three or four feet (one meter).

Throughout all of May, C/2012 X1 should remain around 8th or 9th magnitude, making it an easy target for 6-inch telescopes. The comet cuts through the constellations Aquarius and Capricornus, which stand highest above the horizon in the predawn sky. The best views will come during the month's first and last weeks, when moonlight will not interfere with observing. Use a range of magnifications to see all of the comet's features. If you bump up the power past 100x, you might even glimpse the "false nucleus", a pinprick shining in the middle of the brightest glow. The true surface of C/2012 X1 LINEAR lies hidden behind several bright layers of dust and gas, ejected in the previous several days.



Comet C/2012 X1 Linear Finder Map

Date	RA	Dec	Mag	Distance
May 01	21h33m	-10°37'	+8.0	1.753
May 15	21h55m	-14°15'	+8.0	1.684
May 31	22h15m	-19°21'	+8.0	1.613

C/2014 E2 Jacques is a new bright comet, discovered last March by Cristovao Jacques and the SONEAR team at an observatory near Oliveira, Brazil. The preliminary orbit indicates that the comet will approach to the Sun down to 60 million miles (96 million kilometers) in July, when it is expected to brighten to magnitude +7. Before the perihelion passage, from mid-northern latitudes, Comet Jacques will be observable until late May. After perihelion, starting mid-July, the comet will emerge in the morning sky and will swing north from Taurus into Cepheus and Perseus.

Throughout this month, C/2014 E2 Jacques travels northwestward among the background stars of Monoceros, the Unicorn. From the Northern Hemisphere this region stands highest in the evening twilight, above the southwestern horizon. Glowing at 8th-magnitude, the comet should have a bright core surrounded by a small and faint halo, about two arc-minutes across. This halo will disappear under light-polluted skies, however, so try to find as dark an observing site as you can.



Comet C/2014 E2 Jacques Finder Map

Date	RA	Dec	Mag	Distance
May 01	07h31m	-04°27'	+8.0	1.196
May 15	07h02m	+03°24'	+8.0	1.406
May 31	06h39m	+09°49'	+8.0	1.607

C/2012 K1 PanSTARRS As May opens, PanSTARRS skims between Eta Ursae Majoris (the star at the end of the Big Dipper's handle) and M51, the Whirlpool Galaxy. The spiral galaxy glows at 8th magnitude, about two times brighter than the vastly smaller but closer "dirty snowball". After May 15, C/2012 K1 PanSTARRS departs Canes Venatici and enters into larger Ursa Major, south of the widely recognized asterism known as the Big Dipper's bowl.





Date	RA	Dec	Mag	Distance
May 01	13h36m	+49°01'	+9.0	1.474
May 15	12h04m	+48°25'	+9.0	1.506
May 31	10h49m	+42°30'	+9.0	1.647

Meteors: The **Eta Aquariids** may not be as spectacular as the Perseids in August or the Leonids of winter, but it is fun to think that these meteors are in fact particles of the most famous comets of all - Halley's Comet! The shower gets its name from the area of the sky from which the meteors appear to radiate at the date of the maximum, in this case, a star designated by the Greek letter Eta in the constellation Aquarius the Water-Bearer. The Eta Aquariids first appear around April 19, and some can be seen until May 28. The shower's peak occurs around May 6, when up to 20 or 30 meteors can be seen each hour from a dark-sky site. Rates are higher the farther south you are located, and for observers in the Southern Hemisphere the hourly rate climbs to 55. Before and after the maximum, the Eta Aquariids produce only two or three meteors per hour.

Throughout May, the shower's radiant is found in northern Aquarius - close to Eta Aquarii - and moves daily a little to the northeast. The radiant never gets very high in the sky before dawn, so your observing time is limited. Many Eta Aquariid meteors are bright yellow, and some will likely leave brief smoke trails in their wake.

Eta Aquariids Finder Map



On the night of May 23-24, shortly before the onset of dawn, astronomers predict that Earth will pass through debris from **Comet 209P/LINEAR.** The resulting meteor shower could produce about one hundred shooting stars per hour, but this is a very cautious estimation. It is very possible that the real activity will turn out to be much higher and storm levels cannot be excluded. The shower is expected to last for only a few hours, with the peak time centered around 7 UT (1:00 A.M. MDT) May 24. This timing favors the United States and Canada except the far north; the rest of the world either will be facing away from the incoming meteors or bathed in daylight. The shower's radiant lies nearly due north near the border between Ursa Major and Camelopardalis, at right ascension 8h 15m, declination +80°. Keep in mind that meteors from this shower will likely be bright and unusually slow-moving, entering the atmosphere at a mere 11 miles per second (18 kilometers per second), far slower than those of any of the annual showers.

The best way to watch and count meteors is to recline on a lounge chair. Tilt your head so that you are looking slightly more than halfway from the horizon to the zenith - the optimum direction for counting meteors. And be sure you have a thermos of hot coffee, tea, or cocoa!

Comet 209P/LINEAR Radiant Map for May 24





C/2012 X1 LINEAR underwent a large outburst in mid-October 2013. Pictured above on April 8, the comet is still bright and more than 20° high in the morning sky. © Damian Peach

Deep Sky

Top ten deep-sky objects for May: M3, M51, M63, M64, M83, M87, M104, M106, NGC 4449, NGC 4565

Top ten deep-sky binocular objects for May: M3, M51, M63, M64, M84, M86, M87, M104, M106, Mel 111

Challenge deep-sky object for May: 3C 273 (Virgo) Right Ascension: $12^h 29^m 06.7^s$ Declination: $+02^\circ 03' 09''$ It is the optically the brightest quasar in our sky. Given its distance from Earth and visual magnitude, 3C 273 is the most distant celestial object average amateur astronomers are likely to see through their telescopes.

Notable carbon star for May: SS Virginis Right Ascension: 12^h 25^m 12^s Declination: 00° 46' 00"

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on May 3rd, 6th, 9th, 12th, 15th, 17th, 20th, 23rd, 26th, and 29th.

The objects listed above are located between 12:00 and 14:00 hours of right ascension.



3C 273 in Virgo

Club Announcements

Win This Telescope!



Meade 8" f/10 Schmidt-Cassegrain OTA with UHTC coatings brand new in the box. (No tripod or mount)

Accessories included: Mounting saddle, visual back, 1.250" prism diagonal, 26mm Meade Super Plossl eyepiece, red dot finder and front OTA cover. (OTA = Optical Tube Assembly)

How to Enter

The Meade OTA Drawing is open <u>only</u> to current members of the Boise Astronomical Society, Magic Valley Astronomical Society, Idaho Falls Astronomical Society, Palouse Astronomical Society and registered attendees of the 2014 Idaho Star Party.

You may obtain **Meade OTA Drawing** tickets from the **Boise Astronomical Society** between now and Saturday, September 20, 2014. Donations for tickets are \$1.00 each or 6 for \$5.00. Tickets may be obtained at **Boise Astronomical Society** meetings or at the **Idaho Star Party** at Bruneau Dunes State Park, September 19-20, 2014. You may obtain tickets by mail by sending your request with donation (check), along with a <u>self-addressed stamped return</u> <u>envelope</u> to:

Boise Astronomical Society, P. O. Box 7002, Boise, ID 83707.

Ticket orders by mail must be received by August 31, 2014.

The winning ticket will be drawn on Saturday afternoon, September 20, 2014, at the **Idaho Star Party**. You do not have to be present to win. The winner is responsible for shipping charges if required. Results will be announced on <u>www.boiseastro.org</u>.

Four Spring Globulars by Steve Bell, BAS

Spring is the start of globular cluster season. During May there are four globular clusters occurring in two sets of two that rise in the early evening. Two are fairly prominent in the eyepiece (one in each pair) and two are less conspicuous. All four are well up in the eastern sky during May by full darkness. All are brighter than 11th magnitude and are large enough to be readily visible in any telescope of 4" or more aperture under decent skies.

CON	OBJ	RA	DEC	MAG	SIZE
CVn	M3	13 42 11	+28 22 35	7	16.2
Воо	NGC5466	14 05 30	+28 32 00	9.1	11
Com	M53	13 12 55	+18 10 07	8.5	12.6
Com	NGC5053	13 16 24	+17 42 00	9.8	10.5





Thumbnails from Aladin

M 3: While officially within the boundary of CVn, I always associate M 3 with Bootes. M 3 is a bright, well-concentrated 18' globular cluster that lies about 33000 light years from the sun. M3 is visible in almost

any scope. Through a 4" f/10 refractor at $\overline{79X}$ it appeared slightly smaller than M13, was granular and circular. Through an 8" SCT at 147X, it was circular, with outer regions resolved and showing granularity across the face of a 1/6 FOV image. M3 forms an equilateral triangle with Arcturus (α Boo) and **p**Boo that is about 12° on a side.

NGC5466: Lying 5.1° almost due east of M3 is the much dimmer globular cluster NGC 5466. Part of the dimness of this GC is due to its distance at 52000 light years, relative to M 3 and most other globular clusters. The rest is due to its star count and lack of central concentration. This GC is fairly large at \sim 11' in diameter, but is dim

at roughly 9th magnitude (low surface brightness). When searching for it, exercise care, as you can pass over it if you are moving quickly. Through an 8" SCT at 107X NGC 5466 appeared fairly large (~0.2°), grainy, but not resolved and dim.



Thumbnails from Aladin

M 53: Situated about 1° NW from α Comae, M 53 is a fairly bright, although smallish globular cluster (high surface brightness). It is some 58000 light years from the sun. Through a 4" f/8.6 refractor at 98X it was granular with a hint of resolution in the outer areas, about 1/10 FOV and had a broad bright core. Through an 8" SCT at 147X, it was a circular granular glow with some outer resolution and was about 1/8 FOV.

NGC5053: This very loose, low surface brightness GC about 1° SE of M53 actually requires lower power to detect. It contains significantly fewer stars than M 53, and, although at about the same distance (57000 light years) is a difficult object. It requires low power. Through an 8" SCT at 64X it subsumed about 1/6 FOV with a hint of granularity using averted vision under excellent sky conditions. Under poorer skies, it may appear more like a circular nebula with smaller apertures. There is a fairly bright star on the cluster's SE edge. There was debate as to whether this cluster was a globular or an open cluster, but spectroscopy has confirmed its membership in the globular cluster clan.

The four globular clusters provide a good study in contrasting the visual appearance of globular clusters. May is the beginning of "globular cluster season" and observation of these four should provide a guide for the appearance of dimmer, more difficult globular clusters.

NASA Space Place

The Power of the Sun's Engines

By Dr. Ethan Siegel

Here on Earth, the sun provides us with the vast majority of our energy, striking the top of the atmosphere with up to 1,000 Watts of power per square meter, albeit highly dependent on the sunlight's angle-of-incidence. But remember that the sun is a whopping 150 million kilometers away, and sends an equal amount of radiation in all directions; the Earth-facing direction is nothing special. Even considering sunspots, solar flares, and long-and-short term variations in solar irradiance, the sun's energy output is always constant to about one-part-in-1,000. All told, our parent star consistently outputs an estimated 4×10^{26} Watts of power; one *second* of the sun's emissions could power all the world's energy needs for over 700,000 years.

That's a literally astronomical amount of energy, and it comes about thanks to the hugeness of the sun. With a radius of 700,000 kilometers, it would take 109 Earths, lined up from end-to-end, just to go across the diameter of the sun once. Unlike our Earth, however, the sun is made up of around 70% hydrogen by mass, and it's the individual protons — or the nuclei of hydrogen atoms — that fuse together, eventually becoming helium-4 and releasing a tremendous amount of energy. All told, for every four protons that wind up becoming helium-4, a tiny bit of mass — just 0.7% of the original amount — gets converted into energy by E=mc², and that's where the sun's power originates.

You'd be correct in thinking that fusing $\sim 4 \times 10^{38}$ protons-per-second gives off a tremendous amount of energy, but remember that nuclear fusion occurs in a *huge* region of the sun: about the innermost quarter (in radius) is where 99% of it is actively taking place. So there might be 4×10^{26} Watts of power put out, but that's spread out over 2.2×10^{25} cubic meters, meaning the sun's energy output *per-unit-volume* is just 18 W / m³. Compare this to the average human being, whose basal metabolic rate is equivalent to around 100 Watts, yet takes up just 0.06 cubic meters of space. In other words, **you emit 100 times as much energy-per-unit-volume as the sun!** It's only because the sun is so large and massive that its power is so great.

It's this slow process, releasing huge amounts of energy *per reaction* over an incredibly large volume, that has powered life on our world throughout its entire history. It may not appear so impressive if you look at just a tiny region, but — at least for our sun — that huge size really adds up!



Image credit: composite of 25 images of the sun, showing solar outburst/activity over a 365 day period; NASA / Solar Dynamics Observatory / Atmospheric Imaging Assembly / S. Wiessinger; post-processing by E. Siegel.



Observatories & Planetariums

Bruneau Dunes Observatory - Bruneau, ID

You're invited to star gaze at the Bruneau Dunes Observatory! See the night sky as you've never seen it before. Observatory tours and solar viewing (through a specially adapted telescope) begin one hour before sunset, and are free of cost. Following that, visitors can view short orientation program and then have the chance to survey the heavens through the observatory's collection of telescopes. There is a viewing fee of \$3 per person (children 5 and under are free of cost) for this. The observatory is open to the public from early May through mid-October on Friday and Saturday nights only, weather permitting. For presentation times, call 208-366-7919, or check the kiosk when you arrive at the park.



Centennial Observatory – Herrett Center – Twin Falls, ID

The observatory features one of the world's largest fully wheelchair-accessible public telescopes. The main instrument is the Norman Herrett telescope, a 24" Ritchey-Chretien reflector on a computer-controlled fork mount, manufactured by DFM Engineering of Longmont, Colorado, USA.



herrett.csi.edu/observatory

Event	Place	Date	Time	Admission
Bimonthly Astronomy Talk: "Introducing Boötes, the Herdsman"	Faulkner Planetarium	Thursday, May 1 st , 2014	7:30 to 8:30 PM	Adults: \$2.50 adults Students (incl. CSI): \$1.50 (Children 6 & under free)
Astronomy Talk Night Telescope Viewing	Centennial Observatory	Thursday, May 1 st , 2014	8:30 to 10:30 PM	\$1.50 (Children 6 & under free) Free to all with paid astronomy talk or planetarium admission
Int'l Astronomy Day Solar Viewing	Centennial Observatory	Saturday, May 10 th , 2014	11:00 AM to 5:00 PM	FREE
Monthly Free Star Party (Int'l Astronomy Day)	Centennial Observatory	Saturday, May 10 th , 2014	8:45 PM to midnight	FREE

Earl & Hazel Faulkner Planetarium – Herrett Center – Twin Falls, ID

Opened in November 1995, the Faulkner Planetarium is the largest planetarium theater in Idaho, seating 144 under a 50' dome. It features a state-of-the-art **Digistar 5** full-dome projection system, 10,200 Watt Dolby 5.1 surround audio, and programmable LED dome lighting.

Faulkner Planetarium Show Schedule May 1 st – 24 th							
		SH	OWS				
		Astronaut w/Live	Sky Tour (ASTRO) ຍັ				
	E	arth, Moon & Sun w	/Live Sky Tour (EM	S) ຂ			
		Perfect Little	Planet (PLP)				
	Pink	Floyd: Dark Side of	the Moon (PF DARI	K SIDE)			
	Sea Mo	onsters: A Prehistorio	c Adventure (S. MO	NSTERS)			
		Tue					
			suay	7.00	0.00		
				7:00	8:00		
				(EMS)ĉ	(S. MONSTERS)		
		Wedr	lesday				
		Thu	rsday	-			
Friday							
				7:00	8:00		
				(ASTRO) ຍິ	(PF DARK SIDE)		
Saturday							
1:30	1:30 2:30 3:30 4:30 7:00 8:00						
(ASTRO) ຍໍ	(PLP)	(EMS)	(PLP)	(S. MONSTERS)	(PF DARK SIDE)		





"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.

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.