

Observer

EVANSVILLE ASTRONOMICAL SOCIETY, INC.

March
2012



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Leo, the Lion

NGC 3242, Jupiter's Ghost, is a planetary nebula located in the constellation Hydra just south of the Mu star and about 30° slightly southeast of the galaxy pair M95 - M96 in the constellation Leo (see page 8). Small telescopes show this 9th magnitude object as a faint bluish green disk. Its central star is clearly visible.

When stars with a mass similar to our sun approach the end of their lives by exhausting supplies of

hydrogen and helium fuel in their cores, they swell up into cool red-giant stars. As the core shrinks from gravity, layers of gas in their outer atmosphere are expelled. This exposes the core of the dying star, a dense hot ball of carbon and oxygen called a white dwarf. The white dwarf is so hot that it shines very brightly in the ultraviolet. The ultraviolet light from the white dwarf, in turn, ionizes the gaseous material expelled by the star causing it to glow. A planetary nebula is really the death of a low-mass star.

Although low-mass stars like our sun live for billions of years, planetary nebulae only last for about ten thousand years. As the central white dwarf quickly cools and the ultraviolet light dwindles, the surrounding gas also cools and fades.

This ultraviolet image is of the extended region around the nebula. It was imaged by the GALEX, NASA's Galaxy Evolution Explorer. The small, circular white and blue area at the center of the image is the well-known portion of the planetary nebula. The precise origin and composition of the extended wispy white features is not known for certain. It is most likely material ejected during the star's red-giant phase before the white dwarf was exposed. However, it may be that it is simply interstellar gas that is coincidentally located close enough to the white dwarf to be energized by it, and induced to glow with ultraviolet light. NGC 3242 is located 1400 - 2500 light years away. It was discovered by William Herschel in 1785.

credit: http://www.nasa.gov/mission_pages/galex/galex-20090403.html

The EAS newsletter, **Observer**, is published monthly. Anyone wishing to contribute articles or photos may mail them to the club's PO box: EAS, PO box 3474, Evansville, IN 47733, or e-mail them to the editor at: gneireiter@wowway.com

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The **Evansville Astronomical Society** (EAS) is a non-profit organization fully incorporated in the state of Indiana. It has, as its primary goal, the advancement of amateur astronomy. Founded in 1952, the society seeks to:

- 1... maintain adequate facilities for its members and for the public in order to extensively study the skies, and
- 2... promote an educational program for those who wish to learn more about the science of Astronomy.

Meetings are held the third Friday of each month, except June, when the annual EAS picnic is held. The society also sponsors monthly Open House events during the warmer seasons that afford the public an opportunity to tour the observatory.

EAS 2012 Officers and Contacts

President - Scott Conner 812.449.2721
ssconner24@gmail.com

Vice President - Tony Bryan

Secretary - Charleen Kaelin 812.303.1711

Treasurer - Scott Bishop

Counselors - Michael Borman, Kent Brenton, and Ed Erickson

Webmaster - Michael Borman

Program Director - open

Newsletter Editor - George Neireiter
812.629.7822 gneireiter@wowway.com

For more information about EAS or directions to the Observatory, visit the club's web page:
<http://www.evansvilleastro.org/>



Local Events and Information

16" Dob is ready... Many thanks to Tony Bryan for volunteering his time in refurbishing the club's 16" Dobsonian telescope. This effort included replacing the secondary holder, and installing large locking casters plus a new Telrad. The telescope has been tested and found to be working well. At some point in the future, a new spider will be installed to help with dampening vibrations. Thank you Tony ! For readers interested in getting more details of this kind of telescope, check out this [web page](#).

Atacama starry nights... Last September, Jason Harris, a graduate student at Harvard and an acquaintance of Birk Fisher, gave a presentation to the club on planet building and the use of radio telescopes for such studies. One of the world's great viewing locations is the Atacama Desert in Chile and home to many radio telescopes, including ALMA, the [Atacama Large Millimeter Array](#). Mike Borman passed along this link to an [impressive video](#) at Atacama composed of over 7500 still shots. It is 5:33 in length and definitely worth watching.

Changes in the newsletter format... Each month, about 22 copies of the newsletter are printed and distributed. In order to reduce the costs of paper, ink, mailing envelopes, and postage, it was proposed by the newsletter editor, at the Board meeting in February, to reduce the number of pages per issue. It was noted that much of the "static" content -- such as the last few pages containing the officer bios, information about the EAS, and maps to the observatory -- are also available on the club's website. After short discussion, it was decided to consolidate or remove much of this content and provide a link to the website.

Starting with this issue, the maps to the observatory are being deleted along with the officer bios and information on dues. All of this information is available on the [website](#), either by selecting "About the EAS" and then choosing "Introduction", or

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< continued from page 2 > ... by selecting "Our Membership" to see the listing of officer names.

The club's mission statement, information about monthly club meetings and public events, plus a listing of officers and key contacts will be consolidated into

one block on page 2 of the newsletter. Additionally, at the bottom of each page, following the cover page, a link to the website will be found.

Overall, these changes will save about two and a half pages per issue. Let me know what you think. ... [George Neireiter](#).

Star cycles... If you don't have a copy of the Year in Space desktop calendar or receive the [weekly newsletter](#) from Steve Cariddi, you missed the highlight on the May 30, 2011 supernova that occurred in the Whirlpool galaxy (M51). This event and galaxy was the picture subject for the week of March 5. Featured was a [gorgeous astro-photograph](#) taken by R. Jay Gabany using a remotely controlled 0.5 meter telescope located at the Blackbird II Observatory (elevation 4610 feet) in the California Sierra-Nevada mountains. Being several thousand feet above surrounding terrain, the site is blessed with laminar

winds that result in spectacular viewing conditions.

The supernova event is notable for two reasons: (1) it was the 2nd supernova in six years in M51, and (2) it coincides with my 60th birthday -- how cool is that ! While exploring Gabany's website, using a link provided by Cariddi, I found a 2-page article he wrote about the [Cosmic Cycle](#). It is well written, informative, and worth taking 10 minutes or so to contemplate our origin.

By the way, check with treasurer Scott Bishop. He might have copies of the weekly Year in Space calendar remaining.



M51, the Whirlpool galaxy. This image was taken in January 2005 with the advanced camera for surveys on board the Hubble Space Telescope. It was posted on NASA's [APOD](#) on April 28, 2005. Also catalogued as NGC 5194, this spiral galaxy and its companion (NGC 5195) are about 31 million light years distant and located within the constellation Canes Venatici. With the use of radio telescopes, it was discovered that the companion passed through the main disk of M51 about 500 - 600 million years ago and then made a 2nd

crossing about 50 - 100 million years ago, thus shaping the current spiral structure of [M51](#).

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April 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6 Full	7 Girl Scout Night
8	9	10	11	12	13 Last	14 Roof Repair Day
15	16	17	18	19	20 Regular Mtg.	21 New
22	23	24	25	26	27	28 Astronomy Day
29 First	30					

generated by [HTML Calendar Maker 1.1](#). Copyright (C) 2009 John Dalbey.

March Events (reminder)....

Regular Meeting	Mar. 16 (Friday) 7:30 pm	Wahnsiedler Observatory
Public Star Watch	Mar. 24 (Saturday) 7:30 pm	Wahnsiedler Observatory
Girl Scout Night	Mar. 31 (Saturday)	Evansville Museum

April Events...

Girl Scout Night	Apr. 7 (Saturday)	Museum (seniors)
Roof Repair Day	Apr. 14 (Saturday) 9 am < rain date is Apr 21 >	Wahnsiedler Observatory
Regular Meeting	Apr. 20 (Friday) 7:30 pm	Wahnsiedler Observatory
Astronomy Day	Apr. 28 (Saturday) 11 am	Evansville Museum
<i>Mid South Star Gaze</i>	<i>Apr. 18 - 21</i>	
<i>Texas Star Party</i>	<i>Apr. 15 - 22</i>	

Moon phase times (CST)

full	2:19 p	Apr 6	new	2:19 a	Apr 21
third quarter	5:50 a	Apr 13	first quarter	4:58 a	Apr 29
courtesy of Time and Date					

The Hidden Power of Sea Salt, Revealed

By Dauna Coulter

Last year, when NASA launched the Aquarius/SAC-D satellite carrying the first sensor for measuring sea salt from space, scientists expected the measurements to have unparalleled sensitivity. Yet the fine details it's revealing about ocean saltiness are surprising even the Aquarius team.

"We have just four months of data, but we're already seeing very rich detail in surface salinity patterns," says principal investigator Gary Lagerloef of Earth & Space Research in Seattle. "We're finding that Aquarius can monitor even small scale changes such as specific river outflow and its influence on the ocean."

Using one of the most sensitive microwave radiometers ever built, Aquarius can sense as little as 0.2 parts salt to 1,000 parts water. That's about like a dash of salt in a gallon jug of water.

"You wouldn't even taste it," says Lagerloef. "Yet Aquarius can detect that amount from 408 miles above the Earth. And it's working even better than expected."

Salinity is critical because it changes the density of surface seawater, and density controls the ocean currents that move heat around our planet. A good example is the Gulf Stream, which carries heat to higher latitudes and moderates the climate.



"When variations in density divert ocean currents, weather patterns like temperature and rainfall are affected. In turn, precipitation and evaporation, and fresh water from river outflow and melt ice determine salinity. It's an intricately connected cycle."

The atmosphere is the ocean's partner. The freshwater exchange between the atmosphere and the ocean dominates the global water cycle. Seventy-eight percent of global rainfall occurs over the ocean, and 85 percent of global evaporation is from the ocean. An accurate picture of the ocean's salinity will help scientists better understand the profound ocean/atmosphere coupling that determines climate variability.

"Ocean salinity has been changing," says Lagerloef. "Decades of data from ships and buoys tell us so. Some ocean regions are seeing an increase in salinity, which means more fresh water is being lost through evaporation. Other areas are getting more rainfall and therefore lower salinity. We don't know why. We just know something fundamental is going on in the water cycle."

With Aquarius's comprehensive look at global salinity, scientists will have more clues to put it all together. Aquarius has collected as many sea surface salinity measurements in the first few months as the entire 125-year historical record from ships and buoys.

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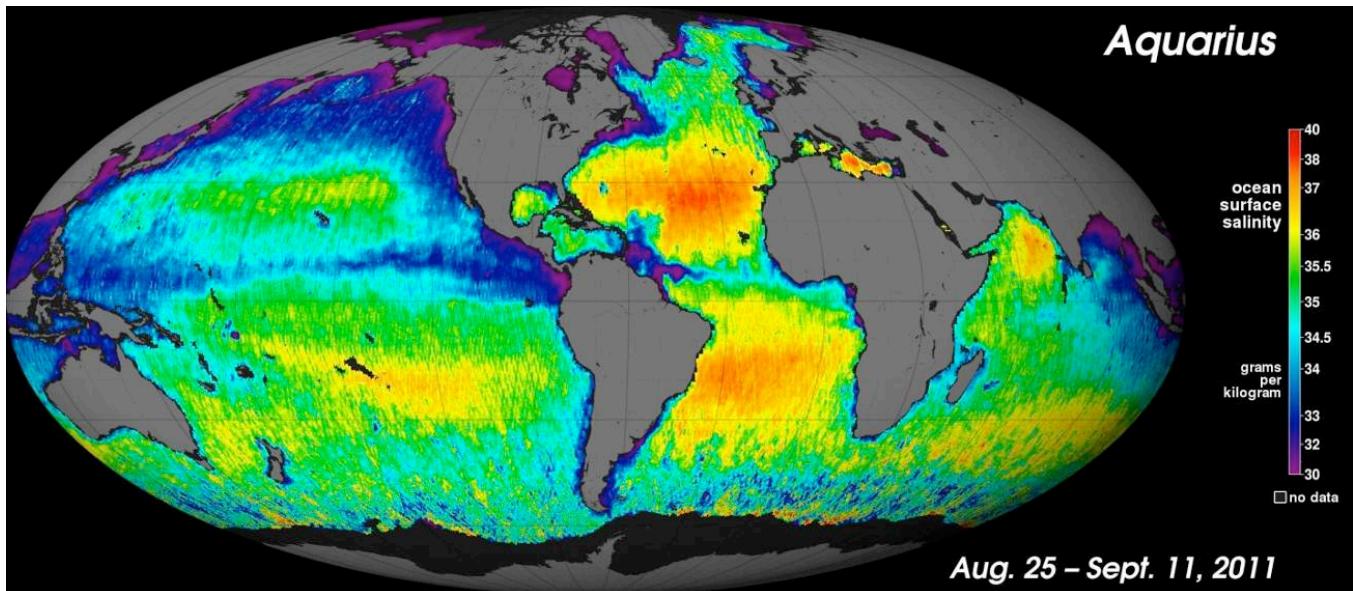
"By this time next year, we'll have met two of our goals: a new global map of annual average salinity and a better understanding of the seasonal cycles that determine climate."

Stay tuned for the salty results. Read more about the Aquarius mission at aquarius.nasa.gov.

Other NASA oceanography missions are Jason-1 (studying ocean surface topography), Jason-2 (follow-on to Jason-1), Jason-3 (follow-on to Jason-2, planned for launch in 2014), and Seawinds on the

QuikSCAT satellite (measures wind speeds over the entire ocean). The GRACE mission (Gravity Recovery and Climate Experiment), among its other gravitational field studies, monitors fresh water supplies underground. All these missions, including Aquarius, are sponsors of a fun and educational ocean game for kids called "Go with the Flow" at spaceplace.nasa.gov/ocean-currents.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Aquarius produced this map of global ocean salinity. It is a composite of the first two and a half weeks of data. Yellow and red represent areas of higher salinity, with blues and purples indicating areas of lower salinity.

**March Program
“Catching the Northern Lights”
By Scott Conner**



Aurora Borealis over Canada

Image credit: NASA.gov

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EAS Meeting Minutes -- February 17, 2012

The meeting was **CALLED TO ORDER** by President Scott Conner at 7:36 PM with 16 members and visitors in attendance. It was moved and seconded to approve the MINUTES of the previous month as will seen on the EAS Internet page.

Vice-President Tony Bryan announced the following **UPCOMING EVENTS:**

Regular Meeting	Friday, March 16	7:30 pm
PSW	Saturday, March 24	7:30 pm
Girl Scout Space Night	Saturday, March 31	@ Museum
Girl Scout Space Night	Saturday, April 7	@ Museum
Dome Repair Day 1	Saturday, April 14	9:30 am (rain date: Sat., Apr. 21)
Regular Meeting	Friday, April 20	7:30 pm
Astronomy Day	Saturday, April 28	@Museum 11 am-9pm
Dome Repair Day 2	Saturday, May 12	9:30 am

There were 3 visitors.

Treasurer Scott Bishop announced that they are still shopping around for a better insurance rate since that is our major annual expense. He also reported the balances in savings and checking accounts. Lastly, he said there are a few WEEKLY CALENDARS and some MONTHLY CALENDARS available.

SPECIAL PROJECTS... The President stated there will be two DOME REPAIR dates. The first will be April 14 to tar the roof and 4 – 5 volunteers are needed. The second date will be May 12 at which time the scraping, painting and repairs to the inside of the dome will be done. For this part, 8 – 10 volunteers are needed. Also, DONATIONS are needed for the dome's new carpet.

OLD BUSINESS... The Annual BOARD MEETING was held at Mike Borman's house in February (5th) at which time the schedule for this year was set and is available on the website. Also, there was a discussion regarding the cost of the insurance and changes to the newsletter format.

NEW BUSINESS... Scott mentioned several other upcoming events like ASTRONOMY DAY on April 28; TRANSIT OF VENUS on June 5 @ 5:00 at the Museum. This will be the last time to view this event in our lifetime. Our annual PICNIC on June 23; PATOKA LAKE on July 14, and CLEAN UP DAY on October 13 @ 1:30 PM.

TONIGHT'S PROGRAM... Tony Bryan explained his journey fixing the 16" telescope which is larger than the one in the dome. Also, we viewed objects with that scope.

The meeting adjourned at 8:01 PM.

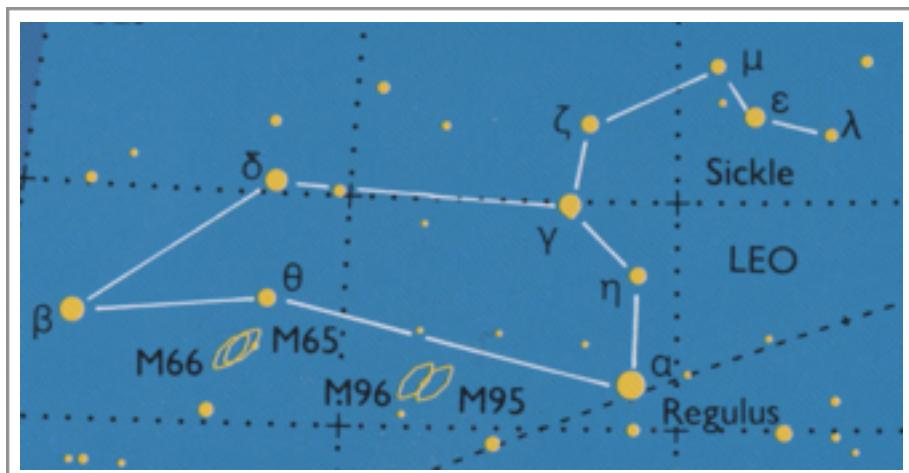
Respectfully submitted... Charleen Kaelin, Executive Board Secretary

Constellation Feature: Leo

Leo, the Lion, is one of the zodiac constellations and possesses a shape that looks passably like the animal it represents. The region called the Sickle forms the lion's head and mane. It appears as a backward question mark. A triangle of stars formed by Beta, Delta, and Theta give rise to the lion's hind quarters and tail.

In the Sickle region, Gamma, Mu, and Lambda are all orange in color. Gamma is actually a double star which can be resolved into a pair of golden yellow stars with a telescope. Brighter than the Sickle stars is **Regulus**, the blue-white Alpha star, at 1st magnitude and about 79 light years away. It, too, is a double star with the fainter component being of 8th magnitude.

At the tail end is the white Beta star, **Denebola**, which is Arabic for "tail of the lion". It is 36 light years distant and appears 2nd magnitude. With 2x the mass of our Sun, it shines 10x brighter as it fuses its hydrogen at a



faster rate, resulting in surface temperatures thousands of degrees hotter than our Sun's.

Just south of a line from Denebola to Regulus is a region rich in galaxies. South of Theta lie **M65** and **M66** (NGC 3623 and NGC 3627). Both are about 9th magnitude and visible in binoculars with good viewing conditions. They are spiral type galaxies, though large telescopes are needed to bring out their spiral form. Together with NGC 3628, another spiral galaxy, they form the Leo Triplet.

About halfway between M65/ M66 and Regulus lie another pair of spiral galaxies: **M95** and **M96**. All four galaxies are about 35 million light years away from Earth.

At left, **M66**, the largest galaxy of the Leo Triplet was imaged by the Hubble Space Telescope and released on April 8, 2010. It has an unusual asymmetry in its spiral arms and an apparent displacement of its core. This is most likely caused by the gravitational pull of its two neighboring galaxies. It is about 100,000 light years across, similar in size to the Milky Way.

The image is a composite using filters for wavelengths of near IR (814 nm), green (555 nm), and H-alpha (for the glowing hydrogen gas). They have been combined to represent the real colors of the galaxy.

Credit: <http://www.spacetelescope.org/images/heic1006a/>



For more on the night sky objects of March, play the Movie of Tonight's Sky at [Amazing Space](#)

Credits: Text and constellation diagram from The Star Guide, by Robin Kerrod, 1993 MacMillan, pages 48-49. The StarDate website <http://stardate.org/nightsky/constellations/leo>