Snake River Skies

The Newsletter of the Magic Valley Astronomical Society
February 2014

Membership Meeting

Saturday February 8th 2014
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho
Public Star Party follows the
General Mtg. at Centennial Obs.

Club Officers:

Robert Mayer, President
mayerrbrt@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@mvastro.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,

We're just finishing up a noteworthy January. The annual telescope clinic again featured great stuff from Tom Gilbertson, and was well attended by club members. KMVT even showed up and gave us some air time.

And at the end of the month, the sky has us buzzing. Supernova SN2014J in M82 is believed to be one of the closest observed supernovae since the 1987. The e-mail has been filled with chatter over the discovery, and some members have already overcome the weather inversion to get a look at the development -- including one member who braved the cold of the City of Rocks. We look forward to hearing from their reports as February progresses.

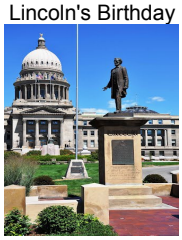
As for this month, it's a case of saying, "it's about time." That is, it's about time for the club to check out the new equipment at the Faulkner Planetarium. With that in mind, our regular MVAS meeting for February will be at the planetarium. The show starts at 7 p.m., and costs $6 for adults. This is the second straight year the club has made it a point to visit the planetarium, and this year, we'll be seeing the new shot, "The Astronaut," as well as a Live Sky tour. We look forward to seeing you there.

May your views be clear,
Rob Mayer

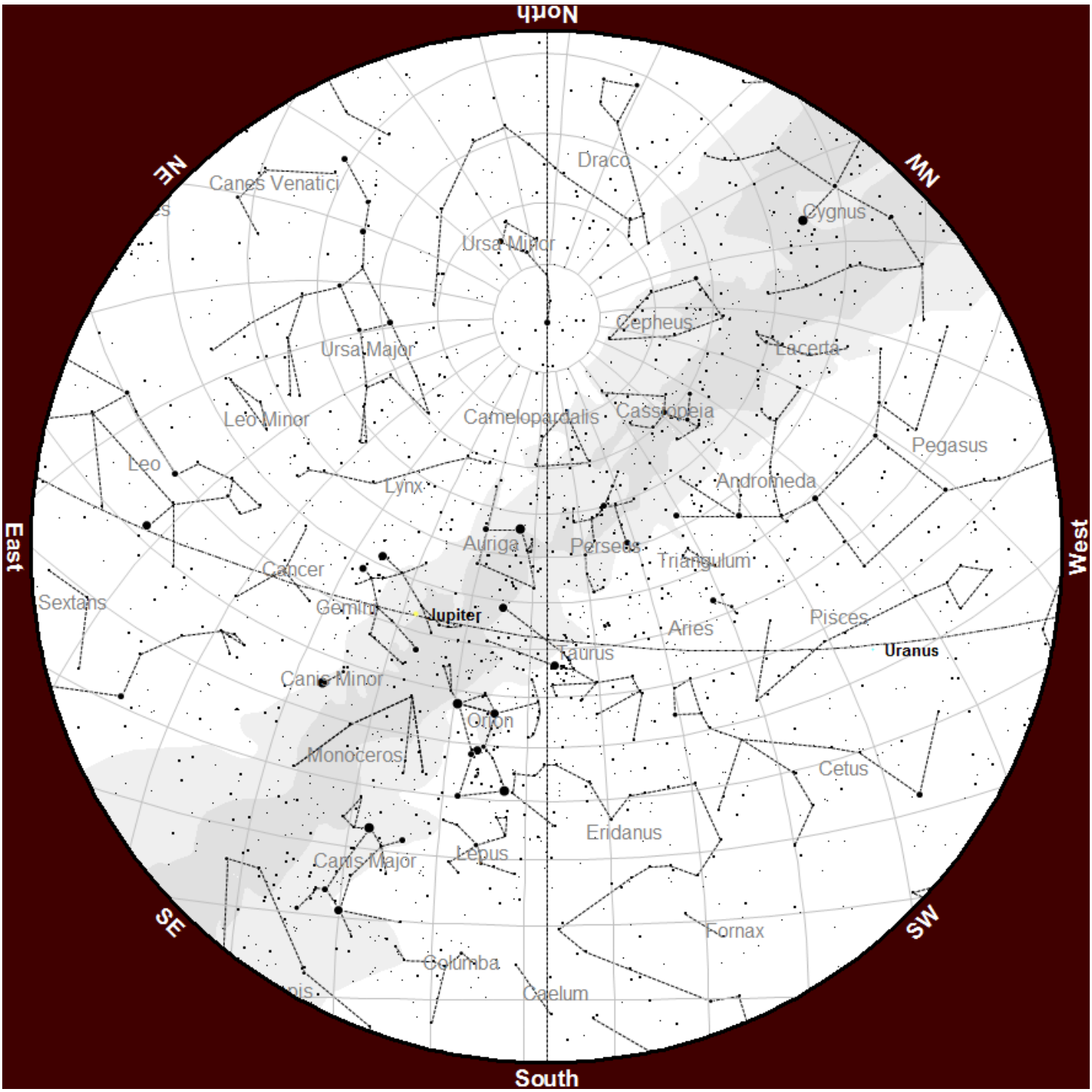
Robert Mayer - President

Calendar

February 2014

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2 Groundhog Day 	3	4	5	6  First quarter Visible: 47% ↑	7	8 **General Membership Mtg at 19:00**
9	10	11	12 Lincoln's Birthday 	13	14 Valentine's Day  Full moon Visible: 100%	15 National Flag of Canada Day 
16	17 President's Day 	18	19	20	21	22 Washington's Birthday  Last quarter Visible: 53% ↓
23	24	25	26	27	28	

Planisphere



Planisphere should be used as a guide for the month of February, mid-month, end of astronomical twilight (19:45)
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 – Explore Your Universe

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, Rigel, the bright white star in the lower right corner of the constellation of Orion the Hunter. Rigel's name comes from the Arabic, ar-Rijl, which means "the foot". Astronomers know Rigel as Beta Orionis, indicating that it is the second brightest star in Orion. Actually though, Betelgeuse, the red-orange star in Orion is slightly fainter than Rigel, making Rigel the brightest star in Orion. Overall, Rigel is the 7th brightest star in our skies. It's a blue supergiant star, 17 times more massive than our Sun, 70 times larger, and 40,000 times brighter. At a distance of 777 light years, the light that you see tonight left Rigel in 1237.

Orion is due south at 9:30 PM in the beginning of February, making it well placed for observing. While looking for Rigel, take a moment to look at the middle star in Orion's sword. This is the famous Orion Nebula, a great stellar nursery. Here, hundreds of stars are being born within a swirling cloud of dust and gas. Images taken with the Hubble Space Telescope show that many of these stars are surrounded in a disk of dust and gas. Perhaps in some 4 billion years, an intelligence on a planet around one of these stars will look up their night sky and wonder about the possibility of life around the stars visible in the night sky. By then, unfortunately, our Sun will be a white dwarf star and slowly cooling down after having incinerated some of its planets, possibility even one called Earth.

February Overview

During February, the sun rises earlier and farther north each day and sets later and farther north each day. As a result, the sun travels higher across the sky, the days are getting longer, and the nights shorter. At the beginning of the month, the Sun rises at around 8:00 AM and sets around 6:00 PM, making the day 10 hours long. By the end of the month, the Sun rises at about 7:25 AM and sets around 6:30 PM, making the day just over 11 hours long.

February 1st - The Moon is 4° north of Mercury (00:00). The Moon is 5° north of Neptune (07:00).

February 3rd - The Moon is 3° north of Uranus (16:00).

February 6th - Mercury is stationary (00:00). First Quarter Moon (14:22). For experienced telescope users, two of Jupiter's satellites cast shadows simultaneously on the planet in the morning.

February 7th - The moon skirts the edge of the Hyades star cluster.

February 11th - The Moon is 5° south of Jupiter (01:00).

February 12th - The Moon is at apogee, the point in its orbit when it is farthest from Earth (00:10). The moon leads you to the Beehive star cluster M-44.

February 14th - Full Moon (18:53).

February 15th - Mercury is in inferior conjunction with the Sun (15:00).

February 16th The Zodiacal Light becomes visible in the west after dark starting tonight and will remain visible until the beginning of March.

February 19th - The Moon is 3° south of Mars (19:00).

February 21st - The Moon is 0.3° south of Saturn (17:00). Saturn and the double star Zubenelgenubi appear along side the moon in the morning.

February 22nd - Asteroid 2 Pallas is at opposition (14:00). Last Quarter Moon (22:15).

February 23rd - Neptune is in conjunction with the Sun (11:00).

February 25th - 26th - The Moon is 0.4° north of Venus (23:00).

February 27 - The Moon is at perigee, the point in its orbit when it is nearest to Earth (12:51). The Moon is 3° north of Mercury (14:51). Mercury is stationary (16:00).

February 1 – 7

A very thin crescent moon appears low in the west just after dark on the 1st. You'll want to use binoculars to observe this. The moon is just over two days old, so this isn't a record to break. It's just a neat sight to see.

Forty years ago on the 5th, spacecraft Mariner 10 flew past Venus. Spacecraft were flying past Venus for about a decade by this time and it would be another 18 months before a spacecraft entered orbit around Venus (Venera 9). However, in this case, Venus was not the primary target of Mariner 10. The spacecraft was using the gravity of Venus to change its trajectory in order to approach Mercury and enter orbit around this planet.

If you have a telescope, you should be able to use it to observe the shadows cast by two of Jupiter's satellites early on the morning of the 6th. The first shadow appears at 1:25 AM near the bottom of Jupiter (this is through a telescope that inverts images) and is cast by Callisto. The second, smaller shadow appears closer to the equator of Jupiter. It appears at 3:20 AM and is cast by Europa.

The moon passes the Pleiades star cluster on the night of the 6th and the Hyades star cluster on the night of the 7th. Get you binoculars out for the 7th, since the moon will be just edging into the Hyades that night.

February 8 – 14

Novelist Jules Verne was born 186 years ago on the 8th. Considered one of the fathers of the science fiction genre, Verne is probably the third most translated author in the world. Many of the elements from his story, **From the Earth to the Moon** match those in the Apollo 11 mission to the moon. Verne died in 1905 at age 77.

Are you a new astronomer who wants to know how to locate planets? The moon is here to help on the evening of the 10th. Jupiter will be the bright star to the moon's upper left.

You have an opportunity to find a historically famous star cluster on the night of the 12th. That's because the moon points it out. Aim your binoculars at the moon and then shift due east. Go far enough to push the moon out of your field of view. Near the left edge of the binocular's view will appear a grouping of stars. The popular name of this cluster is the Beehive. In your binoculars, the stars in this cluster have the appearance of a swarm of bees.

The bright yellowish star to the moon's left on the evening of the 14th is Regulus. Regulus is the brightest star of Leo the Lion and it represents his heart. Valentine's Day a great day for space history. First, 14 years ago on the 14th, NEAR Shoemaker entered orbit around Eros. NEAR (Near Earth Asteroid Rendezvous) Shoemaker was the first spacecraft to orbit an asteroid. It remained in orbit for one year before Johns Hopkins commanded it land. Near Shoemaker then became the first spacecraft to make a controlled landing on an asteroid. You can read about this really interesting mission at the NEAR Shoemaker website, http://near.jhuapl.edu/.

Valentine's Day also marks the 24th anniversary of the Pale Blue Dot photograph. In 1990, the Jet Propulsion Laboratory (with the urging of Carl Sagan) commanded Voyager 1 to turn its camera around and photograph the solar system from a distance of 3.7 billion miles. The result shows most of the planets of the solar system from a perspective outside of the solar system. Earth is indeed just a pale blue dot and nearly lost in a lens flare.

Finally, NASA launched the first geosynchronous satellite 51 years ago on Valentine's Day. The satellite was named Syncom 1 and unfortunately, its kick motor appears to have exploded 19 seconds into its firing. The kick motor was necessary to raise the orbit of Syncom 1 from low Earth orbit to geostationary. Later Syncom satellites were more successful. It was Syncom-3, which famously relayed live coverage of the 1964 Tokyo Olympics to the United States.

Hermann Noordung and Arthur C. Clarke brought to the attention of engineers that a satellite located 22,300 miles above the equator would take exactly 24 hours to orbit the Earth. From our perspective therefore, the satellite hangs fixed in the sky. That apparent motionlessness makes communication satellites a convenient way to transmit data around the planet.

February 15 – 21

The 15th is Galileo Galilei's 450th birthday (he was born in 1564 in Pisa, Italy). In many ways, Galileo was one of the first scientists. Rather than rely of the knowledge passed down to his time from the ancient Greeks, Galileo began testing hypotheses. His results made clear several severe shortcomings in the philosophical musings of the ancients. Galileo is also known for breaking the mold of academics for his time. He was among the first to publishing books about his findings in the local language. This let the common person read and understand new scientific findings. That made him similar to Carl Sagan and Neil deGrasse Tyson.

We know Galileo best for his work in astronomy. For example, he is the first person to make serious use of the telescope (which he called the spy glass) in astronomy (there are a few minor claims prior to his use of the telescope as an astronomy tool). His telescopic findings helped convince many people about the correctness of the Copernican hypothesis, that is, that the sun and not Earth is the center of the solar system. If you have a telescope, celebrate Galileo's birthday by observing the satellites of Jupiter and the full moon tonight.

Did you know that its summer in the Mars' northern hemisphere on the 15th? At its warmest, the temperature on Mars can reach 70 degrees at the equator. Unfortunately, it also gets as cold as -225 degrees at the North Pole. I'm beginning to think that it ain't so cold here.

The 18th is the 84th anniversary of Clyde Tombaugh's discovery of Pluto. Clyde was a Kansas farm boy with an interest in astronomy. He had made his own telescope and recorded his observations through it. The astronomers at the Lowell Observatory in Flagstaff, Arizona were so impressed with his work that they invited him to join their staff. His task was to take photographs of the sky in search of a 9th planet in our solar system. Clyde took hundreds and possibly thousands of photographs through one of the Observatory's telescopes. Each photograph contained thousands of star images. Possibly, one of those stars was an unknown planet. By comparing two photographs taken several days a part, Clyde could detect a planet by its movement between the two photographs. Clyde discovered countless asteroids in the process, but on the 18th of February, He found one star that moved far too little to be a nearby asteroid. Clyde had discovered a new planet located some 3 billion miles away from the Earth. The planet was named after the Roman god of the underworld, Pluto. Today astronomers have cataloged over a thousand Pluto-like bodies in the frozen depths of our solar system. To many, Pluto is not a planet, but is instead a frozen remnant from the formation of our solar system called a Kuiper Belt Object (KBO). The KBO's are one source of the comets in solar systems.
The 19th is the 541st anniversary of Nicolas Copernicus' birth. Copernicus was a well educated Catholic cleric who we best known for his model of a sun-centered solar system. Since the sun was at the center of the solar system in his model, it's called a heliocentric model. Copernicus was not the first person to propose the heliocentric model, some ancient Greeks and Arabs had done the same centuries prior. Copernicus however, proposed this model when the time was ripe for many learned people to accept it. Still, it was a hard sell. His model, which was conceptually simpler than the current geocentric model, could not predict planetary positions any better than the old model and required that stars be immensely larger than the sun. These issues were eventually resolved with the telescope, which was invented after his death.

Earth is approaching closer to Mars this year. On the 19th, Mars and the star Spica pose with the moon. Spica will be noticeably whiter in color and below the moon. Mars will have a more yellow color and appear to the moon's left.

Remember John Glenn? His first flight into space occurred 52 years ago on the 20th. Glenn was the first American astronaut to orbit Earth; the previous two astronauts (Shepard and Grissom) only made 15 minute suborbital hops. The goal of Glenn's mission was to make three orbits around Earth in his capsule, Friendship 7. Except for a scare caused by a faulty switch located between his capsule and heat shield, his flight was success that boosted American moral early in the Space Age. As a result of his hero status, NASA did not permit Glenn to travel into space again. That is until 1998 when he was given a ride on the Space Shuttle. That flight brought back memories for many older Americans.

Go outside at 3:00 AM on the 21st. You'll find the moon low in the southeast sandwiched between the star Zubenelgenubi and the planet Saturn. Zubenelgenubi is the brightest star next to the moon's right and a pair of binoculars will show that this is a double star. Saturn is brighter and located farther away to the moon's left. A small telescope will show Saturn's rings and brightest satellite, Titan. Titan will appear three ring diameters away from Saturn to its lower left through your telescope (which inverts images).

February 22 – 28

It's been 27 years since the detection of supernova SN1987A. On February 23rd, 1987, Ian Shelton discovered a new star in the Large Magellanic Cloud (LMC). The supernova still remains the supernova closest to Earth since the invention of the telescope. Astronomers and physicists didn't just study SN1978A by the light it emitted. Neutrino detectors buried underground detected 25 neutrinos from the explosion. This makes the explosion of SN1987A the birth of neutrino astronomy.

Forty six years ago on the 24th, astronomer Jocelyn Bell and her college advisor Dr. Anthony Hewish found a one inch long squiggle on a chart recording made by their radio telescope. That short squiggle was so perfectly regular in time, that at first they wondered if they had discovered the radio beacon of an extraterrestrial civilization. Instead, they had discovered the regular radio pulses of a rapidly rotating neutron star, or pulsar.

Neutron stars are the end stage of stars containing more than 1.4 times more mass than the sun, but less than 3.2 times as much mass. Dying stars with masses in this range cannot support their weight by the repulsion of electrons (recall that like charges repel each other). This results in the star's electrons and protons getting squeezed into neutrons. The

repulsion between subatomic particles like neutrons prevents further collapse, unless the star's mass is greater than 3.2 times the sun's. Since neutron stars have a diameter of six miles, a teaspoon of their material has the same weight as a mountain on earth.

The moon passes the Morning Star on the 25th and 26th. To see this close encounter, you'll need to go outside around 6:30 AM and look low in the southeast. The moon will be three days from new on the 25th, so it will appear as a slender crescent. The moon and Venus will be close enough together to appear in your binoculars' field of view on the 26th, and maybe on the 25th.

The Solar System

As February opens, innermost Mercury is visible about 30 minutes after sundown, relatively near to the western horizon. The planet fades quickly during the next week, dimming by 0.2 magnitudes with each passing day. It disappears in the evening twilight soon before mid-month, reaching inferior conjunction with the Sun on the 15th.

By late February, Mercury switches to the morning sky. On the 28th, the innermost world shines at magnitude +1 in the southeast, far to the lower left of Venus. Binoculars could prove useful for spotting it against the bright dawn light, but make sure you do not use them after the Sun comes up.

At magnitude -4.6 Venus is the brightest morning "star", but it is not high above the horizon. Look for it blazing low in the southeast right around the first light of dawn. To get a steady view of the planet in a telescope, try following it until sunrise or even later.

The telescopic appearance of Venus changes dramatically during February. On the 1st, the planet spans 51 arc-seconds and shows a disk just 13-percent lit. By the 28th, Venus' apparent diameter has shrunk to 33 arc-seconds, but the disk is then 35-percent illuminated.

Mars rises around 11 P.M. local time in early February and nearly two hours earlier by month's end. The best time to look, however, comes around 5 A.M. local time early in the month and shortly after 3 A.M. in late February. The planet is then much higher in the south, nearly halfway from the horizon to the zenith.

The orange-gold world is now slowly heading towards opposition, its closest approach to the Earth. In early April, Mars will appear brighter and larger than any time since 2007. The planet's globe already spans 10 arc-seconds at mid-month, wide enough for nice views in 8-inch or larger telescopes.

Jupiter, the Giant, reached opposition and peak visibility in early January, but shows little decline this month. It still climbs in the east shortly after sunset, remains visible well after midnight and looks stunning through a telescope.

A small instrument at about 70x will readily show two dusky belts spanning Jupiter's equatorial region. The planet's disk measures 45 arc-seconds at the start of the month, but by late February, as Jupiter gets farther from us, the disk's angular size shrinks to 42 arc-seconds.
Throughout February, Saturn pokes above the horizon roughly two hours after Mars, and lies a good 30° high in the south as dawn begins. The ringed planet resides among the background stars of the constellation Libra and shines at magnitude +0.5, two full magnitudes brighter than any of Libra's stars. Through a telescope, Saturn sports an angular size of 17 arc-seconds, while the rings span 39 arc-seconds and tilt 23° to our line of sight.

Uranus stands about 20° above the western horizon as evening twilight fades to darkness. Look for it in the southern part of the constellation Pisces the Fish, some 5° southwest of 4th-magnitude Delta Piscium. At magnitude +5.9 the planet is bright enough to spot with binoculars, but only a telescope will reveal its pale bluish or greenish disk, 3.3 arc-seconds wide.

February finds Neptune very low in the evening twilight, just a few degrees above the western horizon. The distant planet reaches conjunction with the Sun on the 23rd, when it begins its slow crawl towards dawn visibility. Neptune will again be visible in backyard telescopes starting around mid-April.

Pluto has yet to be visited by unmanned probes (although the Hubble Space Telescope has taken pictures) and, with amateur telescopes, is extremely difficult to detect. It is very faint and, therefore, virtually indistinguishable from surrounding stars, except for its movement. The dwarf planet lies in northern Sagittarius and stands 15° high in the southeast shortly before dawn. It glows dimly at magnitude +14, which means you will need at least an 8-inch telescope to have a decent chance of spotting this glimmer of light.

Asteroids

For years, astronomers had little interest in asteroids - in fact, they considered them a nuisance. Those of them trying to count stars found that asteroids made their work harder, and those trying to photograph stars found their plates filled with irritating little streaks. It was not until fairly recently that astronomers decided that asteroids are in fact very interesting indeed.

To date, eleven main-belt asteroids have been photographed close up (from largest to smallest): 4 Vesta, 21 Lutetia, 253 Mathilde, 243 Ida, 433 Eros, 951 Gaspra, 2867 Steins, 5535 Annefrank, 4179 Toutatis, 9969 Braille and 25143 Itokawa. The Dawn spacecraft imaged Vesta, and the Rosetta probe passed within 1,965 miles (3,162 kilometers) of Lutetia in July 2010. The Galileo spacecraft studied Ida and Gaspra on its way to Jupiter, while the NEAR Shoemaker spacecraft visited Mathilde and Eros.

The best time to observe Vesta is in the wee morning hours, when Virgo - the constellation through which the asteroid tracks - is highest above the southern horizon. Zeta Virginis serves as a good guidepost for following the slow nightly motion of 7th-magnitude Vesta, but it may take a few nights of telescopic observing before you notice the asteroid's movement.

The Deep Sky

Before 1752, star maps of the southern sky looked a little different. The large constellation Argo Navis, the ship of the Argonauts, spanned over 70° in east-west direction and contained over 800 naked eye stars within its huge borders. Due to its vast extent, the French astronomer Nicolas Louis de Lacaille subdivided it into four component constellations: Carina (the hull of the ship), Puppis (the stern), Vela (the sails) and Pyxis (the compass, formerly the mast).

For observers in the Northern Hemisphere, Puppis is the most familiar part of the fragmented archaic constellation Argo Navis. It lies east of Canis Major, in an area notably devoid of any bright stars. Although it lacks naked eye luster, Puppis is home to many bright star clusters.

Comets

At the start of February, C/2013 R1 is magnitude +7 and moves through the large constellation Ophiuchus the Serpent-bearer, positioned well for mid-northern observers just before dawn. By February 18, the comet shifts into Serpens, where it spends the rest of the month.

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.

Dark Skies and Bright Stars,
Your Interstellar Guide,

This Month's Sources

Astronomical Events 2014, http://www.universetoday.com/107259/101-astronomical-events-for-2014/
Mars Calendar, http:/www.planetary.org/explore/space-topics/mars/mars-calendar.html
Mars Facts – NASA Quest!, quest.nasa.gov/aro/planetary/mars.html
NEAR Shoemaker, http://en.m.wikipedia.org/wiki/NEAR_Shoemaker
Night Sky Explorer (software)
Pale Blue Dot, http://en.m.wikipedia.org/wiki/Pale_Blue_Dot
Space Calendar, http://www.jpl.nasa.gov/calendar/
Venera 9, http://en.m.wikipedia.org/wiki/Venera_9
Additional Material by David Olsen, Editor

M-47

The Other Open Clusters of Auriga

By - Steve Bell

When observers think of open clusters in Auriga, the three very nice Messier clusters M36, M37 AND M38 typically come to mind and potentially NGC1907, which is adjacent to M38, some 32 minutes to the SSW. Including NGC1907, there are four non-Messier open clusters within its boundaries that are worth observing with moderate apertures: NGC1907, NGC1857, NGC1778 and NGC1893.

Auriga Bright Open Clusters

Object	RA	DEC	Mag	Size
M36	05 36 18	+34 08 24	6.5	12
M37	05 52 18	+32 33 12	6	24
M38	05 28 40	+35 50 54	7	21
NGC1907	05 28 00	+35 19 00	8.2	7
NGC1857	05 20 12	+39 21 00	7	6
NGC1778	05 08 06	+37 03 00	7.7	7
NGC1893	05 22 42	+33 24 00	7.5	11

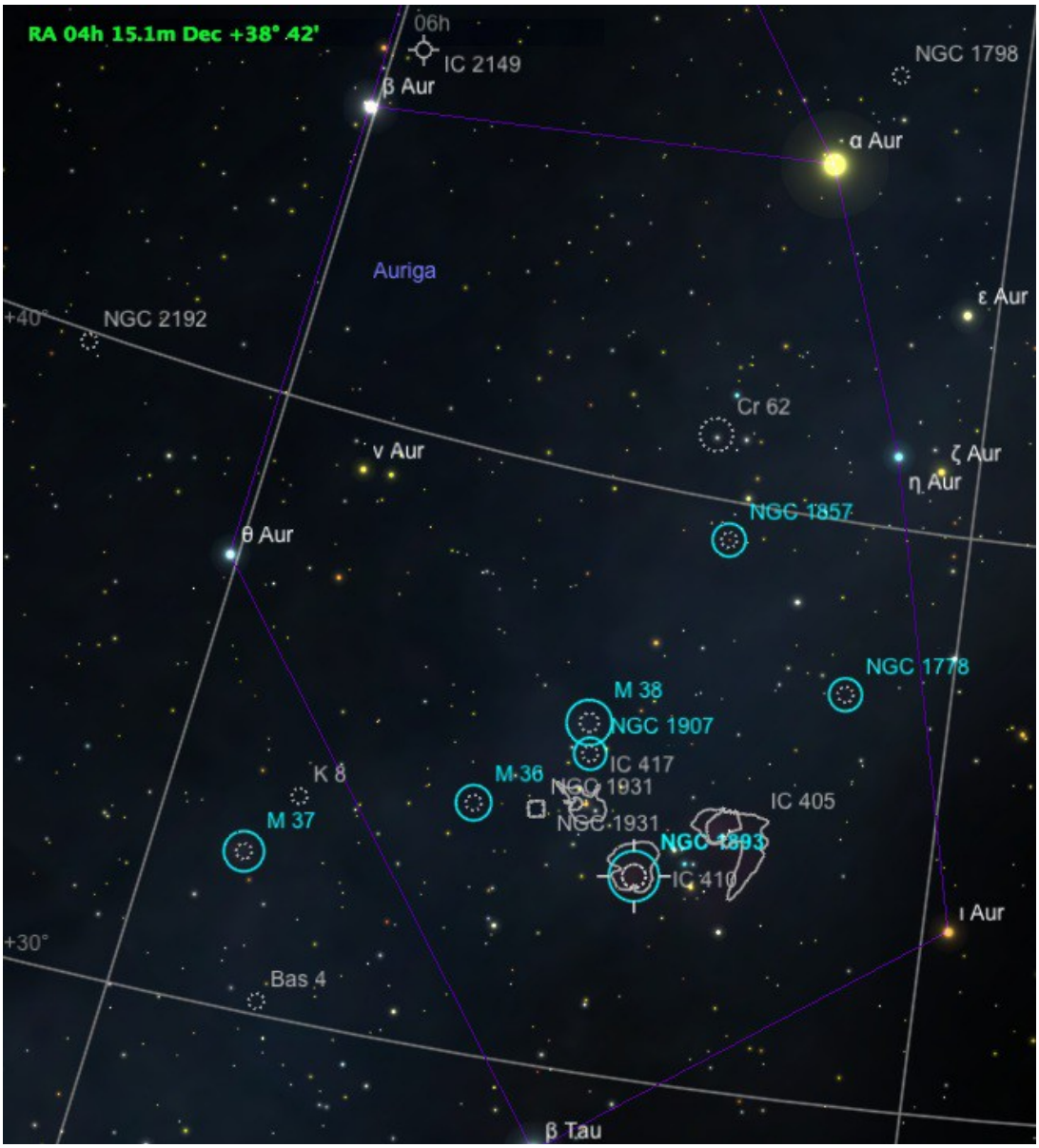
The three Messier clusters have the size and brightness to be seen with any reasonable instrument, including binoculars. They are routinely detectable from a suburban back yard (roughly mag 4 skies) with 10 x 42 binoculars, although they cannot be classified as spectacular. The data for these clusters is included for comparison. Observing the four NGC clusters will need a bit more aperture and magnification due to their smaller sizes and lower brightness.

NGC1907: NGC1907 is a small, moderately faint cluster lying about a half degree almost due south of M38. Under dark skies it is detectable in a 50 mm finder and is well resolved in an 8" SCT at 150X. It is fairly dense with about 25 stars and occupies about 1/10 FOV. NGC1907 is about 4500 light years distant, 12.5 light years in diameter and 500 million years old.

NGC1857: NGC1857 is small but slightly brighter than 1907 and about 3.9 degrees NNW of M38. In an 8" SCT at 107X it was moderately difficult to separate from the background with about three dozen stars resolved. It is described in my notes as a "very pretty" field of view. The bright star at center is very yellow with two very blue flankers. NGC1857 is about 5000 light years from the sun and 133 million year old.

NGC1778: Lying about 4.2 degrees WNW from M38, NGC1778 is a moderately bright cluster with an official count of 30 stars of magnitude 10 and fainter. Under suburban sky conditions with a 4" refractor at 100X, only 12 stars were seen, but it stood out well from the background. It spanned about 1/8 FOV. NGC1778 is about 4800 light years distant and 143 million years old.

NGC1893: NGC1893 is an open cluster embedded in (formed from) nebula IC410. Under dark skies the nebula can be detected without a filter, but the view is greatly enhanced with a narrow band/UHC. This nebula/cluster complex has been described as a smaller, dimmer Rosette Nebula, the well known stellar nursery in Monoceros, east of Orion. Including the nebula, this complex is almost a half-degree in diameter, although the cluster is an 11' arc or crescent partially edging a dark portion of the nebula. This was a very nice object through an 8" SCT at 75X with a UHC filter. There are numerous star chains within the nebula. This is a relatively young complex at about 10.6 million years old at a distance of 20,000 light years. This stellar nursery should be very photogenic.

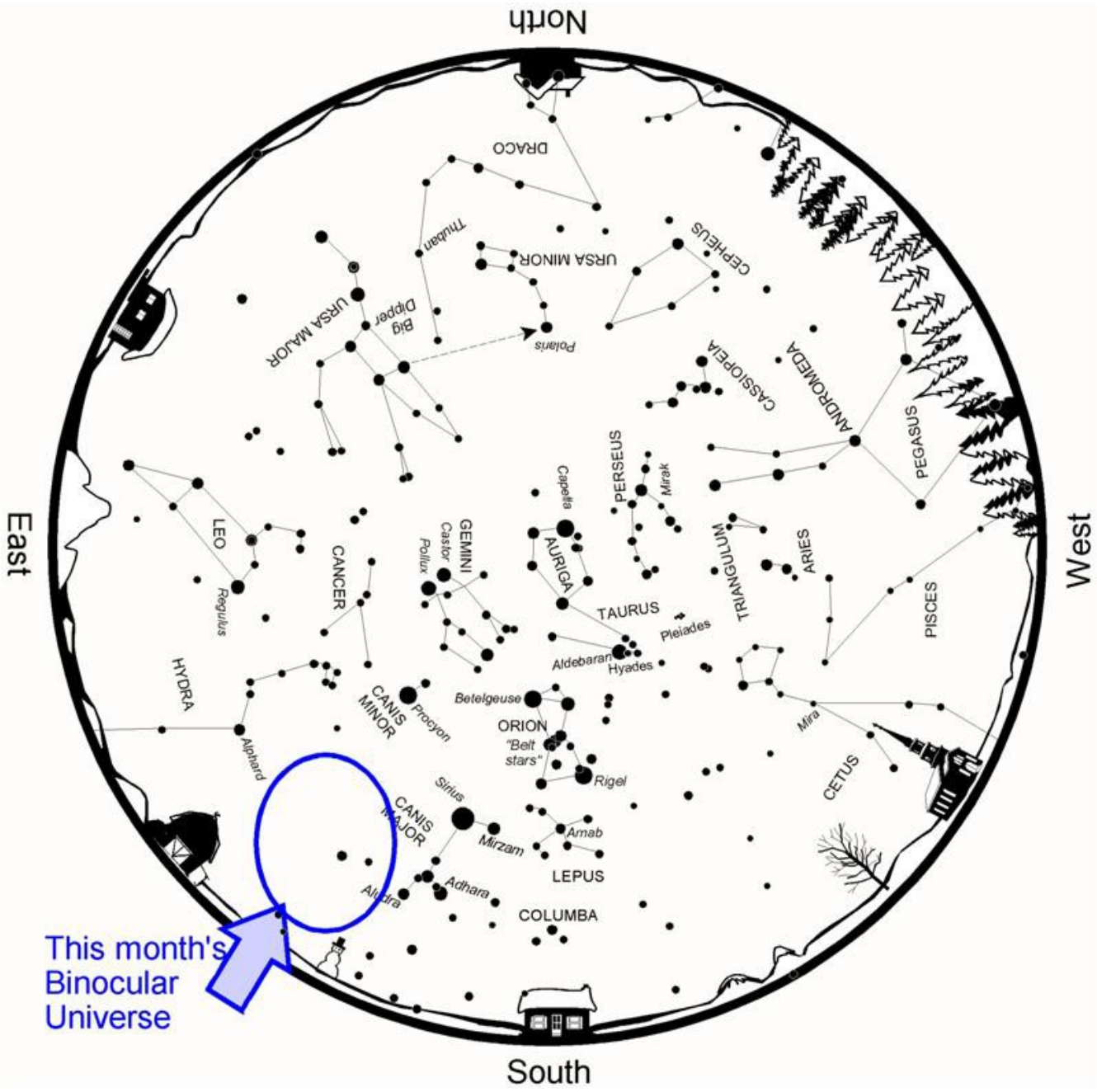


Sky Safari 1.8 for Mac

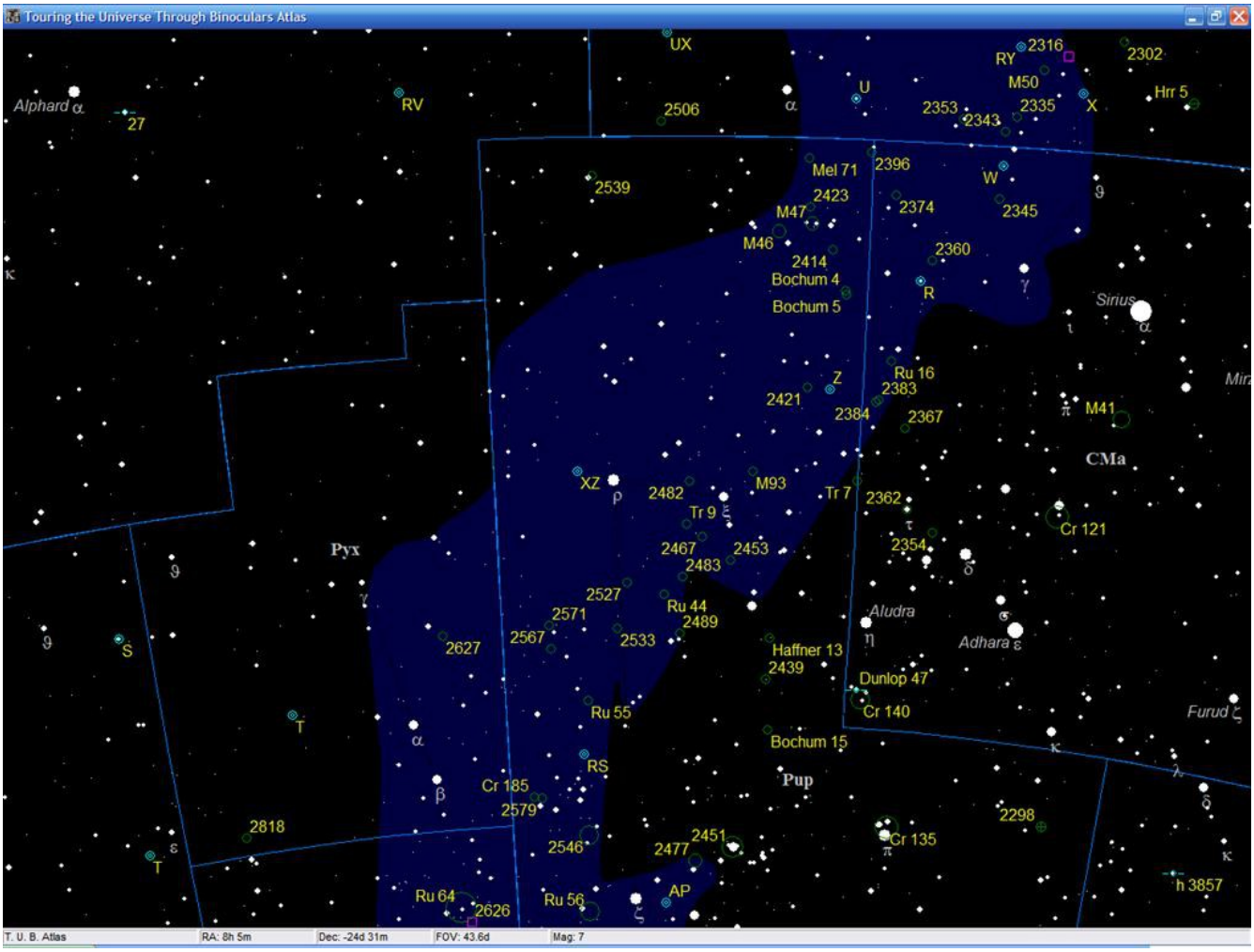
Binocular Universe: More Poop

by Phil Harrington writing for www.Cloudynights.com

February may be the shortest month of the year, but its sky is long on mid-winter binocular treasures. We all know many favorite objects, like the Orion Nebula and the Pleiades. But rather than rehash these, let's break some unfamiliar ground in the southern sky and enjoy some lesser known gems that lie within the faint constellation of Puppis, the Poopdeck of the fabled ship Argo Navis.



Above: Winter star map from Star Watch by Phil Harrington.



Above: Finder chart for this month's Binocular Universe.
Chart adapted from Touring the Universe through Binoculars Atlas *(TUBA)*

Back in March 2012, this column surveyed some of what Puppis has to offer, including the striking open clusters M46, M47, and M93. This month, we return to the scene to visit some objects to their east.

For those of us in mid-northern latitudes, the targets this month are going to be a challenge. You'll need a good view to the south-southwest and get outside right as evening twilight ends. But you are viewing from south of about 30 degrees north latitude, these objects should all be fairly easy to identify.

We begin with NGC 2451, a striking, but often ignored, open cluster. Thirty or so stars are within range of 50-mm binoculars, with the remainder creating a vague background shimmer. Highlighting the scene is c Puppis, the cluster's brightest star. This red beacon stands out well amid a bevy of blue white stellar jewels. With an apparent diameter of 45 arc minutes, NGC 2451 is too broad to cram into most telescope fields, but it is wonderful for the wider fields of binoculars.

But hold on there. Is NGC 2451 really an open cluster? That's how it is listed in Dreyer's NGC, which is based on earlier observations by John Herschel. Herschel, in turn, had based his observations on even earlier records by Giovanni Bapista Hodierna. Hodierna is credited with the group's discovery sometime before the 1654 publication of his catalog of deep-sky objects. But more recent studies, beginning in the mid-1980s, now cast doubt on this being an open cluster. A 1994 paper written by German astronomers Siegfried Roser and Ulrich Bastian and published in Astronomy and Astrophysics provides good evidence that the stars we see in NGC 2451 are not gravitationally bound to one another. So, when we look its way, we are not really seeing a true object at all. Or are we?

That's because Roser and Bastian did uncover some two dozen stars in the surrounding area that have the same proper motion (that is, they are moving through space together). They dubbed these as the Puppis Moving Group, but also emphasized that these do not constitute NGC 2451. The Puppis Moving Group lies some 600 light years from Earth.

They also suspected that several more distant stars in the region form a second open cluster lying some 1,300 light years away. Several sources, both on-line as well as in print, refer to the Puppis Moving Group as NGC 2451A and the second cluster as NGC 2451B.

That's not technically accurate, however, since this is not the way they were originally recorded in the New General Catalog. Call it what you will, NGC 2451 is a striking stellar cache through binoculars. Don't let this part of the sky slip away without catching a glimpse!

NGC 2477 is found about a degree southeast of NGC 2451 and just north of 4th-magnitude b Puppis. While pale in comparison, it is still worth a mention. Through 10x50 binoculars, it appears as a starless smudge of grayish light about the size of the full moon. But increase magnification and aperture to 15x70s and above, and NGC 2477 will begin to reveal the brightest of its 160 stars. None shines brighter than 10th magnitude, and so will require exceptionally clear nights for easy detection. In his book The Caldwell Objects, author Stephen O'Meara notes that through his 4-inch refractor many of the stars in NGC 2477 appear to be arranged in several parallel rows that stretch out from a backbone of other stars. He compares the overall appearance to that of "an X-ray of the human torso with a spine and a rib cage." Can this same effect be seen through 80-mm and larger binoculars? Take a look and let me know.

Continue eastward another 4 degrees for our next port-of-call, NGC 2546. This is a loosely gathered grouping of some 40 suns strewn across nearly 3/4 of a degree and ranging in brightness from magnitudes 6 to 11. Through my tripod-mounted 10x50 binoculars, I can see about twenty faint stars framed by an isosceles triangle of three 7th- and 8th-magnitude suns. The cluster's brightest star, a 6.5-magnitude blue-white inferno, lies in the group's southeastern corner.

For this next object, head 8 degrees north-northeast to a pair of challenging open clusters. NGC 2571 is a collection of about two dozen 9th-magnitude suns. The combined light of this open cluster's stars equals 7th magnitude. The second, NGC 2567, is even dimmer and smaller. I've never made a convincing observation of this one through my 10x50s, but have it on my "16x70 To Do List" for this winter.

Let's head back north for NGC 2539. Unlike the previous two targets, this open cluster is easy to glimpse through nearly all binoculars. You'll find it 7 degrees due south of the bright open cluster M48, and 8 degrees east-northeast of another beauty, M47. The light of the 50 suns within NGC 2539 combines to magnitude 6.5. My 10x50s show an ill defined blotch of light apparently touching the unrelated 5th-magnitude 19 Puppis. By upping my game to my 16x70s, I can begin to make out some of the cluster's true stars, which shine between magnitudes 9 and 11. The two brightest cluster stars are a 9.1-magnitude red giant and a 9.6-magnitude orange giant. Even larger binoculars may offer subtle hints of their colors by first slightly defocusing the view.

We've only just scratched the surface of all that Puppis has to offer. Check the list below for even more tempting targets, as well as a renegade from nearby Pyxis. Be sure to post your results in this column's discussion forum.

Object	Con	Type	R.A. (2000)	Dec	Mag	Size/Sep/ Period	Notes
Bochum 15	Pup	OC	7 40.1	-33 33	6.3		
Haffner 13	Pup	OC	7 40.5	-30 7		15'	*TUB page 209*
2439	Pup	OC	7 40.8	-31 39	6.9	10'	*TUB page 209*
M93	Pup	OC	7 44.6	-23 52	6.2	22'	*TUB page 210* NGC 2447
2451	Pup	OC	7 45.4	-37 58	2.8	45'	*TUB page 210*
2453	Pup	OC	7 47.8	-27 14	8.3	5'	
2477	Pup	OC	7 52.3	-38 33	5.7	27'	*TUB page 210*
2467	Pup	OC	7 52.6	-26 23	7.1p	16'	
2482	Pup	OC	7 54.9	-24 18	7.3	12'	
Tr 9	Pup	OC	7 55.3	-25 56	8.7	6'	
2483	Pup	OC	7 55.9	-27 56	7.6	10'	
2489	Pup	OC	7 56.2	-30 4	7.9	8'	
Ru 44	Pup	OC	7 59	-28 35	7.2	5'	
2527	Pup	OC	8 5.3	-28 10	6.5	22'	*TUB page 210*
2533	Pup	OC	8 7	-29 54	7.6	4'	
Ru 55	Pup	OC	8 12.3	-32 36	7.8	17'	
2546	Pup	OC	8 12.4	-37 38	6.3	41'	*TUB page 210-211*
RS	Pup	Vr	8 13.1	-34 35	6.5-7.6	41.388 days	Cepheid
XZ	Pup	Vr	8 13.5	-23 57	8.0-10.9p	2.192 days	Eclipsing Binary
2567	Pup	OC	8 18.6	-30 38	7.4	10'	
2571	Pup	OC	8 18.9	-29 44	7.0	13'	*TUB page 211*
2579	Pup	OC	8 21.1	-36 11	7.5	10'	
Cr 185	Pup	OC	8 22.5	-36 10	7.8	9'	
2627	Pyx	OC	8 37.3	-29 57	8.4	11'	

Next month, let's try something a little different, what is for some a seasonal rite of passage. Until then, remember my stargazing mantra: two eyes are better than one.

About the author: Phil Harrington has written 9 books on astronomy, including Star Ware, Star Watch, and his latest, Cosmic Challenge. Visit his web site, www.philharrington.net, for more information.

Surprising Young Stars in the Oldest Places in the Universe

By Dr. Ethan Siegel

Littered among the stars in our night sky are the famed deep-sky objects. These range from extended spiral and elliptical galaxies millions or even *billions* of light years away to the star clusters, nebulae, and stellar remnants strewn throughout our own galaxy. But there's an intermediate class of objects, too: the *globular star clusters*, self-contained clusters of stars found in spherically-distributed halos around each galaxy.

Back before there were any stars or galaxies in the universe, it was an expanding, cooling sea of matter and radiation containing regions where the matter was slightly more dense in some places than others. While gravity worked to pull more and more matter into these places, the pressure from radiation pushed back, preventing the gravitational collapse of gas clouds below a certain mass. In the young universe, this meant no clouds smaller than around a few hundred thousand times the mass of our Sun could collapse. This coincides with a globular cluster's typical mass, and their stars are some of the oldest in the universe!

These compact, spherical collections of stars are all less than 100 light-years in radius, but typically have around 100,000 stars inside them, making them nearly 100 times denser than our neighborhood of the Milky Way! The vast majority of globular clusters have extremely few heavy elements (heavier than helium), as little as 1% of what we find in our Sun. There's a good reason for this: our Sun is only 4.5 billion years old and has seen many generations of stars live-and-die, while globular clusters (and the stars inside of them) are often *over 13 billion years old*, or more than 90% the age of the universe! When you look inside one of these cosmic collections, you're looking at some of the oldest stellar swarms in the known universe.

Yet when you look at a high-resolution image of these relics from the early universe, you'll find a sprinkling of hot, massive, apparently *young* blue stars! Is there a stellar fountain of youth inside? Kind of! These massive stellar swarms are so dense -- especially towards the center -- that mergers, mass siphoning and collisions between stars are quite common. When two long-lived, low-mass stars interact in these ways, they produce a hotter, bluer star that will be *much* shorter lived, known as a *blue straggler star*. First discovered by Allan Sandage in 1953, these young-looking stars arise thanks to stellar cannibalism. So enjoy the brightest and bluest stars in these globular clusters, found right alongside the oldest known stars in the universe!

Globular Cluster NGC 6397. Credit: ESA & Francesco Ferraro
(Bologna Astronomical Observatory) / NASA, Hubble Space Telescope, WFPC2.

Recent globular cluster discovery: http://www.nasa.gov/press/2013/september/hubble-uncovers-largest-known-group-of-star-clusters-clues-to-dark-matter. Kids can learn more about how stars work by listening to The Space Place's own Dr. Marc: http://spaceplace.nasa.gov/podcasts/en/#stars.

Bruneau Dunes Observatory – Bruneau, ID

The observatory is currently closed.

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. The observatory features an elevator to take visitors to its second-story location at the south end of the museum. Once there, a wheelchair elevator is available to lift visitors with limited mobility to the observing deck under a six meter (20 foot) motorized dome manufactured by Observa-Dome of Jackson, Mississippi, USA. The ARE-125 an optical "periscope" designed by DFM, allows unprecedented access to the telescope for wheelchair bound or limited mobility visitors. An Apogee Alta E47 + CCD Camera is available for imaging, a generous gift of Dick and Jody Shotwell.

Event	Place	Date	Time	Admission
Monthly Free Star Party	Centennial Observatory	Saturday, Feb 8th, 2014	7:00 PM to midnight	FREE
Telescope Tuesday	Centennial Observatory	Tuesday, Feb 11th, 2014	7:00 to 9:00 PM	$1.50 (Children 6 & under free)
Telescope Tuesday	Centennial Observatory	Tuesday, Feb 25th, 2014	7:30 to 9:00 PM	$1.50 (Children 6 & under free)

http://herrett.csi.edu/

The 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 February Show Schedule

February 1st – March 1st

Day	Time	Show
Tuesday	7:00	Astronaut w/Live Sky Tour
	8:00	Violent Universe: Catastrophes of the Cosmos w/Live Sky Tour
Friday	7:00	Perfect Little Planet
	8:00	Sea Monsters: A Prehistoric Adventure
Saturday	1:30	Perfect Little Planet
	02:30:00 AM	Astronaut w/Live Sky Tour
	3:30	Sea Monsters: A Prehistoric Adventure
	4:30	Violent Universe: Catastrophes of the Cosmos w/Live Sky Tour
	7:00	Astronaut w/Live Sky Tour
	8:00	Sea Monsters: A Prehistoric Adventure

http://herrett.csi.edu/

"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.