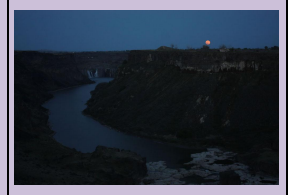




# Snake River Skies

The Monthly Newsletter of the  
Magic Valley Astronomical Society  
November 2013



[www.mvastro.org](http://www.mvastro.org)

## Membership Meeting

Saturday, November 9<sup>th</sup>

Herrett Center  
Join us at 7:00 pm



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## Letter from the Vice President – Jim Hoggatt

Busy two weeks coming up.

Friday, Nov 1, 6:30-7:30 PM - Chris' astro talk "Introducing Delphinus, the Dolphin"

7:30-9:30 PM - Star gazing at the Centennial Observatory

Saturday, Nov 2, 6 PM - MVAS star party at the Jerome Gun Club. Bring a sack dinner. Memorandum from Paul McClain

All MVAS members are encouraged to attend a star party! That's right; we should all get together on Saturday night, November 2 at a mutually agreeable location to celebrate the new moon and watch Orion rise. No slackers. Yeah, it'll be cool but that's what coats are for so this is a reason to buy a new coat. Don't worry about the weather, it never snows in Idaho. If you want to bring a civilian fine, but you're responsible for 'em all night. Hot drinks and sweet treats would be a good idea (personally I'm fond of chocolate in all forms but German).

Saturday, Nov 9, 7PM - MVAS meeting. Nominate now for election of officers at this meeting. Bring your favorite snack/dessert.








8PM - observatory public star party

See you there!

### In this Issue

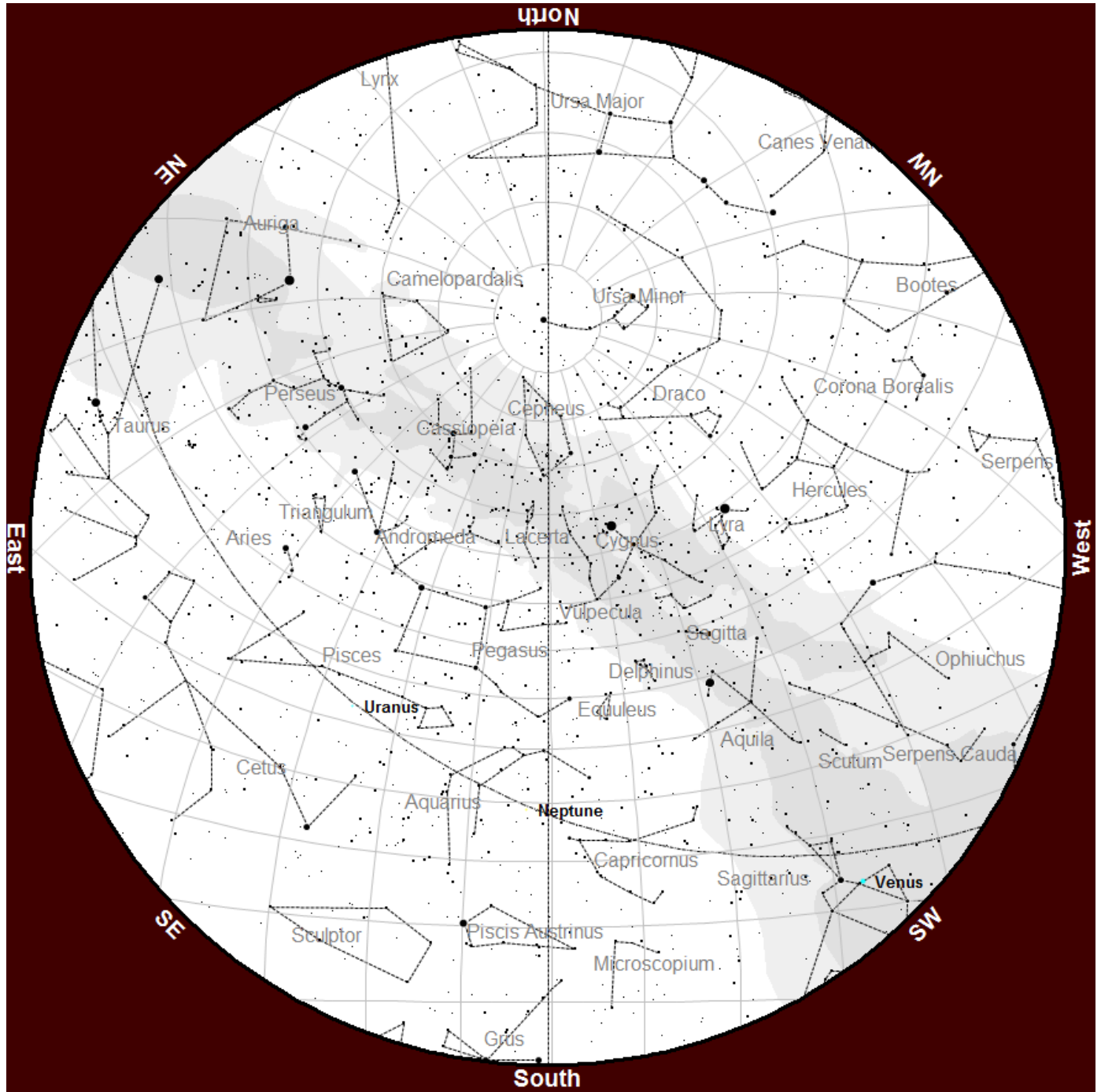
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## Calendar for November

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Astronomy Talk Herrett Center at 18:30 "Introducing Delphinus, the Dolphin"	2 Club Star Party Jerome Gun Club 18:00 
3 New Moon 1% Visible Daylight Saving Time Ends 	4	5	6	7	8	9 Monthly Membership Meeting Herrett Center 7:00pm Public Star Party Centennial Observatory
10 First Quarter Moon 53% Visible Waxing 	11 Veterans Day Remembrance Day 	12	13	14	15	16
17 Full Moon 100% Visible 	18	19 Reopening of the Upgraded Faulkner Planetarium at 19:00 Watch for the Show Schedule on Monday, the 4 <sup>th</sup>	20	21	22	23
24	25 Last Quarter Moon 54% Visible Waning 	26	27	28 Thanksgiving Day 	29	30

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 © 2013 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. The image of M51 image is explained on the back page. The Shoshone Falls on the Snake River in Idaho; a prominent landmark feature in the Magic Valley near Twin Falls, ID

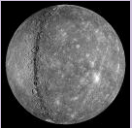





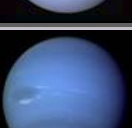

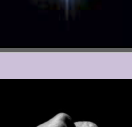


Planisphere for November



Planisphere should be used as a guide for the month of November, mid-month, end of astronomical twilight (20:30) Planisphere is provided as a courtesy from Chris Anderson, Coordinator, Centennial Observatory, Herrett Center for Arts & Science - College of Southern Idaho, Twin Falls, ID

Be Safe, Get Out There, and Explore Your Universe!


**Solar System Highlights**


	<b>Mercury</b> Innermost Mercury goes through inferior conjunction on November 1, starting around November 10, the planet becomes visible to the unaided eye and quickly climbs into view before dawn. Mercury appears significantly higher and brighter each morning after that, and by the time it reaches greatest western elongation on the 17th, it stands 10° high in the east 30 minutes before sunrise.
	<b>Venus</b> does not set until almost three hours after the Sun for viewers at mid-northern latitudes this month. It is by far the brightest point of light in the sky, shining at an awesome magnitude -4.5 in the southwest for more than half the duration of the long northern evenings in November. Venus is at greatest elongation, 47° from the Sun, on the evening of November 1.
	<b>Mars</b> rises around 2:30 A.M. local daylight time on November 1 and around 1 A.M. local time on November 30. The best time to look is hours later, when the planet is much higher in the southeast. The orange-gold world begins the month in south-central Leo, but its eastward motion carries it into Virgo the Maiden on the 25th.
	<b>Jupiter</b> The giant planet rises around 10:30 P.M. local daylight time in early November but breaks the eastern horizon by 7:30 P.M. local time on the 30th. Jupiter spends the month 5° southwest of Gemini's twin stars, Castor and Pollux. You will also find the planet about 5° above a waning gibbous Moon on the night of November 21-22.
	<b>Saturn</b> Everyone's favorite planet, Saturn, passes through conjunction with the Sun on November 6 and does not become easily visible to the naked eye until the last week of November. It then returns to the morning sky and climbs higher with each passing day. Saturn lies less than 1° from Mercury on November 25 <sup>th</sup> and 26 <sup>th</sup> ; on the 25 <sup>th</sup> .
	<b>Uranus</b> is visible virtually all night long this month, but it is highest in the south and best observed around 9 P.M. local time in mid-November. At magnitude +5.7, the planet is bright enough to see with the naked eye in a really dark sky. Telescopes will reveal its pale bluish or greenish disk, just 3.6 arcseconds wide.
	<b>Neptune</b> in central Aquarius close to 4th-magnitude Iota Aquarii is well placed for telescopic observing by mid-evening. The distant planet then lies due south and nearly halfway from the horizon to the zenith. Neptune shines at magnitude +7.9 and appears a tiny 2.5 arcseconds wide.
	<b>Pluto</b> Ultra faint Pluto, in Sagittarius, is technically in the evening sky in November. However, the dwarf planet sets soon after the Sun and is in too bright a sky to be seen in most amateur telescopes.
	<b>Asteroid 20 Massalia</b> is the first asteroid whose name did not originate in mythology. It is the Greek spelling for the French city Marseilles, where co-discoverer Jean Chacornac first sighted it in September 1852. The 9th-magnitude space rock spends November among the background stars of Aries the Ram, during mid-evening and remains in view well into the wee morning hours. Start from the Ram's brightest star, 2nd-magnitude Hamal, and hop about 10° to the south (as an alternative, you can hop a more comfortable 2° from the 6th-magnitude star 19 Arietis).
	<b>Comet ISON</b> begins November at magnitude +9.5 among the background stars of Leo the Lion, fairly low in the east during dawn. Based on the sluggish rate at which the comet has brightened so far, by November 20 when ISON will plunge in the Sun's glare towards perihelion it will be magnitude +8 at best. However, chances remain that ISON will be visible with the naked eye very close to the Sun on perihelion day, when it may briefly reach magnitude -4 or -5.
	<b>Meteors:</b> The <b>Leonids</b> are renowned for their periodic storms - outbursts of very high activity lasting less than an hour but during which the observed meteor rate climbs to thousands per minute. In recent years, however, rates for the Leonids have declined significantly from the storm levels of 2001 and 2002, so you may see only five to ten meteors per hour at the peak on Sunday morning, November 17. Reduced numbers can be seen for several days before and after the maximum, from November 6 to November 30.



**Idaho Skies for November 2013**  
**Volume 7 Number 11**



**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 [streetastro@gmail.com](mailto:streetastro@gmail.com). Check the Idaho Skies Twitter page for notices and images at [www.twitter.com/IdahoSkies](http://www.twitter.com/IdahoSkies).**

This month look for the star, Alpheratz, the Lucida, or brightest star of Andromeda. Alpheratz is one of the few stars connecting together two constellations. In this case, Alpheratz unites the constellations of Andromeda and Pegasus. Alpheratz passes just south of the overhead position at 9:00 PM in early November and about two hours earlier in late November. Alpheratz is 97 light years, so if you know someone born in 1916, Alpheratz is his or her birthday star this year.

The surface temperature of Alpheratz is approximately 23,000 degrees F (making it what astronomers call a class B star). Being 150% hotter than the surface of our sun, Alpheratz produces significantly more ultraviolet radiation than the sun. In addition to producing more ultraviolet radiation, the star is producing 200 times more radiation than our Sun. To emit this amount of radiation, Alpheratz must be more massive than the sun. As a result of this additional mass, mathematical calculations predict that Alpheratz will live a shorter life than the Sun.

Alpheratz is not alone in space. It has a companion star with an orbital period of 97 days. Alpheratz is too distant and its companion too close for telescopes to see the two stars separately. Astronomers determine that stars like Alpheratz are binary stars by measuring the variations occurring in their combined spectra. The lines in the spectra of Alpheratz shift back and forth over a period of 97 days, giving away the fact that there are two orbiting each other in this period of time. We call stars like these spectroscopic binaries because of the way astronomers detect them.

### **November 1 – 7**

Venus reaches its greatest distance from the sun on the evening of November 1<sup>st</sup>. However, since the elliptic is strongly inclined towards the south in November, the brilliant planet appears only 9 degrees above the southwestern horizon when it finally gets dark.

Don't forget to turn your clocks back one hour on the night of the 3<sup>rd</sup>.

The first spacecraft to visit inner planet Mercury was launched 40 years ago on the 3<sup>rd</sup>. Mariner 10 flew past Venus and used the planet's gravity to alter its course and approach Mercury. This was the first use of a gravitational assist to alter the trajectory of a spacecraft. The assist was necessary because Mariner 10 was required to lose a lot of energy in order to drop down to Mercury's orbit.

As Mariner 10 approached Mercury on March 29, 1974, it used Mercury's gravity as a second gravitational assist to alter its course and bring it back to Mercury two additional times. In addition to using gravitational assist, the spacecraft also used the force of sunlight to alter its course further.

Mariner 10 discovered that ultraviolet filters could bring out cloud details in Venus' atmosphere. The spacecraft recorded over 7,000 images of both Venus and Mercury. However, because the orbital period of Mariner 10 around the sun was twice as long as Mercury's, Mariner 10 was only able to photograph 45% of Mercury's surface. Images returned revealed that Mercury's surface shared a similarity to the moon. In addition, Mariner 10 discovered that Mercury's temperature reached a high of 369 degrees and that the planet was surrounded by a weak magnetic field.

The Taurid meteor shower reaches its peak on the night of the 3<sup>rd</sup>. The Taurids actually consist of two meteor streams appearing so close together that it was difficult for astronomers to distinguish between them. Astronomers now refer to this meteor shower as a complex rather than as a simple meteoric stream. The moon will be nearly new on the 3<sup>rd</sup> making it easier to see the fainter members of this shower. You can expect to see around five meteors per hour after midnight. Don't let the low meteor count dissuade you from observing, the complex appears to have a larger than usual share of large particles increasing your chances of seeing a fireball or bolide.

### November 8 – 14

During the height of the Space Race between the USA and USSR, the Soviets launched Zond 6 forty-five years ago on the 10<sup>th</sup>. Zond 6, 7, and 8 were unmanned tests of a spacecraft designed to fly around the moon and return cosmonauts to Earth. Even though the flight of Zond 6 was successful; the Soviets never attempted a manned mission to the moon. This is most likely because of their difficulty in developing a sufficiently powerful enough booster rocket that was also safe.

The 9<sup>th</sup> would have been Carl Sagan's 79th birthday. We know Carl Sagan for his work on some NASA space missions and his efforts to bring science to the public through his books and the PBS program, Cosmos. His science fiction story, Contact, was made into a movie shortly after his death. His gift for science popularization is sorely missed.

Apollo 12, the second manned expedition to the Moon, was launched 46 years ago in the 14<sup>th</sup>. Navy astronauts, Pete Conrad, Richard Gordon, and Alan Bean were its crew. On the 19<sup>th</sup>, Conrad and Bean took their lunar module, Intrepid, to the lunar surface in the Ocean of Storms. There they spend 7 hours and 45 minutes exploring the lunar surface. Apollo 12 returned over 75 pounds of rocks and dust when it splashed down in the Pacific Ocean on the 24<sup>th</sup>.

### November 15 – 21

Astronomer William Herschel was born 275 years ago (in 1738) on the 15<sup>th</sup>. Herschel was a native of Germany but moved to England at age 19 to work as a musician and composer. In his spare time, he and his sister Caroline explored the heavens through many of the telescopes he built. Herschel was the first person in modern times to discover a planet (Uranus). In addition, he discovered two of its satellites, two new satellites of Saturn, hundreds of multiple stars, cataloged of over 2400 deep sky objects, determined the changing size of the Martian ice caps, mapped the distribution of stars in the galaxy, and found a region of invisible light beyond the red end of the visible spectrum called infrared light.

The Leonid meteor shower peaks the morning of the 17<sup>th</sup>. The Leonids are famous for producing spectacular showers every 33 years. Unfortunately, this is not one of those years and the moon is full on the 17<sup>th</sup> anyway. Your best opportunity for viewing the Leonids is to observe them several days earlier, when the moon will set before dawn. Expect any Leonids you see to be swift and to originate from the east. On average, you can expect to see 10 Leonids per hour. During its best showers, the Leonids produced over 1,000 meteors per hour, leading some astronomically-declined people to believe the world was ending.

It was the Leonid meteor shower of 1833 that introduced the public to the existence of meteors. Even people who were sleeping at the time became aware of the shower; either by the commotion of their neighbors or by the bright light emanating from the shower's numerous fireballs.

On the 18<sup>th</sup>, the innermost planet reaches its greatest distance from the sun. You can see this elusive planet at around 6:30 AM. It will appear as the brightest star low in the east-southeast. You can take a certain amount of pride in knowing that you observed a planet that it is claimed famed Polish astronomer Nicholas Copernicus never saw.

Twenty-four years ago on the 18<sup>th</sup>, a Delta rocket launched the Cosmic Background Explorer (COBE) into Earth orbit. COBE spent four years making measurements of the universe's cosmic microwave background (CMB) radiation. The CMB is a relic of the Big Bang and represents the cold radiation left over from the origin of the universe. COBE's instruments determined that the CMB is very uniform across the sky except for tiny fluctuations that cosmologists refer to as anisotropies.

The uniform nature of the CMB and its tiny anisotropies indicate that the universe expanded very evenly after its creation except for some mass fluctuations created by quantum effects. In time, these tiny mass fluctuations lead to the formation of gas clouds, which eventually became the clusters of galaxies we see filling the universe today.

The results of COBE and its follow on missions WMAP and Planck have increased the confidence that astronomers have in their understanding of the universe's evolution since the Big Bang.

The discovery of the expansion of the universe and therefore, the existence of the Big Bang, was the work of astronomers like Edwin Hubble. Hubble was born 124 years ago on the 20<sup>th</sup>. He first gained prominence some 90 years ago with his discovery that some of the nebulae astronomers has discovered actually resided outside the Milky Way galaxy. In other words, these were not glowing clouds of gas or small clusters of stars, but were instead vast islands of stars just like the Milky Way.

Later, Hubble discovered that most of the galaxies were expanding away from the Milky Way. Now this doesn't mean that the Milky Way is the center of the universe. Any alien astronomer residing in any of the galaxies we detect expanding away from us would come to the conclusion that all of the universe's galaxies were expanding away from him or her. This observation is only possible if the space between the galaxies is expanding. By knowing the rate of this expansion, one could in principle determine when all the galaxies were last together, and therefore, the age of the universe. There are some complications in performing this calculation and it has taken some extra detective work for astronomers to discover that the universe began 13.8 billion years ago. Some of that evidence came from studies of the CMB by missions like the Planck spacecraft.

### November 22 – 31

Since having passed greatest western elongation on the 17<sup>th</sup>, Mercury is approaching the sun and descending closer to the horizon. At the same time, Saturn is rising higher. The two planets approach their closest together on the morning of the 26<sup>th</sup>. You'll need to be outside between 6:30 when they rise and 7:00 AM, when the sky gets too bright to see them. The planets will appear as two closely spaced stars (side by side) very low in the east-southeast. To their right will be a slightly fainter star called Zubenelgenubi. Zubenelgenubi is a double star that can easily be resolved as two stars in a pair of binoculars.

The first spacecraft to fly past Mars and return meaningful images was launched 49 years ago on the 28<sup>th</sup>. Mariner 4 was launched on a mission to flyby Mars because it could not carry enough propellant to slow down into a Martian orbit. By chance, Mariner 4 over flew some of most boring terrain of Mars. It's 22 images of the Martian surface lead many space scientists to believe that Mars was similar to the moon, and therefore, boring and without a chance of ever having hosted life. Later missions, like Mariner 9, discovered that Mars has a variety of interesting terrain, including some carved by water.

#### This Month's Sources

Apollo 12, <http://nssdc.gsfc.nasa.gov/planetary/lunar/apollo12info.html>

Hart, Douglas. The Encyclopedia of Soviet Spacecraft

Leonids, <http://meteorshowersonline.com/leonids.html>

Mariner 10, [http://en.wikipedia.org/wiki/Mariner\\_10](http://en.wikipedia.org/wiki/Mariner_10)

Night Sky Explorer (software)

Observer's Handbook 2013, The Royal Astronomical Society of Canada

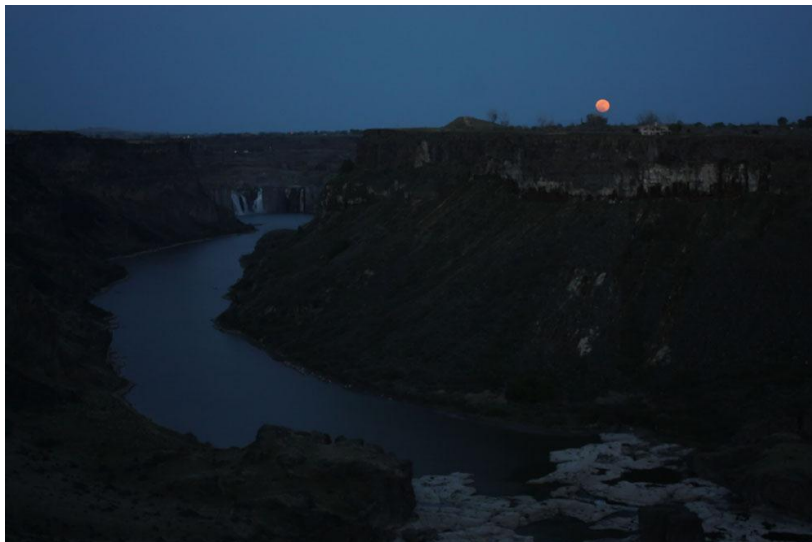
Space Calendar, <http://www.jpl.nasa.gov/calendar/>

STARS, <http://www.astro.uiuc.edu/~kaler/sow/alpheratz.html>

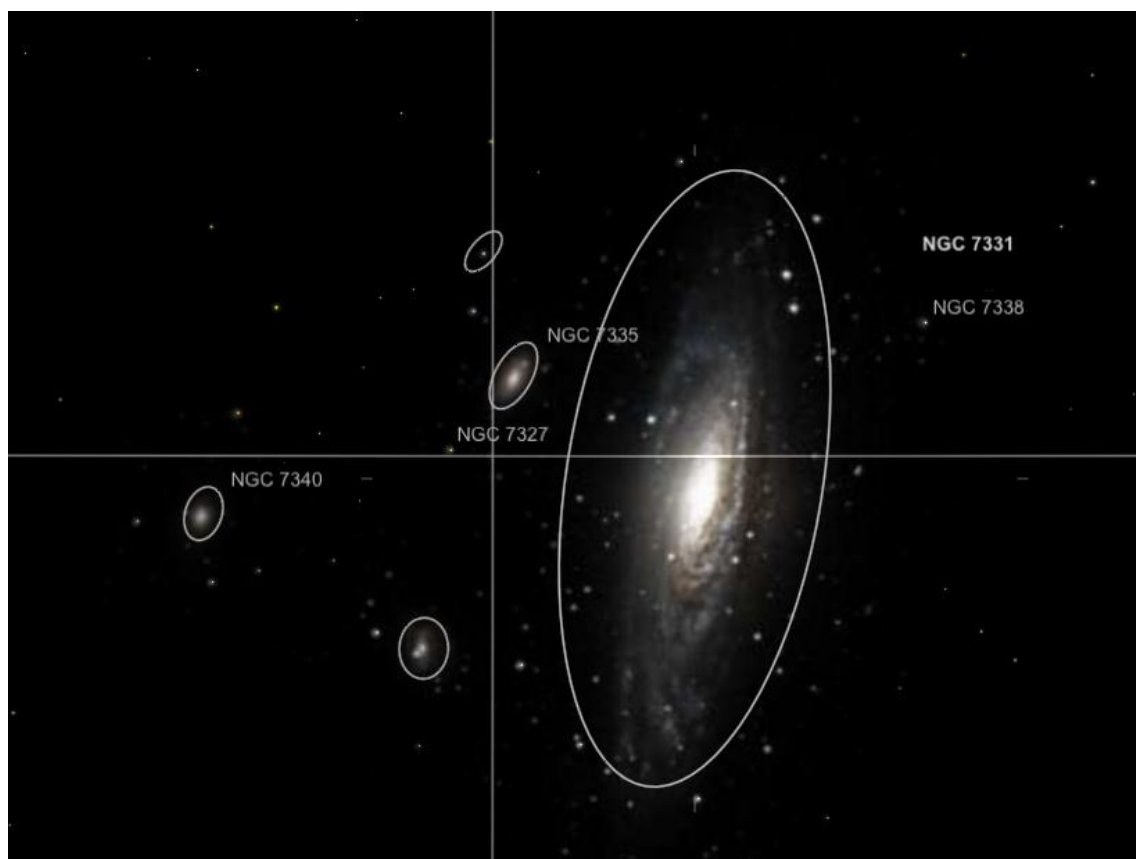
Taurids, <http://meteorshowersonline.com/showers/taurids.html>

William Herschel, [http://en.wikipedia.org/wiki/William\\_Herschel](http://en.wikipedia.org/wiki/William_Herschel)

Dark Skies and Bright Stars,  
Your Interstellar Guide  
Dr. Paul Verhage, PhD



## Deep Sky Highlight by Steve Bell NGC 7331 and Friends



SkySafari Pro 1.8 for Mac

NGC 7331 is a bright, angled face-on spiral in Pegasus. At magnitude 9.5, it is accessible to most telescopes and even larger binoculars. Its four companions however, with magnitudes ranging from 13.3 to 14.5 are more problematic with apertures less than about eight inches. When looking for the companions, use enough magnification to darken the background and make their size relative to the field of view more easily detectable by the eye. Dark, transparent skies are necessary.

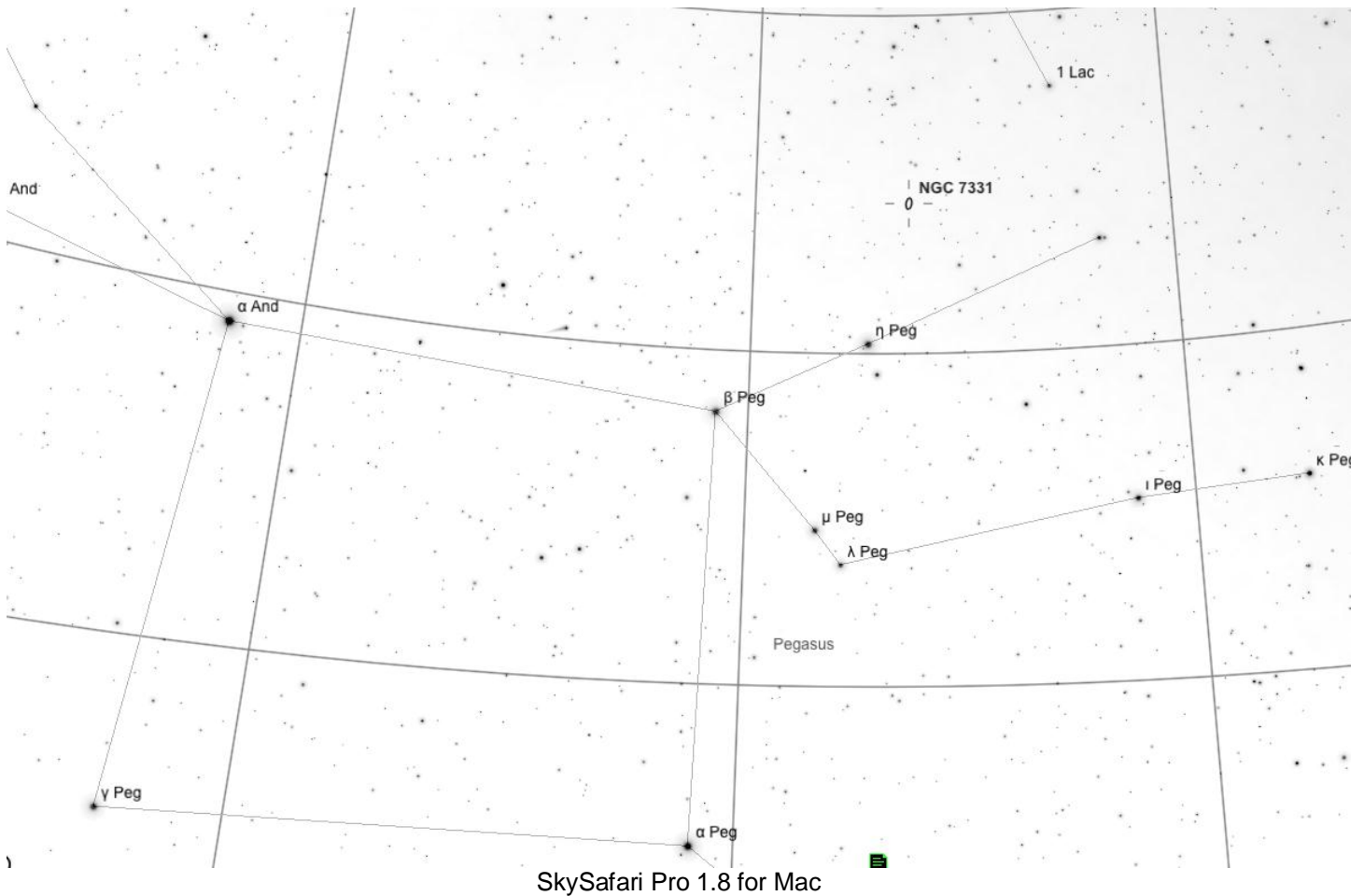
The star hop to NGC 7331 is moderately easy, as it forms a somewhat distorted isosceles triangle with  $\eta$  and  $\eta_2$  Pegasi as the northern vertex.

Object	Right Ascension	Declination	Mag	Size
NGC 7331	22 <sup>n</sup> 37 <sup>m</sup> 04.1 <sup>s</sup>	+34° 24' 56"	9.5	10.2 x 4.2
NGC 7335	22 <sup>n</sup> 37 <sup>m</sup> 19.30 <sup>s</sup>	+34° 26' 52.0"	13.3	1.2 x 0.6
NGC 7336	22 <sup>n</sup> 37 <sup>m</sup> 21.90 <sup>s</sup>	+34° 28' 54.0"	14.5	0.8 x 0.4
NGC 7337	22 <sup>n</sup> 37 <sup>m</sup> 26.70 <sup>s</sup>	+34° 22' 26.0"	14.4	1.0 x 0.8
NGC 7340	22 <sup>n</sup> 37 <sup>m</sup> 44.20 <sup>s</sup>	+34° 24' 36.0"	13.7	0.9 x 0.6

Through a 14" Newtonian at 114X and 178X, NGC 7331 was bright with a broad, bright core and a stellar nucleus. It was oval, about 4:1 in aspect ratio (NNW-SSE). Companions 7335, 7337 and 7340 were noted with averted vision. NGC 7336 was essentially stellar and was not identified.

For the astrophotographers out there, this group would make an excellent single-frame field subject.

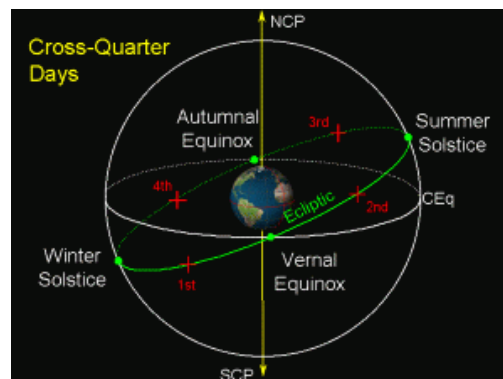




### Did You Know

Halloween – short for *All Hallows' Eve* – is an astronomical holiday. Sure, it's the modern-day descendant from *Samhain*, a sacred festival of the ancient Celts and Druids in the British Isles. But it's also a *cross-quarter day*, which is probably why *Samhain* occurred when it did. Early people were keen observers of the sky. A cross-quarter day is a day more or less midway between an equinox (when the sun sets due west) and a solstice (when the sun sets at its most northern or southern point on the horizon). Halloween – November 31 – is approximately midway point between the autumn equinox and winter solstice, for us in the Northern Hemisphere.

Halloween – *Samhain* – happened on the night that the Pleiades star cluster culminated at midnight. In other words, the Pleiades climbed to its highest point in the sky at midnight on or near the same date as this cross-quarter day. In our day, Halloween is fixed on November 31, though the midnight culmination of the Pleiades cluster now occurs on November 21.



Cross-quarter days fall midway between equinoxes and solstices.



## Observatory and Planetarium Events



### Schedule for the Centennial Observatory – Herrett Center Twin Falls

[herrett.csi.edu](http://herrett.csi.edu)

Event	Place	Date	Time	Admission
Bimonthly Astronomy Talk: "Introducing Delphinus, the Dolphin"	Rick Allen Room	Friday, November 1 <sup>st</sup> , 2013	6:30 to 7:30 PM	\$2.50 adults \$1.50 students (incl. CSI) Free - children 6 & under
Astronomy Talk Night Telescope Viewing	Centennial Observatory	Friday, November 1 <sup>st</sup> , 2013	7:30 to 9:30 PM	\$1.50 per person Free - children 6 & under Free to all with paid astronomy talk admission
Monthly Free Star Party	Centennial Observatory	Saturday, November 9 <sup>th</sup> , 2013	6:15 PM to midnight	FREE
Telescope Tuesday	Centennial Observatory	Friday, November 12 <sup>th</sup> , 2013	6:15 to 9:00 PM	\$1.50 per person Free - children 6 & under
Telescope Tuesday	Centennial Observatory	Friday, November 26 <sup>th</sup> , 2013	6:00 to 9:00 PM	\$1.50 per person Free - children 6 & under Free to all with paid planetarium admission

### Faulkner Planetarium – Herrett Center Twin Falls

The next generation of the Faulkner Planetarium is about to begin. Join us when the upgraded theater reopens, for the most realistic tour of the universe you've ever seen, on **Tuesday, November 19<sup>th</sup>, 2013**.




### Bruneau Dunes Observatory



The Bruneau Dunes Observatory is now closed for the season. We will see you in the spring.



## Comets in November



The first week of November should be very good for viewing Comet ISON, which by that time might have brightened to naked eye visibility. The comet will still be a pre-dawn object, visible fairly low in the east, below Mars and  $10^\circ$  to the right of Denebola (Beta Leonis). No matter how cold it will get, you should definitely bundle up, step outside, and have a look at the wonderful addition to the late autumn night sky. Although no one can know for sure how long ISON's tail will be in early November, we do know that it will point directly away from the Sun, so it will be streaming in the direction of the planet Mars. If we are lucky, C/2012 S1 ISON will display both a broad dust tail and a wispy blue ion tail. From within city limits, where the sky is not very dark, the comet may appear as a tail-less, fuzzy smudge.

By mid-November, Comet ISON's path will carry it away from Leo toward Virgo. The comet will have moved well away from Mars ( $30^\circ$  to the lower left of the planet) and will have begun its plunge in the Sun's glare, towards perihelion. Although only  $20^\circ$  above the southeastern horizon around 6 A.M. local time, from urban locations ISON will be easy to spot, and from darker sites it will be impressive. On November 18, C/2012 S1 ISON will pass very close to Virgo's brightest star, 1st-magnitude Spica. Both objects will then fit within a  $1^\circ$  circle, and as a bonus, on the same morning, Mercury and the periodic comet 2P/Encke (around magnitude +5 or +6) will be visible just below ISON, close to the horizon. Binoculars will prove useful if not mandatory for spotting Mercury and Comet Encke.

After only a few days, starting around November 21, morning twilight will swallow Comet ISON. However, if the comet will develop a bright tail, there is a slim chance that we might see part of the tail poking above the horizon just before sunrise. Odds favoring that are low, and probably ISON will remain out of sight until closest approach to the Sun on November 28. On that day the comet should return to view – in broad daylight, close to the Sun!

If Comet ISON will reach magnitude -10 at perihelion on November 28, it will be easily visible with the naked eye as a bright speck close to the Sun. If the comet will be dimmer (magnitude -8 to -6), chances are that it will be quite difficult to observe. In either case, because ISON will be only  $1.5^\circ$  away from the Sun's disk, extreme care should be taken.

**Never look directly at the Sun, especially through binoculars and telescopes. It can cause severe damage to the eye! Before attempting to view the comet in daylight, make sure the Sun will be hidden behind a building or a wall.**

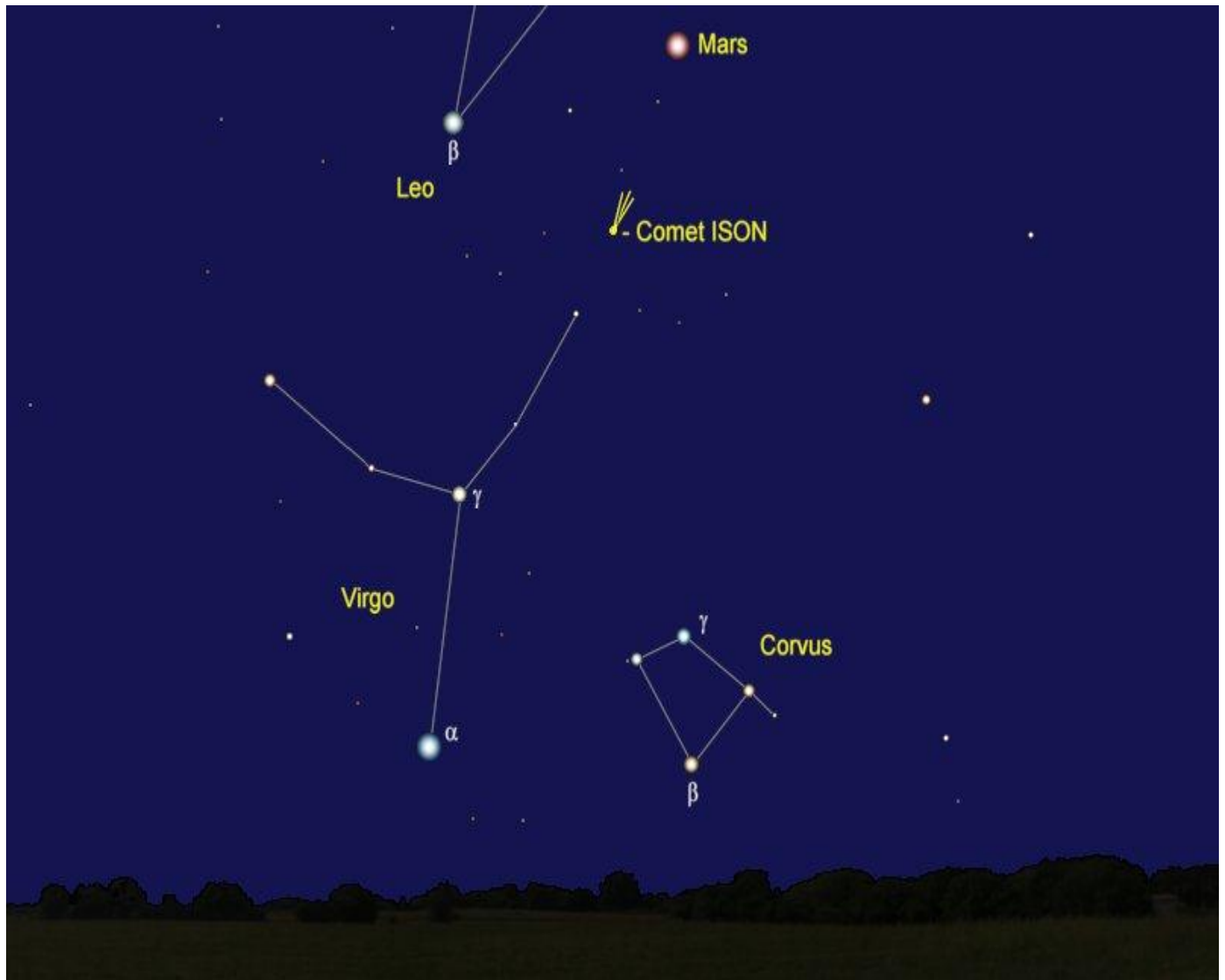
The following diagrams show the position of Comet ISON relative to the Sun's disk, at certain times on November 28. The diagrams are drawn for locations in the United States and Europe, and are divided into two tables – one for the United States and one for Europe, respectively.

The Sun's disk and the separation from the comet are shown to scale, with north at the top of the image and west to the right. Keep in mind that ISON will be very close to the Sun ( $1.5^\circ$  on average, around three times the apparent diameter of the Sun). If you will try to observe the comet in daylight, **use just your naked eye**, no binoculars, telescopes, eclipse glasses or welding glass. Make sure that the Sun is blocked by something solid!

After perihelion, C/2012 S1 ISON will rapidly begin to fade, and will remain lost in the Sun's glare until about December 5. However, the best will still be to come! December will likely be the highlight of Comet ISON's apparition.

Finder Map for C/2012 S1 ISON map can be found on the next page dates for the map (below) shows RA / Dec / Mag and Distance.

Date	RA	Dec	Mag	Distance
Nov 01	11h15m	+06°00'	+2.0(?)	1.218
Nov 15	12h57m	-07°27'	+1.0(?)	0.901
Nov 30	16h21m	-15°18'	-10.0(?)	0.892



The story of comet **C/2013 R1 Lovejoy** began when Australian amateur astronomer Terry Lovejoy detected a tiny, 14th-magnitude smudge on CCD images taken September 7 and 8 this year. The images were acquired during a regular survey he conducts to search for new comets, started nearly ten years ago. This is the fourth comet discovered solely by Lovejoy.

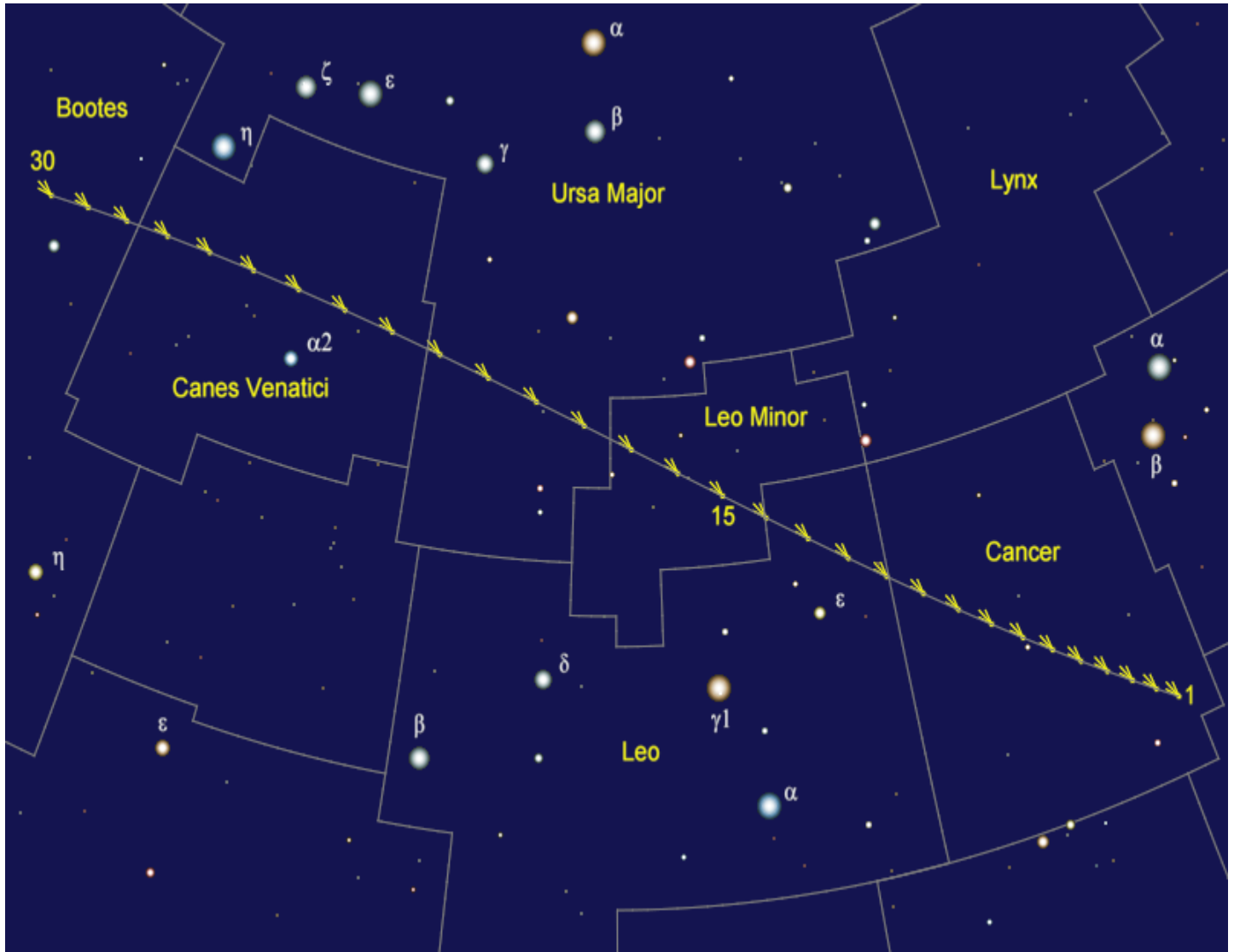
At the start of November, C/2013 R1 is 8th magnitude and moves northeast through the constellation Cancer, positioned well for mid-northern observers after midnight. By November 11, the comet shifts into Leo, where it spends a few days at about 7th magnitude before crossing into Leo Minor.

On the night of November 23, at closest approach to Earth, C/2013 R1 is less than  $5^\circ$  from Cor Caroli, the brightest star in the constellation Canes Venatici. By now, the comet should be nearly 6th magnitude!

C/2013 R1 Lovejoy will reach perihelion on Christmas Day, at a distance of 82 million miles (132 million kilometers). From the Northern Hemisphere it will remain visible in excellent condition until late spring 2014, when it will fade out below magnitude +11.

Finder Map for C/2013 R1 Lovejoy map can be found on the next page dates for the map (below) shows RA / Dec / Mag and Distance.

Date	RA	Dec	Mag	Distance
Nov 01	08h07m	+11°26'	+8.0	0.623
Nov 15	10h15m	+32°29'	+7.0	0.412
Nov 30	14h42m	+40°59'	+6.0	0.483



**Comet Encke** (officially designated 2P/Encke) is back into our inner solar system, after its last return in August 2010. This is Encke's 62nd documented appearance, making it one of the best-studied comets on the sky.

Originally found in 1786 by the French astronomer Pierre Mechain, it was seen again in 1795 by Caroline Herschel, William Herschel's sister, and yet again in 1805 by Johann Huth, from Germany. In 1818 it turned up once more, and was detected by Jean Pons, whose grand total of comet discoveries amounted to 37. The orbit was calculated by Johann Encke, of Berlin, who concluded that the comets of 1786, 1795, 1805 and 1818 were one and the same; he gave the period as 3.3 years, and predicted a return for 1822.

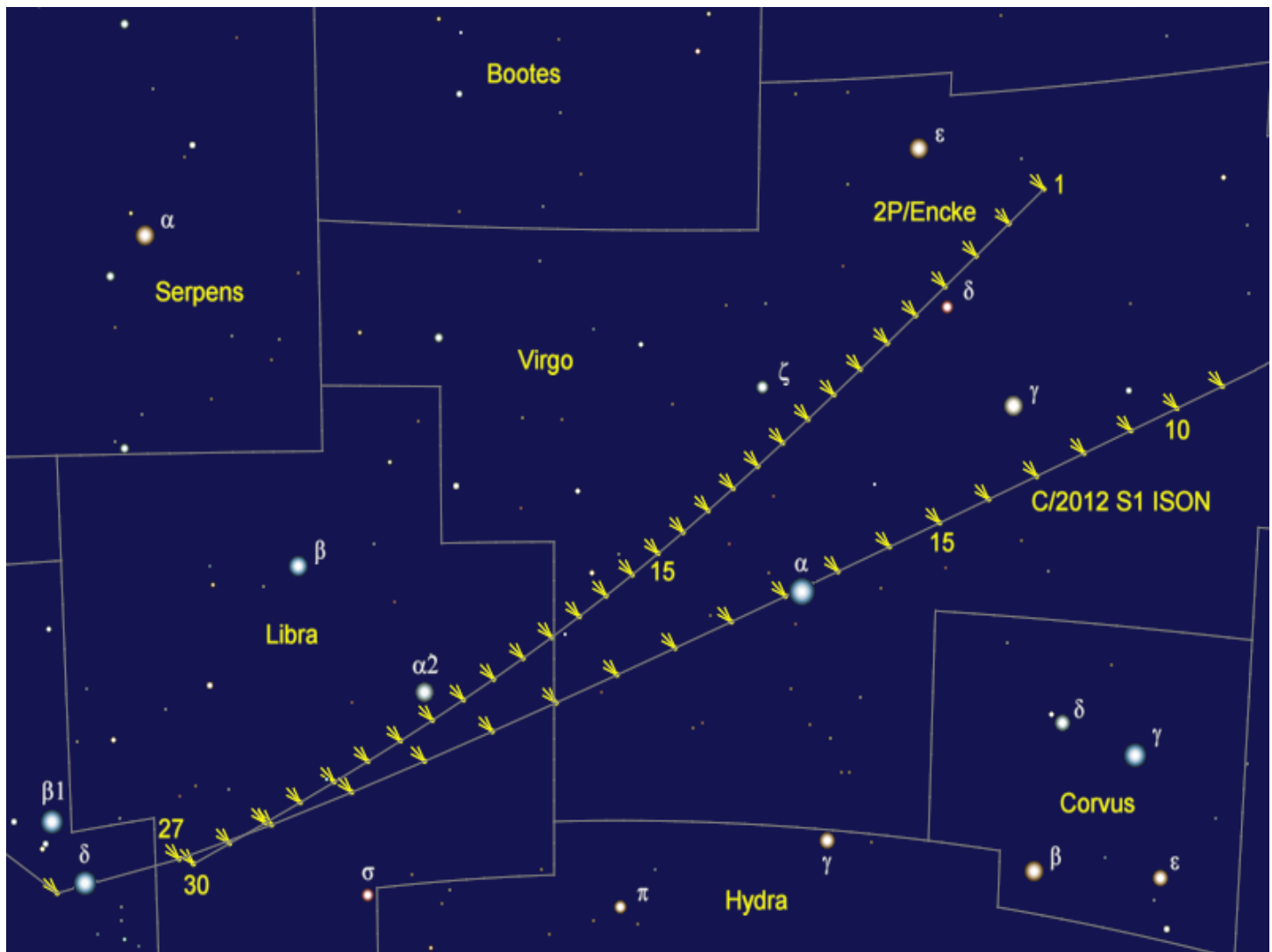
The comet appeared just where Encke had expected, and, very appropriately, was named after him. Since then it has been seen at every return except that of 1945, when it was badly placed and when because of the Second World War most astronomers had other things on their minds.

At some returns during the last two centuries, Comet Encke was quite prominent; in 1829 it reached magnitude +3.5, with a tail 20 arcminutes in length. Nowadays it does not achieve such eminence, and although it is hard to be sure - estimating comet magnitudes is far from easy - it does seem to have faded. Whether it will survive into the 22nd century remains to be seen.

You can spot Encke low above the eastern horizon just before dawn, close to Comet ISON during most of November. It likely will not brighten to better than 7th magnitude around mid-month, so binoculars are the instrument of choice here. Comet Encke should be fairly large and diffuse, with a narrow fan extending westward.

Urban sky glow will make the comet disappear, so you will have to leave the city and find it under rural skies. Mid-November is the best time for visual observations, since moonlight hits the morning sky thereafter and the comet gradually sinks into the bright twilight.

#### Finder Map for 2P/ Encke

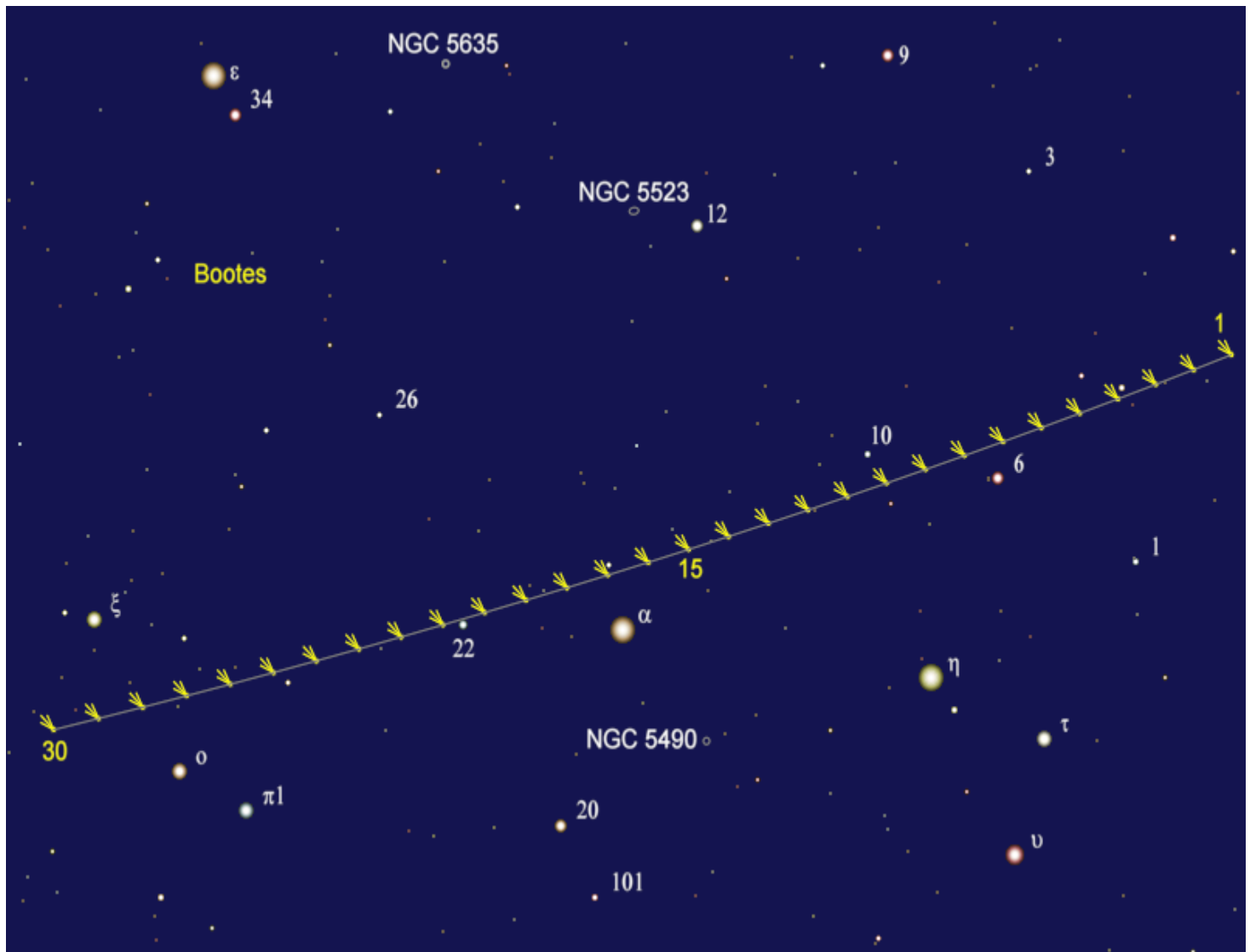


Date	RA	Dec	Mag	Distance
Nov 01	12h38m	+08°37'	+8.0	0.607
Nov 15	13h59m	-09°20'	+7.0	0.922
Nov 30	15h41m	-22°46'	+6.0	1.337

Although it was predicted to be magnitude +14 this time of the year, 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.

Throughout all of November, C/2012 X1 should remain around 8th magnitude, making it an easy target for 4-inch telescopes. The comet cuts through the constellation Bootes the Herdsman, and rises about two hours before the start of astronomical twilight for mid-northern observers. By the time dawn begins to brighten, it is already some 30° above the eastern horizon. 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 feet (one meter).

#### Finder Map for C/2012 X1 Linear



Date	RA	Dec	Mag	Distance
Nov 01	13h34m	+22°47'	+8.0	2.845
Nov 15	14h14m	+20°05'	+8.0	2.663
Nov 30	14h54m	+17°24'	+8.0	2.510



## Membership Information



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](mailto:jtubbs015@msn.com) or home telephone: 736-1989 or mail directly to the treasurer at his home address. 550 Sparks Twin Falls, ID 83301

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

M-51 viewed in this newsletter 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.

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"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.

### Membership Benefits

Sky and Telescope group rates. Subscriptions to this excellent periodical are available through the MVAS at a reduced price of \$32.95.

Astronomy Magazine group rates. Subscriptions to this excellent periodical are available through the MVAS 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 Library: Contact, the current board for information.

Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others. Contact Rick Widmer, Webmaster for more information.