



The Monthly Newsletter of the Magic Valley Astronomical Society

June Events

June 2nd—Summer Solar Sessions Begin—1:30-3:30 on the Stargazer's Deck at the Centennial Observatory.

June 9th—Summer Solar Session #2 1:30-3:30-Obs.

June 12th—Monthly Meeting and Public Star Party at 7:00 pm Herrett Center. Our speaker is Dr. Candace Wright Dr. Wright will present "The Big Bang and the Expanding Universe."

June 11th - 12th Craters of the Moon Star Party; see our website for details.

June 16th-Summer Solar Session #3 1:30-3:30-Obs.

June 23rd— Summer Solar Session #4 1:30-3:30-Obs.

June 26th— Partial Lunar Eclipse; Centennial Observatory doors open at 3:30 am, Eclipse begins at 4:00 am **Volunteers Needed!**

June 30th— Summer Solar Session #5 1:30-3:30 Obs.

Image: Partial Lunar Eclipse of Sept. 2006. Wikimedia Commons.



Terry Wofford—The President's Message

Your officer team needs some input from all members concerning the future of MVAS. We recently came across a youtube grant application for any non-profits for \$10,000.

We tried to put together a video to send in but it was on such short notice we just couldn't get it accomplished in time. We also realized that beyond getting a video produced, we, as a club have never truly defined what we would like to work towards. Is there certain equipment like scopes, accessories, cameras, or....? that would benefit the club?

We started to compile a list of suggestions to get the ball rolling, but we need to know what you, as members of this club feel it would be best to work for. Please take into consideration all aspects of the club. Many sources for grants we may apply for will

be looking at what we do, especially concerning education and outreach. Many of them require a request for a single, large item.

We wish to compile a list of wants/needs, and reasons for each one. Think big and small! This is your chance to voice your opinion, so please don't complain down the road if we have acquired something that you don't agree with if you never added you two cents worth before! Also, once we have a priority list, we may need to jump around dependent on the source of the grant or donation requirements. With budget cuts in so many school districts, education and public outreach are going to become more important to the spread of amateur astronomy and everything associated with it. I have sent all members an e-mail with a beginning list and We are seeking input.

Please take a moment and check your e-mail for further details.

Finally, Chris Anderson will be leaving town on the 22 June until 8 July. In his absence he has asked the club to assist with Solar observing and the Eclipse. If you can help please contact Chris Anderson at CSI.

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

June Observing Highlights



Venus will be climbing higher in the evening sky at dusk all month. It will be shining very brightly at magnitude -4.1 by the end of the month. Through a telescope Venus will not change much in appearance. Venus will dominate the western sky after sunset.



Mars will be visible in the south west sky as it grows dark. It will sit in Leo very close to the star Regulus and will be about 1° from Regulus on the 6th. By mid-month Mars will shine at magnitude 1.2 and magnitude 1.3 at the by end of the month. Mars is still too small to see detail.



Jupiter will be in the eastern sky before dawn this month. This month Jupiter will be just high enough above the horizon just before dawn to be a good telescope target. It will be climbing higher in the coming months. Jupiter will be very close to Uranus all month.



Saturn will be high 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. Saturn will peak around magnitude 1.1 this month. This is the best time to notice Saturn's subtle cloud belts and medicine ball outline.



Uranus will be in the eastern dawn sky near Jupiter and both planets may be just far enough above the horizon for detailed telescope surface views just before dawn. They should still be a good binocular target and will be about 1° apart.



Neptune will be above Jupiter in Aquarius in the eastern morning sky. It will rise not long after midnight so sometime after 3AM 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 7.9.



Moon Phases for June

- 4 Last Quarter Moon
- 12 New Moon
- 18 First Quarter Moon
- 26 Full Moon
- 26 Partial Lunar Eclipse beginning at 4 am



The Summer Solstice

June 21 at 11:29 UT, The time when the Sun reaches the point farthest north of the celestial equator marking the start of summer in the Northern Hemisphere and winter in the Southern Hemisphere.

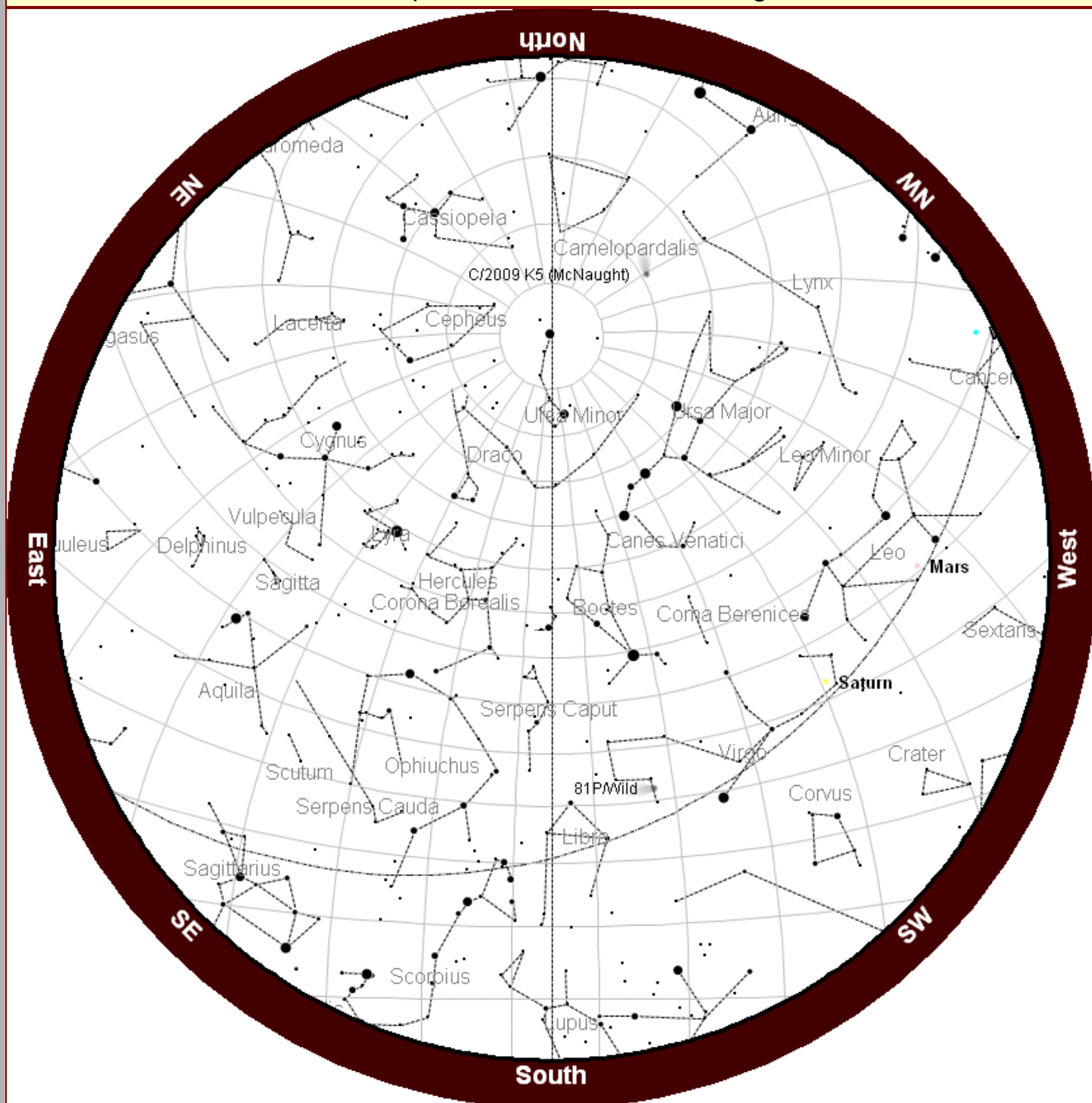
Sky Calendar—June 2010

- 3 17h **Moon at apogee** (farthest from Earth) at UT (distance 404,266 km; angular size 29.4').
- 4 **Last Quarter Moon** at 22:13 UT.
- 6 **Moon near Jupiter** (morning sky) at 4h UT.
- 7 **Mars 0.8° NNE from Regulus** at 6h UT.
- 8 **Jupiter 0.44° SSE from Uranus**
- 10 **Moon near Pleiades** (morning sky) at 23h
- 11 **Moon near Mercury** (morning sky) at 1h UT.
- 12 **New Moon** at 11:15 UT.
- 15 **Moon near Venus** (evening sky) at 4h UT.
- Moon at perigee** (closest to Earth) at 15h UT
- Moon near Beehive cluster (M44)** at 17h UT.
- 17 **Moon near Regulus** (evening sky) at 4h UT.
- Moon near Mars** (evening sky) at 15h UT.
- 18 **Ceres at Opposition**
- 19 **First Quarter Moon** at 4:29 UT.
- 20 **Venus near Beehive cluster** at 20h UT.
- 21 **Moon near Spica** (evening sky) at 1h UT.
- Summer Solstice** at 5:29 MDT
- 24 **Moon near Antares** (evening sky) at 12h UT.
- 25 **Ceres 1° S. of Moon** (Asteroid)
- Pluto at Opposition**
- 26 **Full Moon** at 11:30 UT.

Lyrid Meteor Shower

June's Lyrid meteor shower peaks from June 15 to 16. The moon is just past new stage, which means that it will be a thin crescent that sets in the early evening, providing dark skies for viewing. The Lyrids are not an especially active shower, bringing only about 10 meteors per hour at its

Planisphere for June Late Evening



Did you Know?

On 3 June 1965, Gemini IV launched into space aboard a Titan II rocket.

There were several firsts accomplished by Gemini IV. Astronaut Ed White became the first American to perform an EVA, or space walk. The Mission Control Center outside of

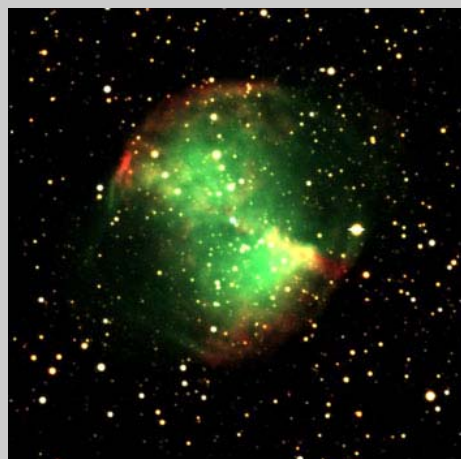
Houston, TX was first used and this was the first multi-day flight designed to show that it was possible for humans to remain in space for extended lengths of time.

For the first time an international audience, from twelve European nations,

could watch the lift off on live television via the Early Bird Satellite.

Sadly, Astronaut Edward White II, was killed during a training accident aboard Apollo 1 on the launch pad at the Kennedy Space center.

Looking Through the Eyepiece—Nebulas



M27, the Dumbbell Nebula in Vulpecula, imaged by Chris Anderson-Centennial Observatory Manager. Image below is a NASA/STScI/AURA/ESA Hubble view of M27 showing the Central Star.

The **Dumbbell Nebula** (also known as **Messier 27**, **M 27**, or **NGC 6853**) is a planetary nebula (PN) in the constellation Vulpecula, at a distance of about 1,360 light years.

The Dumbbell was the first planetary nebula to be discovered; by Charles Messier in 1764. At its brightness of visual magnitude 7.5 and its diameter of about 8 arcminutes, it is easily visible in binoculars, and a popular observing target in amateur telescopes.

The central star, a white dwarf, is estimated to have a solar radius which is 0.055 ± 0.02 , giving it a size larger than any other known white dwarf. Despite their name, planetary nebulae have absolutely nothing to do with planets.

They got their name because early observers thought they resembled the disks of Uranus and Neptune. Instead planetaries are old, highly evolved stars which have thrown off their outer layers.

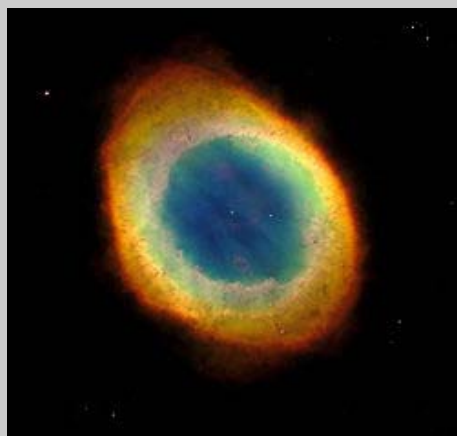
The discarded shells shine because of the ultra-violet radiation emitted by the central star, which is extremely hot (with a surface temperature which may reach up to 700,000 degrees F) and is well on its way to becoming a white dwarf.

Dumbbell Nebula Observation Data

Right Ascension— $19^h 59^m 36.340^s$
 Declination— $+22^\circ 43' 16.09''$
 Distance—1360 l.y.⁺¹⁶⁰₋₂₁₂
 Apparent Magnitude—7.5
 Apparent dimensions— $8'.0 \times 5'.6$



B/W Image of M27 Dumbbell Nebula as an amateur would see this object in a small telescope—with no filters. Image source unknown.



M57—Credit: NASA/STScI/AURA/ESA

Recent research has confirmed that M57 is, most probably, actually a ring (torus) of bright light-emitting material surrounding its central star, and not a spherical (or ellipsoidal) shell, thus coinciding with an early assumption by John Herschel. Viewed from this equatorial plane, it would thus more resemble the Dumbbell Nebula M27 or the Little Dumbbell Nebula M76 than its appearance we know from here: We happen to view it from near one pole.

Ring Nebula Observation Data

Right ascension— $18^h 53^m 35.079^s$
 Declination— $+33^\circ 01' 45.03''$
 Distance— $2.3^{+1.5}_{-0.7}$ kly
 Apparent magnitude — 8.8
 Apparent dimensions— $230'' \times 230''$

M57-The Ring Nebula is one of the most famous objects in the sky and perhaps the most spectacular example of a planetary nebula. It is bright, relatively large and most important of all, easy to find midway between two bright stars in **Lyra**. The Ring is visible in a 3-inch telescope as an elongated hazy spot. A 6-inch scope will reveal the famous smoke ring structure. Many observers describe M57 as having a slight greenish tint. Users of larger telescopes should try to see the faint central star. With a 16-inch or larger scope look for streaks or streamers.

B/W Image of M57 Ring Nebula as an amateur would see this object in a small telescope with no filters. Image source unknown.



When the Sun Sets in Great Basin National Park, the Universe is Revealed

Article by Kelly Carroll-NPS

Greetings from Great Basin National Park in Baker, Nevada. We are excited to be starting a new summer of exploring the wonders of the night sky that a truly dark sky location can provide. Low humidity and low light pollution, combined with high elevation, create a unique window to our universe.

Our unique setting provides one the darkest locations in the continental United States (mag 7.2). Any location that is open, and away from outdoor lighting, will provide fantastic views. One of the best spots in the park is Mather Overlook, at an elevation of 9200 feet, can provide panoramic views with few obstructions.

The first annual Great Basin National Park Astronomy Festival will take place August 6 through August 8, 2010. Experience out of this world family fun, excitement, and learn about day and nighttime astronomy. If you would like to participate in the festival, give a public talk, help with daytime events, or just opening your telescope for a children and adults alike to gaze at the wonders of the night sky. We will provide free camping in the "astronomer's camp." — a place where you will be able to set up equipment, keep it up all weekend, and camp in a safe, closed location. Come enjoy fellowship with Park Rangers, as well as members from other regional astronomy groups. For up to date Festival information, please visit our website at www.nps.gov/grba/planyourvisit/2010-astronomy-festival.htm.

Public programs at the park are conducted throughout the summer. This summer's programs include Memorial Day weekend, Snake Valley Festival (July 24 & 25), Astronomy Festival (Aug. 6-8), and Labor Day weekend. Please feel free to contact "Dark" Rangers Kelly Carroll (kelly_carroll@nps.gov) or Roberta Moore (roberta_moore@nps.gov) or 775-234-7331, if you have any questions about observing at Great Basin

National Park. We look forward to your visit us and would love the company at our telescopes.

The National Park Service and Night Sky Protection

Night sky pollution and night sky protection is a very important and urgent resource protection issue to the National Park Service (NPS). Part of the legislation that created the NPS in 1916, as well as our mission statement is to "...to conserve the scenery, the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations..." The NPS Night Sky Team recognizes that "perhaps for too long we have ignored the other half of the scenery, the half that is night. Visitors to National Parks often are surprised and delighted to view the splendor of the cosmos. For many, it is an inspirational moment."

As with many places throughout our country, here at Great Basin National Park we are concerned about losing our night skies. In an expanding survey of 45 NPS park units, Great Basin National Park ranked in the top five. Night sky quality is principally degraded by light pollution—emissions from outdoor lights that cause direct glare and reduce the contrast of the night sky, but atmospheric clarity here also plays a role. The better the atmospheric clarity, the further the impact of a given light source. Photometric measurements taken within the park show that zenith sky condition is virtually unaltered, attaining the theoretical natural darkness of 21.90 magnitudes per square arc-second and even going beyond that in one dataset to 22.19 magnitudes per square

arc-second. Three artificial light domes are humanly visible from within the park from Las Vegas (311km), Salt Lake City (290km), and the Ely area (62km). The visibility of these light domes is remarkable given their distance and a testament to the transparency of our air, but they are minor impacts to an otherwise natural sky.

The National Park Service recognizes the importance of natural lightscapes and supports research and monitoring to protect this vanishing resource. The National Park Service will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light.

To prevent the loss of dark conditions and of natural night skies, the National Park Service will seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of park units. The National Park Service will not use artificial lighting in areas where the presence of the artificial lighting will disrupt dark-dependent natural biological resource components of a park. We look forward to your visitation at your national parks. As has been said recently, *our national parks are truly one of America's best ideas*. Experience your America.

The Milky Way shines above Wheeler Peak, the highest mountain in GBNP, Nevada. © National Park Service, Used with Permission.



Birr Castle and the Great Telescope

Article by MVAS Member Pam Olsen describes her visit to Birr Castle.

In June of 2004, I had the great privilege to visit the eternally green country of Ireland with my daughter. This being her second visit to the Emerald Isle she was a worthy tour guide. Her first visit being in September 2001, just shortly after the 9/11 attacks. We had visited other Irish landmarks, including Malahide Castle, New Grange and the Book of Kells. We were now visiting sites on western side of Ireland. My daughter, aware of my new-found interest in astronomy said I must visit Birr Castle and the Leviathan.

On a typically rainy morning we set out for Birr Castle and the telescope. We arrived in Parsonstown and parked outside a very high stone wall that surrounds the castle and the grounds. My daughter, having already visited this site elected to wait outside for me, instructing me to take my time as she had a good book and plenty of music to listen to while she waited.

I entered the courtyard of the castle and paid a reasonable fee for entry to the grounds and castle museum (about \$8.00 USD). The first stop was the museum, which had displays of the various technological and scientific advances made by the Earls of Rosse. The castle itself is not open to public viewing as the family still resides there and prefers their privacy. The photo gallery was most impressive as the current display was works by David Malin and his astrophotography. Some of the pictures covered entire walls and fully immersed you in the effect of his amazing work. The next gallery provided photos, drawings and information on the creation, design and construction of the telescope. There were tools, scale models and even the grinding wheel for the huge mirror. I spent many minutes reading and absorbing this information. Then it was outside to view the grounds and commence my quest to see this giant telescope.

Due to the weather, I had the demesne

(or grounds) to myself. There were no paved walk ways, only well-mowed paths in the grassy fields to lead you on your way. Many huge hard-wood trees of alder, oak and hemlock dotted fields. Soon I came upon a small green sign perched near the side of the path. This was site of several meridian stones placed by 3rd Earl of Rosse in the early 1840s to ensure that the Great Telescope was directly on a north-south axis. From there you continue to a grove of trees planted in a spiral to mimic the Whirlpool Galaxy. After this you approach the Great Telescope Leviathan. But first allow me to digress to the history of the family and construction of the telescope.

The 3rd Earl of Rosse, William Parsons was born on June 17, 1800. He was home schooled by parents, tutors and others as his parents thought the Irish school system too primitive at the time. He went to Oxford University in England, graduating with honors in Mathematics. William joined the Royal Astronomy Society in 1924, representing County Offlay, Ireland for many years. After marriage and inheriting Birr Castle from his parents, William began to

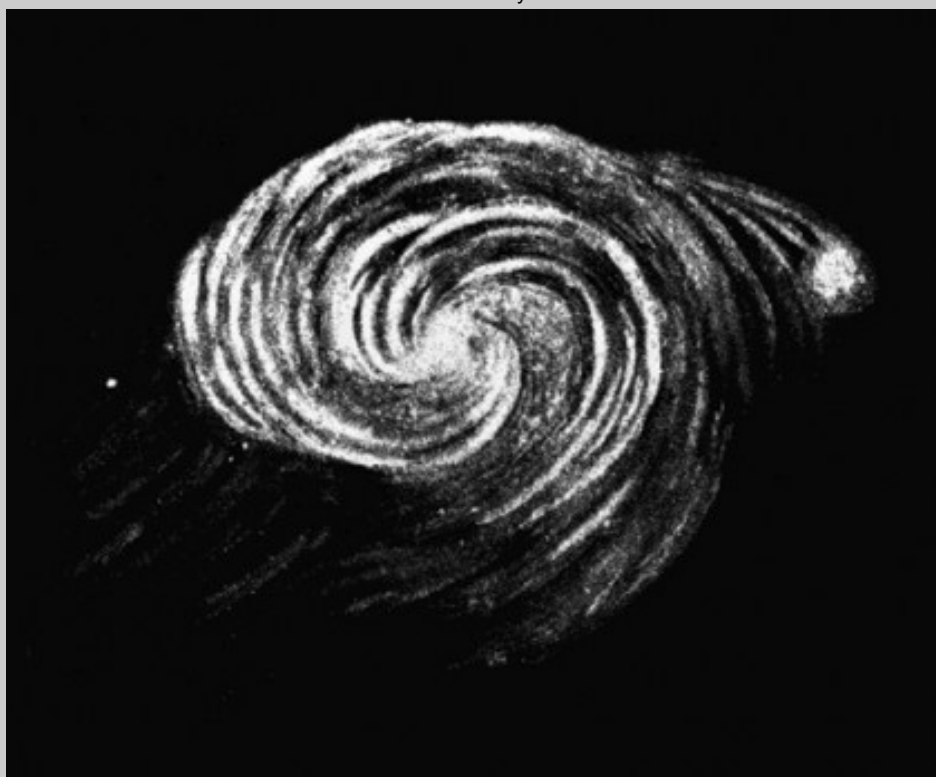
engineer and design telescopes. He published a research paper in the Edinburgh Journal of Science in 1831 detailing his experiments regarding the engineering, grinding and polishing of telescope mirrors.

In 1839, Lord Rosse, designed and built a 36-inch telescope, putting into practice the fruits of his experiments. He studied many star clusters and the moon in detail that was much greater than previously imaged. As with most astronomers, Lord Rosse wanted something bigger to see farther and better. He commenced to build the Great Telescope, taking over 3 years and the labors of many persons.

The telescope was completed and on February 15, 1845 the normally cloudy skies of Ireland cleared and Lord Rosse was able to image the double star Castor for a few minutes. This great telescope was built on the grounds of Birr castle and the mirror weighed over 3 tons!

Continued on the next page

Lord Rosse's 1845 sketch of the Whirlpool galaxy. From the Archives at Birr castle.



Birr Castle and the Great Telescope



a call to restore the Great Telescope and the work was completed (all but the mirror) in 1997. Due to engineering and budget constraints the new mirror was not installed until 1999. What of the future for the Leviathan and Birr Castle? It is a wonderful historical site with beautiful gardens and of course the Great Telescope, but the current Lord of Rosse is providing the land for a radio telescope to be built there, with a second site proposed in Northern Ireland near Armagh. The cost is estimated to be nearly 10 million Euro (\$12,343,000 USD) for the 32 meter radio telescope. This telescope will be used as part of the MERLIN and European VLBI Network and as a stand alone research complex.

The potato famine prevented much research until after 1848, when Lord Rosse began serious work on observing nebulae and star clusters.

He was able to discern that many nebulae were in fact spiral in nature, with radiating arms whirling around a central core. At this time his understanding was not advanced enough to distinguish between nebulae and galaxies. In April of 1845, Lord Rosse was able to discern the spiral nature of M51 (Whirlpool). He also studied M1 in great detail, naming it the Crab Nebula.

Many scientists and other dignitaries came to visit the Great Telescope and Lord Rosse. He was quite the celebrity in his day in Ireland and the scientific community. So impressed was one visitor, Jules Verne, that he mentions the telescope cites the telescope in his novel "From Earth to the Moon."

"The distance which had then separated the projectile from the satellite was estimated at about two hundred leagues. Under these conditions, as regards the visibility of the details of the disc, the travelers were farther from the moon than are the inhabitants of earth with their powerful telescopes. Indeed, we know that the instrument mounted by Lord Rosse at Parsons town, which magnifies 6,500 times, brings the moon to within an apparent

Image of Birr Castle and the Great Telescope by Albert White, taken at Whirlpool Star Party, 26 March 2007 released to public domain.

distance of sixteen leagues."

After the death of 3rd Earl of Rosse in 1867, his son Lawrence, the 4th Earl continued to use the telescope in a somewhat limited manner. He preferred a 36-inch telescope for his observing and research. After the death of Lawrence, the Great Telescope was dismantled. After a book and television program on the telescope and the Lords of Rosse in the 1970s there was

As I visited the telescope many of these things were not aware to me, but as I did further research for this article and my increased love of astronomy grew, I realized what a great gift the Earls of Rosse have given the science of astronomy and to the world.

First Light:	15 February 1845
Weather:	60 nights per year
Dome:	None

Image: Reconstructed Leviathan of Parsonstown, Wikimedia Commons





NASA Science News-Europa's Churn Leads to Oxygen Burn

Science article by Charles Q. Choi for Astrobiology Magazine.

There may be enough oxygen in the waters of Jupiter's moon Europa to support millions of tons worth of fish, according to a new study. While no one is suggesting there are fish on Europa, this finding suggests the Jovian satellite could be capable of supporting the kinds of life familiar to us here on Earth.

Europa, which is roughly the size of Earth's moon, is enveloped by a global ocean about 100 miles deep (160 km), with an icy crust that may be only a few miles thick. From what we know of Earth, where there is water, there is a chance at life, so for many years scientists have speculated that this Jovian moon could support extraterrestrials.

As we learned more about Jupiter's effect on its moons, the possibility for life on Europa grew even more likely. Studies showed the moon could have enough oxygen to support the kind of life we are most familiar with on Earth. The ice on the surface, like all water, is made from hydrogen and oxygen, and the constant stream of radiation pouring in from Jupiter reacts with this ice to form free oxygen and other oxidants such as hydrogen peroxide. The reactivity of oxygen is key to generating the energy that helped multi-cellular life flourish on our planet.



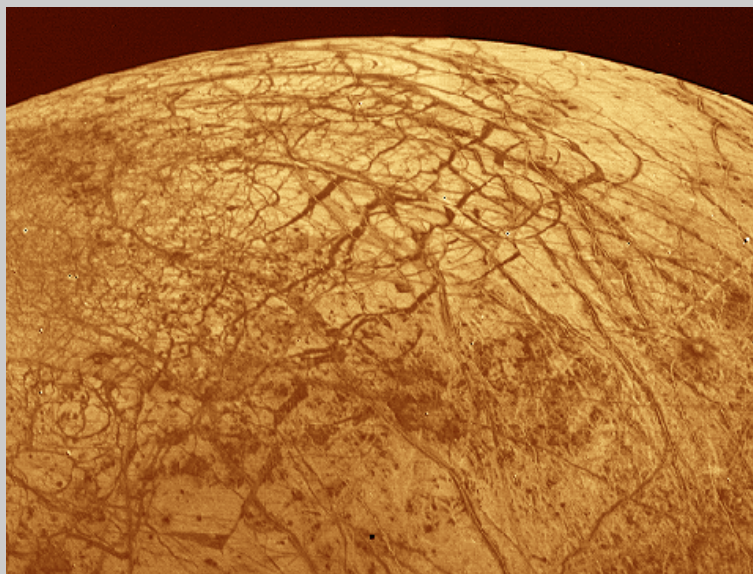
Voyager 1 took photos of Jupiter and two of its satellites (Io, left, and Europa) on Feb. 13, 1979. This photo was assembled from three black and white negatives by the Image Processing Lab at the Jet Propulsion Laboratory. Credit: NASA/JPL

Still, researchers had thought there was no effective method for delivering any of this oxygen-rich matter into Europa's ocean. Scientists had assumed the primary way for surface materials to migrate downward was from the impacts it would suffer from cosmic debris, which regularly bombards everything in our solar system. However, past calculations suggested that even after a few billion years, such "impact gardening" would never lead to an oxygenated layer more than some 33 feet (10 meters) deep into the ice shell, nowhere far enough down to reach the underlying ocean.

However, the new study suggests this oxygen-rich layer could be far thicker than before thought, potentially encompassing the entire crust. The key is looking at other ways to stir Europa's crust, explained researcher Richard Greenberg, a planetary scientist at the University of Arizona's Lunar and Planetary Laboratory at Tucson.

The gravitational pull Europa experiences from Jupiter leads to tidal forces roughly 1,000 times stronger than what Earth feels from our moon, flexing and heating Europa and making it very active geologically. This could explain why its surface appears no older than 50 million years old — its surface underwent complete turnover in that time.

A major resurfacing process on Europa seems to be the formation of double ridges, which cover at least half of its surface. Tidal forces may be causing fresh ice from below — probably newly frozen ocean water — to push



The surface of Europa shows signs of cracks that could allow material to pass to and fro between the ocean below and the irradiated surface. Credit: Calvin J. Hamilton, Voyager Project, JPL, NASA

upward and over the surface, where it would slowly get oxygenated. As ridges pile on top of ridges, older material gets buried, shoving this oxygen-rich matter downward. After one or two billion years, this process alone could spread oxidants throughout the entire crust, thus reaching the ocean, Greenberg calculated.

"I was surprised at how much oxygen could get down there," Greenberg said.

Other mechanisms could help stir Europa's crust also. Parts of the surface could partially melt from below, leading rafts of ice to break loose and tumble around before they froze back in place. Roughly 40 percent of Europa's crust appears to be covered with the ensuing "chaotic terrain." Also, as matter comes up from below and widens cracks, the nearby surface crumples, burying some material. These extra processes could help push some oxidants downward, but it would still take at least two billion years or so before radiation loaded the entire crust with oxygen.

Continued on the next page



NASA Science News-Europa's Churn Leads to Oxygen Burn



Double ridges cover at least half the surface of Europa's ice shell. Image credit: NASA/JPL

As ice on the base of this oxygenated crust melts, even with the most conservative assumptions, after only a half-million years oxidant levels in the ocean would reach the minimum oxygen concentration seen in Earth's oceans, which on Earth is enough to support small crustaceans, Greenberg found. In only 12 million years, oxidant concentrations would reach the same saturation levels of Earth's oceans, enough to support our largest sea life. Given the cold temperatures and high pressures likely seen in Europa's ocean, it could actually take in more oxygen than Earth's oceans could before its water reached its saturation point.

One concern about all this oxygen was that it might actually do more harm than good. The extraordinary reactivity of oxygen could in principle disrupt the chemical processes that are thought to lead to the origin of life and that may have been an aspect of early life. On Earth, life had more than a billion years to evolve, before oxygen became plentiful in the atmosphere, and that delay gave organisms plenty of time to develop genetic mechanisms and physical structures that allowed

them to use oxygen, instead of being destroyed by it.

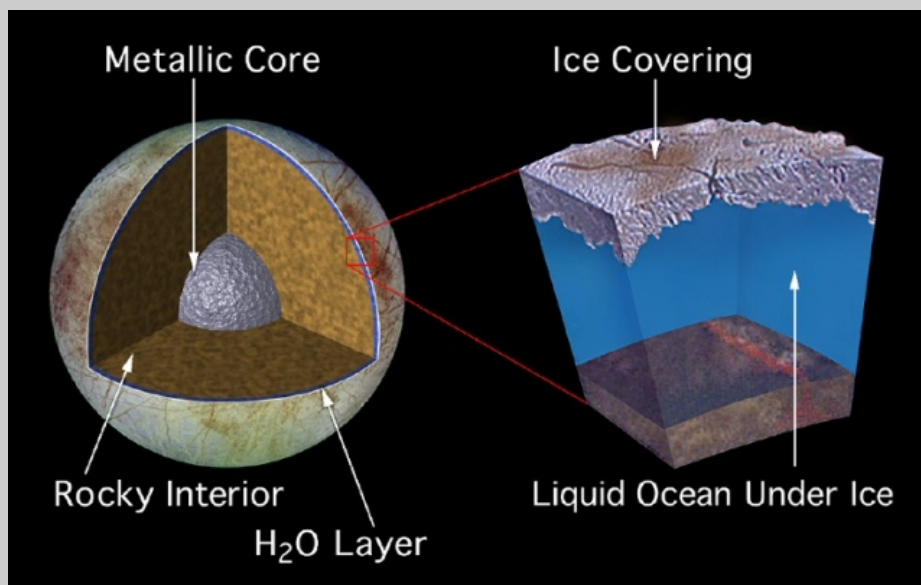
The delay of 1 to 2 billion years before oxygen in Europa's crust made its way into its ocean is roughly the same amount of time it took life on Earth to develop before oxygen became a problem, so life might have enough of a respite to develop on the Jovian moon. Assuming life on Europa respired at rates similar to fish

on Earth, the continuous rate of oxygen delivery there could sustain roughly 3 million metric tons of life, Greenberg said.

One might not have to wait for a probe to land on Europa to detect any oxygen there. "Spectroscopy done by telescopes on Earth or in orbit can tell what substances are mixed into the ice," Greenberg said.

Notes on this article: Astrobiology is the study of the origin, evolution, distribution, and future of life in the universe. This multidisciplinary field encompasses the search for habitable environments in our Solar System and habitable planets outside our Solar System, the search for evidence of prebiotic chemistry and life on Mars and other bodies in our Solar System, laboratory and field research into the origins and early evolution of life on Earth, and studies of the potential for life to adapt to challenges on Earth and in space.

NASA's Astrobiology Program addresses three fundamental questions: How does life begin and evolve? Is there life beyond Earth and, if so, how can we detect it? What is the future of life on Earth and in the universe? In striving to answer these questions and improve understanding of biological, planetary, and cosmic phenomena and relationships among them, experts in astronomy and astrophysics, Earth and planetary sciences, microbiology and evolutionary biology, cosmochemistry, and other relevant disciplines are participating in astrobiology research and helping to advance the enterprise of space exploration.



A model of Europa's interior, including a global ocean. If a 100 kilometer-deep ocean existed below Europa's ice shell, it would be 10 times deeper than any ocean on Earth and would contain twice as much water as Earth's oceans and rivers combined. Image Credit: NASA/JPL

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

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. Images used are normally in the public domain unless otherwise noted and credit for use is given. Snake River Skies. © 2010 by the Magic Valley Astronomical Society.

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.

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.

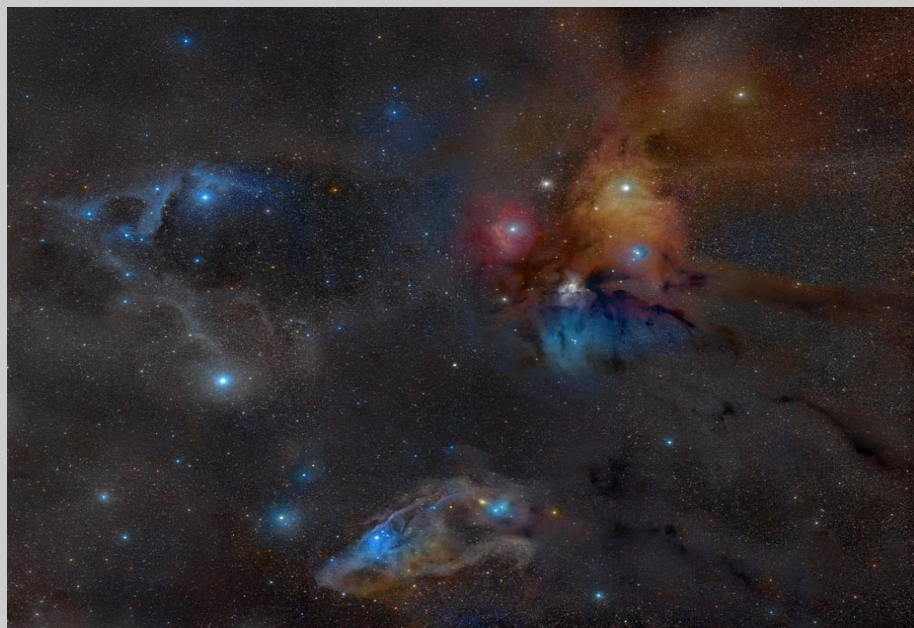
Annual Membership dues will be \$20.00 for individuals, families, \$10.00 for students.



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.

Rho Ophiuchi Wide Field



The clouds surrounding the star system Rho Ophiucus compose one of the closest star forming regions. Rho Ophiucus itself is a binary star system visible in the light-colored region on the image right. The star system, located only 400 light years away, is distinguished by its colorful surroundings, which include a red emission nebula and numerous light and dark brown dust lanes. Near the upper right of the Rho Ophiucus molecular cloud system is the yellow star Antares, while a distant but coincidentally-superposed globular cluster of stars, M4, is visible between Antares and the red emission nebula. Near the image bottom lies IC 4592, the Blue Horsehead nebula. The blue glow that surrounds the Blue

Horsehead's eye -- and other stars around the image -- is a reflection nebula composed of fine dust. On the above image left is a geometrically angled reflection nebula cataloged as Sharpless 1. Here, the bright star near the dust vortex creates the light of surrounding reflection nebula. Although most of these features are visible through a small telescope pointed toward the constellations of Ophiucus, Scorpius, and Sagittarius, the only way to see the intricate details of the dust swirls, as featured above, is to use a long exposure camera.

Image: © NASA/APOD 2010.05.24 by Rogelio Bernal Andreo, All Rights Reserved

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