



Snake River Skies

The Monthly Newsletter of the Magic Valley Astronomical Society

June Events

July 7th Solar Session # 6
1:30-3:30 pm Stargazer's Deck Centennial Observatory, Herrett Center.

July 10th Annual Membership Picnic with the Boise Astronomical Society at 7:00 pm Kinney Court-Rick Allen Room at the Herrett Center.

July 10th Astronomy Talk "Globular Star Clusters: Jewels in the Milky Way's Crown" Follows the picnic at 8:15 pm Public Star Party follows the talk at 9:15 pm —Observatory.

July 14th Solar Session # 7
1:30-3:30 pm Stargazer's Deck Centennial Observatory, Herrett Center.

July 16th Third Annual City of Rocks/Castle Rocks State Park star party Almo, ID details on pages 8-9.

July 21st Solar Session # 8
1:30-3:30 pm Stargazer's Deck Centennial Observatory, Herrett Center.

July 28th Solar Session # 7
1:30-3:30 pm Stargazer's Deck Centennial Observatory, Herrett Center.



Terry Wofford—The President's Corner

This month we made a change in our schedule after a request from club member Deb Hartwell.

First we welcome back Chris Anderson from his trip to Egypt. To help with this welcome home Deb requested we move our picnic to July instead of August. We will be holding this years picnic with the folks (who attend) from the Boise Astronomical Society. We will be on the Kinney Court (outside the Rick Allen Room) beginning at 7:00 pm. Since we are holding this with the Boise club we need a RSVP no later than July 7th.

The picnic is also a potluck affair, so please indicate what dish you want to bring.

Following the picnic, Chris will give his bi-monthly astronomy talk "Globular Star Clusters: Jewels in the Milky Way's Crown" in the Rick

Allen room. Following the talk will be the monthly public star party with the folks from BAS. For more details please see the announcement sent to you via e-mail.

July is also our annual City of Rocks/Castle Rocks State Park star party.

This year we have some requests from club members to attend on Saturday night, so we will now extend this event to two nights with the second night for club members only. This may become another big star party event in Idaho. We would like to thank Juanita Jones, Visitor Services Ranger at City of Rocks/Castle Rocks S.P. who has been our liaison and organizer for this event.

Speaking of memberships there are no renewal for July, but if you have not renewed in quite awhile, then please consider renewing

now. Your dues are good for one-year from the date you have paid them. More information on dues for the club is found on the back of the Newsletter.

Clear Skies until next month.

Terry Wofford, President

MVAS Mission

The Magic Valley Astronomical Society 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. The society serves as a source of astronomical phenomena, history and lore by providing educational and observing opportunities and information for its members and the general public and promotes viewing of celestial objects with special events for adults and children in south central Idaho.

Welcome to the Magic Valley Astronomical Society

Welcome to the society and hello. We hope you have a good time, enjoy the hobby, & bring good skies with you.

We hold indoor meetings each month at the Herrett Center for Arts & Science College of Southern Idaho campus in Twin Falls, ID, USA . Our meetings start at 7:00pm on the second Saturday of the month. There will

always be a very interesting program, class or presentation at these meetings, as well as good fellowship. There is always something new to learn.

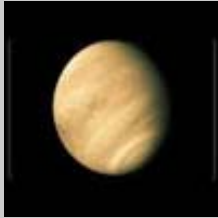
Following our meetings we have a star party (weather permitting) at the Centennial Observatory, also at the Herrett Center.

Our star parties are free and you don't have to bring your own telescope. Telescopes are also set up outside on the stargazer's deck. Star Parties are held year round, so please dress accordingly as the Observatory is not heated, nor air conditioned.

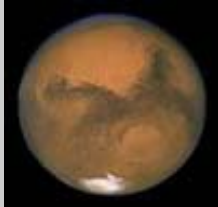
Wishing you dark skies and clear nights!

MVAS Board

July Observing Highlights



Venus will be high in the evening sky at dusk all month. It will be shining very brightly at magnitude -4.3 by the end of the month. Through a telescope Venus will not change much in appearance.



Mars will be visible in the south west sky as it grows dark. Mars will shine at magnitude 1.4 at midmonth. While still relatively bright, through a backyard telescope Mars will be too small to see any detail. Saturn will approach to within 2° of Mars at the end of the month.



Jupiter will be high in the southern sky before dawn this month. The best time to observe Jupiter would be a few hours after midnight when it will be very high in the southern sky and at Magnitude -2.6.



Saturn will be in the sky to the southwest in western Virgo as it grows dark. This would be the time to get a telescope on it – when there is less atmosphere to look through. At the end of the month Mars will be 2° from Saturn. A very bright Venus will be in the area too.



Uranus will be in the southern dawn sky near Jupiter. Last month Uranus was ~1° from Jupiter. This month they move ~3° apart. Uranus will be west of Jupiter. They should still be a good binocular target. Uranus will be shining at magnitude 5.8. This makes it a possible naked eye target from dark skies.



Neptune will be above Jupiter in Aquarius in the eastern morning sky. It will rise not long after midnight so sometime after 2AM but before dawn twilight would be the best time to target it. You will need dark skies and a pair of binoculars or a telescope to spot it. It will be shining at magnitude 7.8.



Moon Phases for July

4 **Last Quarter Moon** at 14:35 UT
 11 **New Moon** at 19:40 UT
 18 **First Quarter Moon** at 10:11 UT
 26 **Full Moon** at 1:37 UT.



Millions of people will be under darkening skies on July 3 and July 4 in the United States, waiting to see the fireworks. As the sun sets and the sky darkens, the brightest astronomical objects will be visible before any fireworks show. Be sure to look skyward before the fireworks begin.

Sky Calendar—July 2010

- 1 **Moon at apogee** at 10h UT
- 3 **Moon near Jupiter** at 20h UT. Mag. -2.5.
- 6 **Earth at Aphelion** at 11h UT.
- 8 **Moon near Pleiades** at 6h UT.
- 9 **Moon near Aldebaran** at 2h UT.
- 10 **Venus 1.0° NNE of Regulus** at 12 UT.
- 13 **Moon at perigee** at 11h UT
- 14 **Moon near Regulus** (evening sky) at 13h UT
- 14 **Moon near Venus** (evening sky) at 22h UT.
- 16 **Moon near Mars** (evening sky) at 0h UT.
- 16 **Moon near Saturn** (evening sky) at 14h UT
- 18 **Moon near Spica** (evening sky) at 6h UT.
- 21 **Moon near Antares** (evening sky) at 20h UT.
- 27 **Mercury 0.3° SSW of Regulus** at 22h UT
- 29 **Moon at apogee** at 0h UT
- 31 **Moon near Jupiter** (morning sky) at 2h UT.
- 31 **Mars 1.8° SSW of Saturn** (evening sky) at 6h

July Meteor Shower

On July 28 and 29 the peak of the Southern Delta Aquarid meteor shower occurs; however, moonlight will outshine most of the meteors. For those who still want to try, the best time to look is before dawn on July 29.

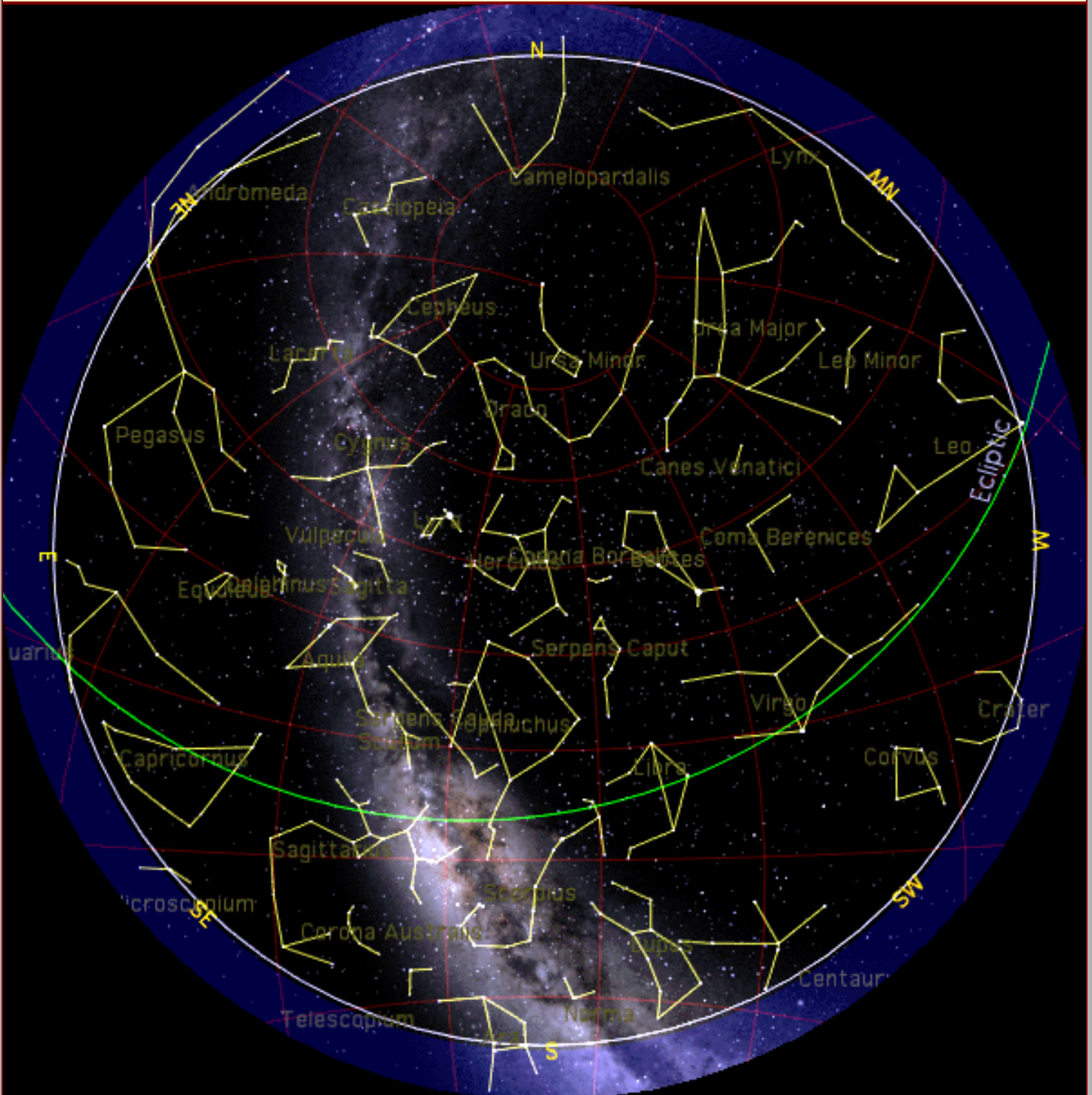
A New Comet McNaught Brightens

The new Comet McNaught, (C/2009 R1), was discovered on September 9, 2009 (9/9/09). This comet is currently approaching the sun where it is brightening and is expected to become visible against dark skies without any optical aid.



Image: The Comet McNaught (C/2009 R1) and NGC 891 a spiral Galaxy in Andromeda
 © 2010 John Chumack

Planisphere for July Late Evening



Did you Know?

Released 11 July 1997, the movie Contact had been in the works since 1979. Dr. Carl Sagan, PhD wrote the initial screenplay with his wife Ann Druyan. The main character in the film Eleanor "Ellie" Ann Arroway finds a strong signal repeating a sequence of prime numbers, apparently emitting

from the star Vega. Vega is a primary star featured in the Summer sky and is the brightest in the Constellation Lyra. A magnitude of 0.03 makes Vega the 5th brightest in the night sky and the second brightest star in the northern celestial hemisphere, after Arcturus. Vega is 25 million l.y. from Earth. With

Altair and Deneb, Vega makes up the great summer triangle. Vega is a white main sequence dwarf star like the Sun.



Image: Vega as seen in the summer sky. NASA / ESA photo.

Looking Through the Eyepiece - The Binocular Tour

A good pair of binoculars can show you great highlights: the moon, planets, double stars, cluster, nebulae, and galaxies. But which of these are best through binoculars?

Before you even pick your object, you need to make sure you can hold your binoculars steady or nothing will look good. Buy a sturdy tripod for best results. A cheaper way to go is to recline in a deck chair while resting your arms on the armrest. You won't see much of anything if your binoculars are bouncing around.

Once you have that simple matter resolved, get ready to see some of the best sights in the northern sky.



The full Moon NASA/ESA image "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." —Norman Herrett, Founder Herrett Center for Arts and Science, CSI-TFID

The Moon—It's bright and easy to find. Even kids can spot the moon in binoculars. The best part of the moon to view? That would be the *terminator*, the dividing line between day and night. This means that full moon is not the best time to view, for the whole surface is illuminated. You want to view the moon during its phases, when the sun's light cuts across the moon, and valleys and mountains of the moon stand out in stark relief at the edge. Also look for rilles, maria (dry lava beds), and craters where brighter debris has been splashed across the surface.

Planets—Planets are not really the place you are going to find a lot of excitement. The rings of Saturn will



Jupiter is a good target in Binocular viewing and you see the four Galilean moons. Image: Cassini composite showing the moon Europa-NASA/JPL/University of Arizona file photo.

probably appear as not much more than slight bulges on each side of the planet. *Jupiter* is probably the target of choice. It will resolve as a disk instead of a point and you will be able to track the four largest moons as they circle the planet. *Uranus* and *Neptune* can be spotted in binoculars too if you have a finder chart or know just where to look. Start with *Uranus*, as it is brighter, and then try for *Neptune*. You probably won't see the disk shape of *Neptune* or any color with binoculars, but it will be a steady light and not twinkling like the stars.

Double Stars—Start with something easy that is up all night every night for those in the Northern Hemisphere. The stars *Mizar* and *Alcor*, located at the bend in the handle of the Big Dipper, can be resolved by people with decent eyesight alone. Try it with binoculars and see what differences there are between the stars in brightness, size,



or color. Next, see if you can resolve the two stars in the summer constellation Cygnus the Swan. The beautiful double star *Albireo* sits at the base of the cross-shaped constellation. The third magnitude pair is a striking yellow and blue in color.

Star Clusters—There are a few globular clusters that make great binocular targets. Start with the best globular in the Northern Hemisphere, the Great Globular Cluster of Hercules, *M13*. Hercules, a summer constellation, has a notable central "keystone" shape, or lopsided square. *M13* lies on the west edge of the keystone. At magnitude 5.9, you can begin to glimpse some of the hundreds of thousands of stars that swarm tightly in this patch of sky.



Another globular, the first to be discovered, is *M22* in Sagittarius. The whole teapot region of Sagittarius is rich with binocular treasures, but *M22* is a stunning magnitude 5.1 cluster just above and to the left of the teapot's lid. Another type of cluster, the open cluster, is best represented in binoculars by the *Pleiades Cluster* in Taurus, a fuzzy patch of six to seven stars seen with the naked eye, and the *Beehive Cluster* at the center of Cancer. The *Pleiades* or *M45* is a 1.6 magnitude gem that is best in binoculars -- a telescope cannot capture the wide range of the cluster's stars. The *Beehive Cluster* or *M44* is a 3.4 magnitude grouping that can also be seen with the naked eye. Through his telescope, Galileo could see more than 40 stars. How many can you see?

Image left—*Albireo* A, *Albireo* B is a singular looking double star that can be resolved into two stars through good binoculars and dark skies. Above—*M-13* Great Globular Cluster in Hercules. Wikimedia Commons file photos.

Looking Through the Eyepiece - The Binocular Tour



Nebulae—Probably the most popular nebula in the sky is the *Orion Nebula*, *M42*, a hazy 4th-magnitude patch on Orion's sword that can be glimpsed with the naked eye. Binoculars enhance this view. Two stars cast their light onto this gas cloud, making it glow, and both those stars are part of multiple star systems. See if you can split one of them into a double star through your binoculars and for a real test, try to see the four stars in the second grouping, known as the Trapezium. Another nebula for binoculars is the *Lagoon Nebula*, *M8*, in Sagittarius, not far from our earlier star cluster target *M22*. Above the spout of the teapot asterism of Sagittarius, imagine steam flowing upward. This stretch of the Milky Way, filled with beautiful targets, contains *M8*, which, at magnitude 5.8, is more of a challenge than Orion. Another even more difficult nebula lies right next to *M8*. *M20*, the Trifid Nebula, is recognizable by the darker dust lanes dividing this nebula into three parts. Make sure you are observing from a dark-sky location to have a chance at this magnitude 6.3 gas cloud.

Galaxies—Start with the obvious galaxy that is possible to glimpse with the naked eye under great conditions. The *Andromeda Galaxy*, *M31*, is a magnitude 3.5 spiral. Lying in the constellation Andromeda and below the W-shape of Cassiopeia, the Andromeda Galaxy will show up as an elongated fuzzy blob. Two 8th-magnitude com-

panions lie along the disk of Andromeda, they will be a real challenge to glimpse in binoculars. A pair of galaxies in Ursa Major, *M81 and M82*, a magnitude 6.9 and 8.4 respectively, are a decent challenge but easily available to Northern viewers. These north circumpolar galaxies are up every night of the year. Scan just above the head of the Great Bear for the two fuzzy patches.

Miscellaneous—There is always something good to view in the sky with binoculars, whether it be one of the objects above, finding a slim moon or planet during sunrise or sunset, catching a new comet, or just scanning the plentiful Milky Way and seeing what amazing sight pops into view.

With the exception of *M-42*, the Orion Nebula, the objects listed in this article are normally a good find in the summer time night sky.

With the cooler evenings as the heat of the day wanes you probably would like to be outside anyway. Why not take a set of binoculars with you and spend some time just looking up.

You know you're ready for touring the heavens with binoculars when you want to get an up-close look at the beauties of the universe but are not ready to purchase a telescope.

Choosing a pair of Binoculars

Beginning stargazers often overlook binoculars, but experienced observers keep them close at hand. Compared to a telescope, binoculars actually have certain advantages. Granted, they're smaller and give lower magnification. But they're lighter, much easier to take

outside, use, and put away, and less expensive. They also give a much wider view than a telescope does, making celestial objects easier to find. They let you use both eyes, providing surer, more natural views. Moreover, in binoculars everything is right-side up and presented correctly, not upside down and/or mirror-reversed.

Finally, there's another big plus for binoculars: you may already have a pair in the back of a closet (or know someone who can loan you a pair). If so, stop reading and go get them now.



Now look them over. On the back you'll see two numbers separated by an "x". Common combinations are 8x40, 7x35, 7x50, and 10x50. The first number is the *magnification*, or "power." The first number is the *magnification*, or "power." The second is the *aperture*, the diameter of the large front lenses measured in millimeters.

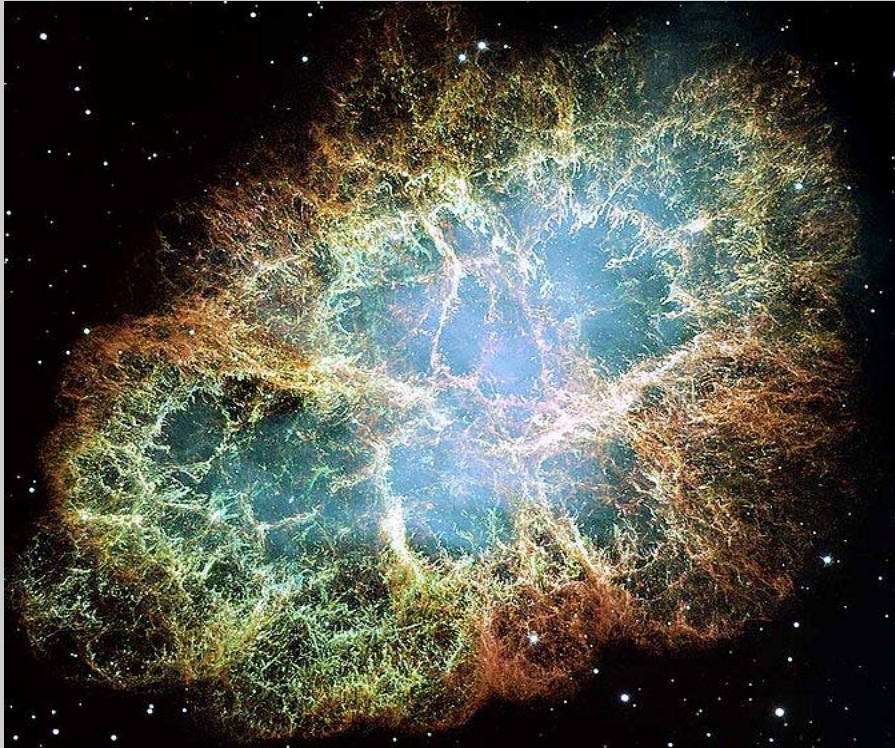
No matter what binoculars you just dug out of the closet, they'll be a great addition to your stargazing sessions. Consider this: on a clear, dark night out in the country, your eyes can see up to 3,000 stars, give or take. But when you use even modest 7x35 binoculars, that number rises to roughly 100,000 stars!

Similarly, in a light-polluted suburb you may be able to see only a couple hundred stars unaided, but binoculars will cut through the murk to show you more than you could see with your unaided eye from the top of Mt. Everest.

Images: *M42*, the Orion nebula. *M31*, the Andromeda Galaxy our nearest neighbor. Calvin College Observatory. Common Binoculars showing the magnification (10 x) and diameter of the front lenses (50mm) Binocular image found in the public domain.



The Crab Nebula



The Crab Nebula is a supernova remnant and pulsar wind nebula in the constellation of Taurus. The nebula was observed by John Bevis in 1731; it corresponds to a bright supernova recorded by Chinese and Arab astronomers in 1054. At the center of the nebula lies the Crab Pulsar, a neutron star (or spinning ball of neutrons), twelve miles across, which emits pulses of radiation from gamma rays to radio waves with a spin rate of 30.2 times per second.

The nebula was the first astronomical object identified with a historical supernova explosion. It has also been claimed that an obscure entry in a number of Irish monastic annals originally referred to SN 1054 but was subsequently corrupted, becoming in the process an allegorical myth based on the legend of the Antichrist. The cloudy remnants of SN 1054 are now known as the Crab Nebula. The nebula is also referred to as Messier 1 or M1, being the first Messier Object catalogued in 1758.

The creation of the Crab Nebula corresponds to the bright supernova that was recorded by Chinese Astronomers

and Arab Astronomers in 1054 AD. The Crab Nebula itself was first observed in 1731 by John Bevis. The nebula was independently rediscovered in 1758 by Charles Messier as he was observing a bright comet. Messier catalogued it as the first entry in his catalogue of comet-like objects. The Earl of Rosse observed the nebula at Birr Castle in the 1840s, and referred to the object as the Crab Nebula because a drawing he made of it looked like a crab.

In the early 20th century, the analysis of early photographs of the nebula taken several years apart revealed that it was expanding. Tracing the expansion back revealed that the nebula must have become visible on Earth about 900 years ago. Historical records revealed that a new star bright enough to be seen in the daytime had been recorded in the same part of the sky by Chinese and Arab astronomers in 1054. Given its great distance, the daytime "guest star" observed by the Chinese and Arabs could only have been a super nova—a massive, exploding star, having exhausted its supply of energy from nuclear explosion and collapsed in on itself.

Recent analysis of historical records have found that the supernova that created the Crab Nebula probably appeared in April or early May, rising to its maximum brightness of between apparent magnitude -7 and -4.5 (brighter than everything in the night sky except the Moon) by July. The supernova was visible to the naked eye for about two years after its first observation. Thanks to the recorded observations of Far Eastern and Middle Eastern astronomers of 1054, Crab Nebula became the first astronomical object recognized as being connected to a supernova explosion.

At the centre of the Crab Nebula are two faint stars, one of which is the star responsible for the existence of the nebula. It was identified as such in 1942, when Rudolf Minkowski found that its optical spectrum was extremely unusual the region around the star was found to be a strong source of radio waves in 1949 and X-rays in 1963, and was identified as one of the brightest objects in the sky in gamma rays in 1967. Then, in 1968, the star was found to be emitting its radiation in rapid pulses, becoming one of the first pulsars to be discovered.

Pulsars are sources of powerful electromagnetic radiation, emitted in short and extremely regular pulses many times a second. They were a great mystery when discovered in 1967, and the team which identified the first one considered the possibility that it could be a signal from an advanced civilization. However, the discovery of a pulsating radio source in the centre of the Crab Nebula was strong evidence that pulsars were formed by supernova explosions. They are now understood to be rapidly rotating neutron stars, whose powerful magnetic field concentrates their radiation emissions into narrow beams.

The crab nebula, according to documents, was discovered July 4th 1054. It is best observed in fall and winter.

Image: NASA/ESA/STScI

NASA News-Shuttle Flights Extended



Tariq Malik-SPACE.com Managing Ed. NASA's space shuttle fleet will continue flying through at least early next year due to delays with the agency's final two missions.

Space shuttle program managers officially decided Thursday to delay the launch of NASA's next space shuttle mission to Nov. 1 and push back the last scheduled flight to late Feb. 2011.

The move was not unexpected – the space agency said in late June it was hoping to postpone the final shuttle flights because of cargo delivery and schedule conflicts. Both missions are bound for the International Space Station.

The new plan delays the launch of Discovery - NASA's oldest space shuttle from an earlier Sep. 16 target to Nov. 1.

Discovery's STS-133 mission is the orbiter's last scheduled flight and will deliver a shuttle cargo pod refitted to serve as a permanent storage closet for the space station. The shuttle will also deliver Robonaut 2, a prototype robot designed to assist astronauts working in space.

Delays preparing Discovery's cargo for launch forced mission managers to push the launch date back. That shift forced another delay with NASA's final space shuttle mission on the schedule – the launch of Endeavour to deliver a \$1.5 billion astrophysics experiment to the space station.

Endeavour is NASA's youngest space shuttle and was slated to launch its experiment payload, called the Alpha Magnetic Spectrometer, no earlier than Nov. 27; but because Discovery's flight is delayed, so too is Endeavour's STS-134 mission.

The next available launch date for Endeavour is Feb. 26, 2011, NASA officials said in a statement.

Launch slips for NASA's last space shuttle missions were anticipated by more than just mission managers. In February, President Barack Obama

included \$600 million for NASA's space shuttle program as part of the agency's fiscal year 2011 budget proposal. The funds were set aside in case NASA needed to delay its final shuttle flights beyond their planned September 2010 retirement date. A report issued in March by NASA's Office of the Inspector General also predicted that the space agency would have to fly some of its final shuttle missions in 2011.

NASA typically spends about \$200 million a month to keep its space shuttle fleet flying, though agency officials have said they have enough funding in place to support operations through February 2011.

NASA is still waiting to hear from the White House if the space shuttle Atlantis – the current middle child of the U.S. orbiter fleet – will get a chance to fly one more mission.

Atlantis flew its 32nd and final scheduled mission in May to deliver a new Russian room to the International Space Station. NASA is hoping to get a chance to launch the shuttle one more time in June 2011 to deliver cargo and supplies to the orbiting lab.

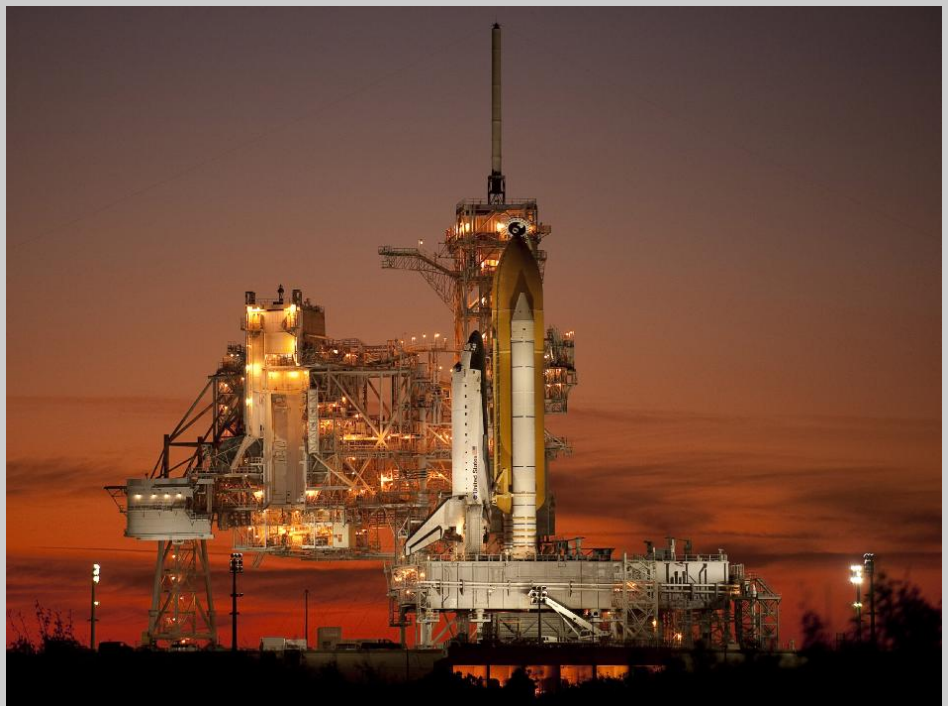
But to give Atlantis one extra shuttle flight, NASA needs approval from the White House, which it does not yet have, by August to begin planning the mission.

NASA is retiring its space shuttle fleet after 30 years of service to make way for future programs aimed at sending astronauts to visit an asteroid by 2025, and then target missions to Mars.

The plan is part of President Obama's new space exploration proposal, which also includes the cancellation of NASA's Constellation program developing new rockets and spacecrafts slated to send astronauts back to the moon.

Once the space shuttles retire for good, NASA will rely on Russia's Soyuz spacecraft to ferry astronauts to and from the space station until American commercial spaceships become available.

Image: Shuttle Atlantis awaits its final launch in the pre-dawn sky over launch complex 39A at Kennedy Space Center Cape Canaveral, FL May 2010. NASA File Photo.



City of Rocks Star Party

City of Rocks Star Party 2010

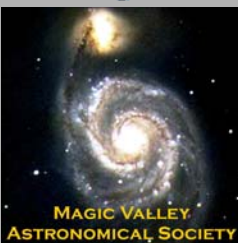


*City of Rocks National Reserve
Castle Rocks State Park*

Two miles north of Almo, ID (1 hr. S. of Burley)

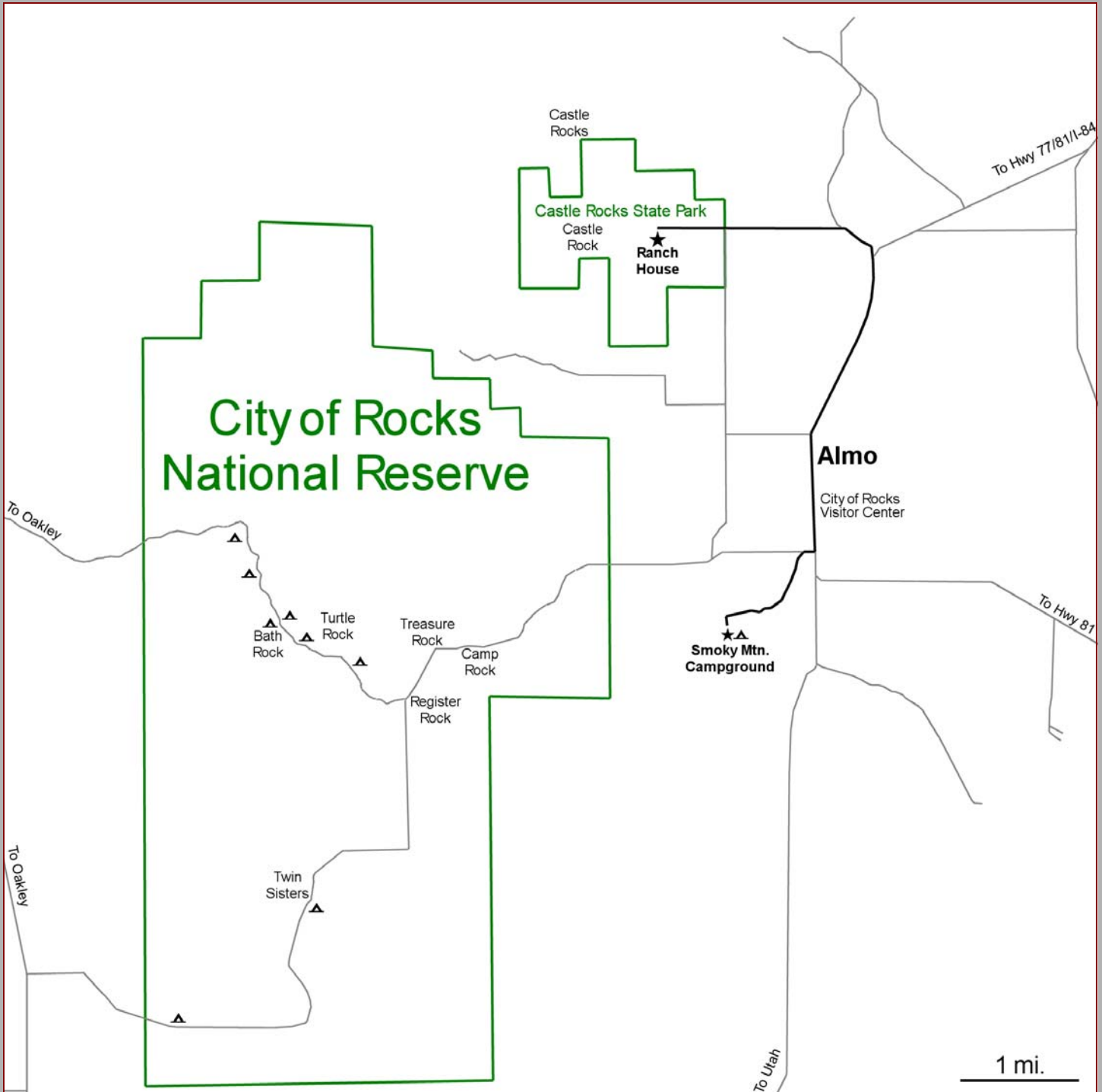
Friday, July 16th, 2010

- 2:00-6:00 p.m. – *Solar viewing (safe views of the Sun with filtered telescopes), Smoky Mtn. Campground, Castle Rocks State Park*
- 9:30 p.m. – *Star party (telescope viewing), Ranch House site, Castle Rocks State Park*



Hosted by: Idaho Dept. of Parks & Recreation, Magic Valley Astronomical Society, and the College of Southern Idaho's Centennial Observatory

City of Rocks Star Party Map



Solar viewing at Smoky Mountain Campground,
2:00—6:00 p.m.

Nighttime telescope viewing at Ranch House, 9:30
p.m.—midnight+

Image: Camping at Smokey Mt. Campground at Castle Rocks/City of Rocks—ISPR Photo - Map and Announcement by Chris Anderson, Manager Centennial Observatory

Magic Valley Astronomical Society
P.O. Box 445
Kimberly, ID, USA 83341
<http://www.mvastro.org/>

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Image of the Centennial Observatory on the front page is courtesy of Chris Anderson, Observatory Manager. The Centennial Observatory is located at the Herrett Center for Arts and Science, College of Southern Idaho, Twin Falls, ID, USA. Shoshone Falls is a major attraction to the Magic Valley and a prominent landmark on the Snake River. Falls image is used under "public domain;" unknown photographer. M-51 on the front page was imaged with the Shotwell Camera and the Herrett Telescope at the Centennial Observatory by club members Rick Widmer & Ken Thomason. Star Party image is a open source photo photographer unknown.

Membership Information

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 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. Please contact a board member for details.

Titan Like Atmosphere Creates Molecules of Life

The first experimental evidence showing how atmospheric nitrogen can be incorporated into organic macromolecules is being reported by a University of Arizona team.

The finding indicates what organic molecules might be found on Titan, the moon of Saturn that scientists think is a model for the chemistry of pre-life Earth. Earth and Titan are the only known planetary-sized bodies that have thick, predominantly nitrogen atmospheres, said Hiroshi Imanaka, who conducted the research while a member of UA's chemistry and biochemistry department.

How complex organic molecules become nitrogenated in settings like early Earth or Titan's atmosphere is a big mystery, Imanaka said.

"Titan is so interesting because its nitrogen-dominated atmosphere and organic chemistry might give us a clue to the origin of life on our Earth," said Imanaka, now an assistant research scientist in the UA's Lunar and Planetary Laboratory. "Nitrogen is an essential element of life."

However, not just any nitrogen will do. Nitrogen gas must be converted to a more chemically active form of nitrogen that can drive the reactions that form the basis of biological systems. Imanaka and Mark Smith converted a nitrogen-methane gas mixture similar

to Titan's atmosphere into a collection of nitrogen-containing organic molecules by irradiating the gas with high-energy UV rays. The laboratory set-up was designed to mimic how solar radiation affects Titan's atmosphere.

Most of the nitrogen moved directly into solid compounds, rather than gaseous ones, said Smith, a UA professor and head of chemistry and biochemistry. Previous models predicted the nitrogen would move from gaseous compounds to solid ones in a lengthier stepwise process. Titan looks orange in color because a smog of organic molecules envelops the planet. The particles in the smog will eventually settle down to the surface and may be exposed to conditions that could create life, said Imanaka, who is also a principal investigator at the SETI Institute in Mountain View, Calif.

Based on a University of Arizona, Tucson news release. Earth and Titan are the only known planetary-sized bodies that have thick, predominantly nitrogen atmospheres. Credit: NASA



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: Currently we have no books to lend.

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

Elected Board

Terry Wofford, President
terrywofford@hotmail.com

David Olsen, VP / Newsletter Ed.
editor@mvastro.org

Jim Tubbs, Treasurer
jtubbs015@msn.com

Rick Widmer, Secretary / Webmaster
rick@developersdesk.com