

Reflector

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Vol. 66, No. 1

December 2013



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New Series: History of Astronomical League's Newsletter
Recovering Comet ISON

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Our cover: The detailed image of NGC 7000 (North America Nebula in Cygnus) was taken by Bill Worley, of the Starlight Astronomy Club in Altoona, Pennsylvania, and a 10-year member of the AL. He used a TPO 8-inch f/4 carbon fiber Imaging Newtonian and SBIG ST-8300M camera, mounted on a Celestron CGE Pro along with a Stellarvue SV66ED guide scope, Orion SSAG guide camera and Baader Planetary RCC focal reducer. Software included DeepSkyStacker, Adobe Photoshop 6, Software Bisque CCDSoft5, Maxim DL, Astroart and Noel Carboni actions. Filters were Baader Planetary 36 mm H-alpha, S II, and O III (bandpasses 7, 8, and 8.5 nm, respectively). Taken from The Cottage Observatory in Altoona on September 4 and 5, 2013. Field radius was 0.754 degrees. The observatory website is webpages.charter.net/paastroman.

To our contributors: The copy and photo deadline for the March 2014 issue is January 15. Please send your stories and photos to our magazine editor, **Ron Kramer** (editor@astroleague.org), by then.

The Astronomical League invites your comments regarding the magazine. How can we improve it and make it a more valuable resource for you, our members? Please respond to the editor's email address above.

Reflector

The Astronomical League Magazine

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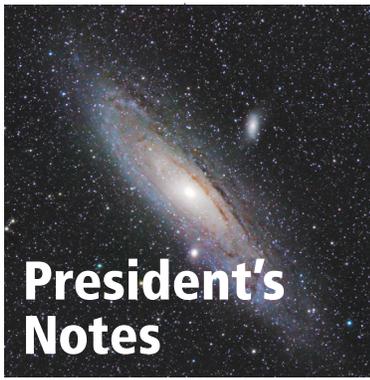
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Peltier Award Presented at Fall AAVSO Meeting in October

The 2013 Astronomical League's Peltier Award was presented to John E. Bortle at the fall meeting held at the Hilton in Woburn, Massachusetts. John Bortle's half-century of extraordinary work in the field of astronomy is noteworthy. Thanks to Dr. Roger Kolman, chair of the Peltier committee, and the rest of the committee for selecting Bortle for this outstanding League award. It was my honor to present this special award. Several former winners of the award also attended AAVSO. Thanks to Arne Henden, director, and the entire AAVSO staff, for their wonderful hospitality, including the tour of AAVSO headquarters.



President's Notes

majority of the plates are direct images of the sky, with each plate covering approximately 5° to 30° fields on the sky and sensitive down to blue (B) magnitudes approximately 12 to 17. They were taken using telescopes with apertures from approximately 1.5 to 24 inches at observato-

ries in both the southern and northern hemispheres. Full-sky coverage is available for approximately 100 years.

Some plates contain multiple exposures, which can be analyzed separately for shorter timescale variability studies. Approximately 10 percent of the plates have been scanned and analyzed, and with full-production scanning and processing (approximately 400 plates/day), the

entire collection can be scanned and online by 2017. With such a huge resource of data, the DASCH project is creating an online database where astronomers and the

public will be able to examine images of or generate century-long light curves for any object in the sky (magnitude-limited). With its unique long timescale and full-sky coverage, this database is a major new resource for the

emerging and very active field of time-domain astronomy.

If you can volunteer, please contact me at president@astroleague.org. This can be done at home from your computer; instructions are provided for the Excel spreadsheet project. The process requires perusal of the JPEG images from the original telescope logbooks used for each telescope to transcribe the appropriate and necessary information that will allow the scanning of each plate. This usually consists of transcribing the right ascension, declination, start and stop times, hour angle, date, and occasional comments associated with each plate. Some volunteers have found this quite rewarding as they have "rediscovered" historical discoveries.

Michael Bakich Keynote Speaker at 2013 Heart of America Star Party

The Heart of America Star Party was honored to have Michael Bakich, senior editor of *Astronomy* magazine, as its keynote speaker. He gave updates on the Colossus telescope project and Comet ISON. Other speakers included Dr. Mark Brodwin from the University of Missouri-Kansas City; a science member of the Euclid space telescope

mission team; Chuck Rühle of the Telescopes for Tanzania project; and Tom Martinez and David Lane from the Astronomical Society of Kansas City.

Continued on page 10



Left to right: 2013 Peltier Award winner John E. Bortle; past Peltier Award winner (PPW) Gerald Samolyk; past League president Barry Beaman; PPW Richard Berry; League president Carroll Iorg; PPW Mike Simonsen; PPW Arne Henden; PPW and Sky & Telescope senior contributing editor Roger W. Sinnott; PPW Elizabeth Waagen; Dr. Roger Kolman, chair, Peltier committee

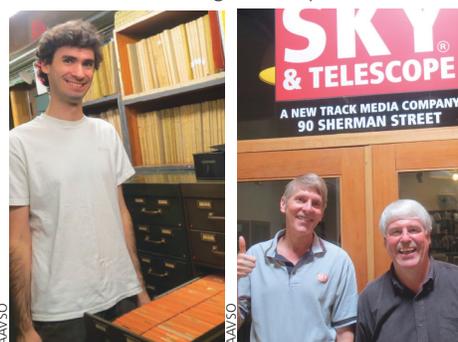
While I was visiting the Boston area, I was privileged to visit the *Sky & Telescope* offices, meeting with senior editor Alan MacRobert and other staff members. The League appreciates *Sky & Telescope's* long-time support, including co-sponsorship of the League's Astronomy Day Award program.

Digitizing the Harvard Plate Stack Collection: You Can Make a Meaningful Contribution

The Harvard Observatory has invited Astronomical League members to help with a special project. The "Digital Access to a Sky Century @ Harvard" project, or DASCH, is digitizing the world's largest collection of astronomical glass-plate photographs of the sky. The collection at Harvard contains more than 500,000 plates (all but approximately 27,000 are 8- by 10-inch; the remainder are 14- by 17-inch) from the 1880s through the early 1990s. The vast



Above: Harvard Observatory Complex; Below, left: Harvard Observatory staff member, David Sliksi, with card catalogs for the plate collection.



Michael Bakich



Carroll Iorg presented the 2013 Peltier Award to John E. Bortle while AAVSO director Arne Henden, left, looked on.



Randy Thompson, above left, was honored for seven years of service to League Sales. Left: Sky & Telescope senior editor Alan MacRobert, left, with Gregg Dinderman, illustration director

TITLE PHOTOGRAPH: COMPLIMENTS OF TOM S. MARTINEZ, ASKC

GARY PITTMAN

IDA "Stars" Featured on the Diane Rehm Show

On September 3, 2013 part of the Diane Rehm Show on National Public Radio (NPR) was devoted to "Environmental Outlook: Combating Light Pollution." Featured on the show were Paul Bogard, author of *The End of Night: Searching for Natural*

Darkness in an Age of Artificial Light; Bob Parks, executive director of IDA; Mary Stewart Adams, program director at Headlands (Michigan) International Dark Sky Park; and Dr. Mario Motta, cardiologist at North Shore Medical Center in Salem, Massachusetts, member of the American Medical Association's Council on Science and Public Health, president of the American Association of Variable Star Observers (AAVSO), and IDA board member.

The show can be heard at thedianerehmshow.org/shows/2013-09-03/environmental-outlook-combating-light-pollution. I recommend it highly. The guest host, Susan Rice, asked very good questions about light pollution. The featured guests were marvelous, with a wonderful command of the issue and well-spoken replies to questions from the host and the audience.

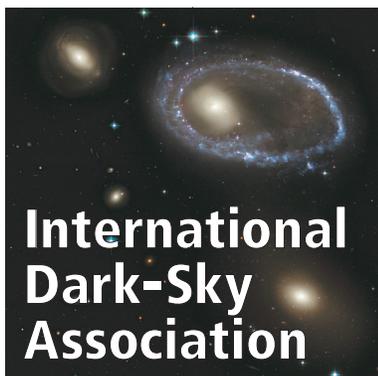
The End of Night: Searching for Natural Darkness in an Age of Artificial Light by Paul Bogard was a prominent part of the discussion on the show. This book has received excellent reviews and has helped focus public attention on the issue of the night sky and its importance to all of us. This book can be purchased on Amazon through the IDA shop at www.darksky.org. A portion of the cost will be donated to IDA.

Thank you

The Ninth Annual Southern California Astronomy Exposition, an astronomy festival hosted by OPT Telescopes, was held last July. \$13,000 in proceeds from raffle ticket sales were donated to IDA. Thanks, OPT and the many people and companies who supported this event!

New French Lighting Curfew Law

A new French law requires businesses to turn off their exterior lighting between 1 and 7 a.m. It went into effect on July 1, 2013. Those who are literate in French or use translation software, such as Google's,



International Dark-Sky Association

can read more about the French efforts to reduce light pollution, save energy, and reduce carbon dioxide emissions at www.gouvernement.fr/gouvernement/une-nouvelle-reglementation-pour-les-eclairages-nocturnes.

It is estimated that this French initiative annually

will reduce carbon dioxide emissions by 250,000 tons, equivalent to the annual energy use of 750,000 homes. The French Ministry of Ecology, Sustainable Development, and Energy and the French light pollution advocacy group *l'Association Nationale pour la Protection du Ciel et de l'Environnement Nocturnes* (ANPCEN) were

instrumental in promoting this initiative. The ANPCEN website is www.anpcen.fr.

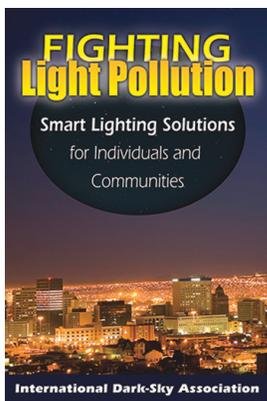
I was last in France in July 1997 with my wife and two children on a family trip to Europe. We all thoroughly enjoyed France, especially Paris. Fortunately, we came back home still speaking to each other after a few close calls exacerbated by three weeks of a typical European

tour of near-daily bus trips and putting your suitcases out in the hallway early in the morning for collection by the tour company.

Paris is filled with magnificent buildings, many of which are illuminated at night. I was struck by the superb nighttime beauty of these grand monuments. The buildings were each bathed in a warm glow with little spill lighting or glare. There was none of the shining of blinding search lights on the side of a building, with resulting glare and light trespass, which all too often passes for artistic nighttime lighting in this country. I am convinced that lighting for architectural effect is difficult and requires some effort to avoid light pollution, glare, and light trespass, but it can be done with very pleasing artistic results, even for someone like me who prefers as little lighting as possible. Paris, like any other large urban center, has considerable light pollution, but at least in 1997, this was not caused by lighting of monuments. ☀

TIM HUNTER

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Reflector

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A39A1

Dear Editor:

Several years ago I had the opportunity to meet Dr. Steve Ostro of NASA's Jet Propulsion Laboratory. I also had the opportunity to accompany him out to Goldstone Tracking Station where he was going to be doing some observing using radar and the 70-meter dish. For me, as a very amateur astronomer, it was a very interesting day.

I first became aware of Dr. Steve Ostro one evening while watching a program on near-Earth and Earth-crossing asteroids on the Discovery Channel. Because of my interest in the subject, and as I was program chairman of the Adventurers' Club, I invited him to speak. He accepted, but due to scheduling conflicts it was almost a year later that he spoke.

During his talk he used the phrase, "if you were to come with me to Goldstone." I asked if that was an invitation, because I would like to go. We arranged for a trip on August 6, 2000, when he would be observing (4486) Mithra, an asteroid about a mile (1.6 km) in diameter.

When I first became interested in astronomy around my 12th or 13th birthday, I read about the three big radio telescopes: Woomera in Australia (which was deactivated in 1972), Jodrell Bank in the U.K., and Goldstone in the U.S. I was fascinated about what they did. I was also interested in anything to do with space.

For me this trip was like Christmas Eve for a little kid; I didn't sleep well the night before. I think it was because of my excitement or anticipation of the day's events. The alarm was set for 5 a.m. I was to meet Dr. Ostro in Barstow, California at 8:45 a.m. I planned to leave my house at 6 a.m. and be there in plenty of time. I was not going to be late!

The antenna Dr. Ostro used is 70 meters in diameter. The Goldstone main antenna, DSS-14, is a fully steerable, 70-meter, parabolic reflector with horn feeds. Its 500-kilowatt transmitter is the world's most powerful one at X-band (8560 MHz, 3.5 cm). I was taken up into the structure to see it more closely. Up close it is really impressive—and big! Seventy meters is about 230 feet. The first 200 feet of the climb was fairly easy, but from that point on the stairs were steep and narrow. I could have gone even higher, but elected not to. I ended up inside the horns.

Mithra was about 1.5 light minutes round-trip, or 9 million miles, away when the observation started. The first thing to be done was the



Reflector Mail

"pointing" function, to make sure the antenna is pointed in the proper direction. This is followed by a "ranging" function to check the distance and speed of the object being observed. Finally, the "imaging" function builds up an image of the object observed. At about 11:55 a.m. I saw the first return from Mithra. Dr. Ostro was concerned about a 2.4 Hz frequency shift. This meant the asteroid's speed was

about 4 centimeters per second different than what was predicted, which was about 15 kilometers per second. While not a lot to me, observations over, say, an hour would have a smear. About 2 p.m. they were satisfied with the ranging results and switched to imaging. This step would take some time. During imaging, a signal is transmitted for about a minute and a half, then the transmitter is switched off and listening begins for a minute and a half. The room where the work is done was very cold. I went outside to get warm every hour or so. It



Imagery of Asteroid Mithra

was interesting to see how much the antenna had moved each time.

As scanning progressed, Mithra began to show some shape on the plot. The various points indicated high spots. Dr. Ostro said that when the observation was completed, a grayscale image would be created to better show the asteroid's shape. Even I was able to see the shape as the points began to plot. By the end of the day I had a fairly good idea of the shape and contour of Mithra.



Dr. Steven Ostro

When things were finished at Goldstone, Dr. Ostro and I drove back to Barstow. He would be going out the next day for more observations; I went home that evening after we had dinner.

So, what did I come away with from this adventure? Well, I got to see one of the world's largest and best radio telescopes up close. I saw how a part of radar astronomy is done. I had a chance to talk with some of the leading experts on near-Earth asteroids. Would I do it again? You bet I would!

See www.sciencedirect.com/science/article/pii/S0019103510000540 for more information about Mithra.

Update: Since I wrote this article, Dr. Ostro died on December 15, 2008. My impression after spending a day with him was that he was a really nice guy willing to



Goldstone 70-meter dish; photo by Jane Houston Jones

share his time and knowledge with someone very limited in experience and knowledge.

Bill Murrell
Correspondence Secretary,
Oklahoma City Astronomy Club

Dear Editor:

Good of you to publish a full page on the teenagers' outreach service work. How refreshing it is to see teenagers with a passion for astronomy and dedication to service as volunteers. With these we can keep looking up.

Glenn R. Showalter, M.Ed.

Dear Editor:

Our hobby has a problem, but it is not a graying/young problem. Our graying amateurs stay because of the friends, the shared experiences, etc., not because of the hobby. Our young people don't stay because astronomy has become boring.

Hobbies are interesting only as long as they provide a personal sense of accomplishment. A good hobby always offers more to learn.

Is "look what I finally found after two hours!" the same as "look what my computer found!"? Learning astronomy now means learning to plug the correct cord into the correct computer port. Once you've mastered cord-plugging, you can aim a telescope at anything in any database. The limitation is not you, but the size of your scope. People quickly become accomplished at punching the right keys on the computer, and boredom sets in. So, seeking that personal sense of accomplishment, they try a bigger scope or astrophotography, until cost steps in. Then, nothing more to do. Boredom. Abandonment.

The hunt for that elusive object, the stalking, and the final triumphant feeling when that little devil is in the eyepiece is gone. The Astronomical League has tried "manual" and "computer-aided" certificates, but that has not solved the problem.

Can anyone out there think of a way to put the personal sense of accomplishment, the more-to-learn aspect of astronomy, back into our hobby?

Sue Wheatley, Master Observer No. 21

Dear Editor:

AAVSO has added a new binocular section for variable star observers. Did you know you can use binoculars completely for the Variable Star Program Award? Pick out a few binocular variables from the binocular list (153 total) at www.aavso.org/aavso-binocular-program. Print out some charts and become acquainted with variable stars, including famous ones like Mira, Mu Cephei, and La Superba (Y Canum Venaticorum). You can view the same star every week or two depending on the cycle. Go to the Astronomical League program or use tutorials from the League website to get started. I was able to estimate the recent nova in Delphinus with binoculars almost every night for a couple of weeks, even through bright moonlight. Pretty soon you'll go right to a star without charts and just need to check your chart for comparison magnitudes. Be careful, though: without having to set up telescopes, you'll find yourself under the stars more!

Robert Togni
Variable Star Program Coordinator

CORRECTIONS & CLARIFICATIONS

In the September issue, on page 20, under Carbon Star Award, No. 34, Mark Johnston's name was incorrectly spelled.

Also, in the September issue, the article by Bill Warren was inadvertently omitted. It will be published in the March 2014 issue.

We regret the errors.

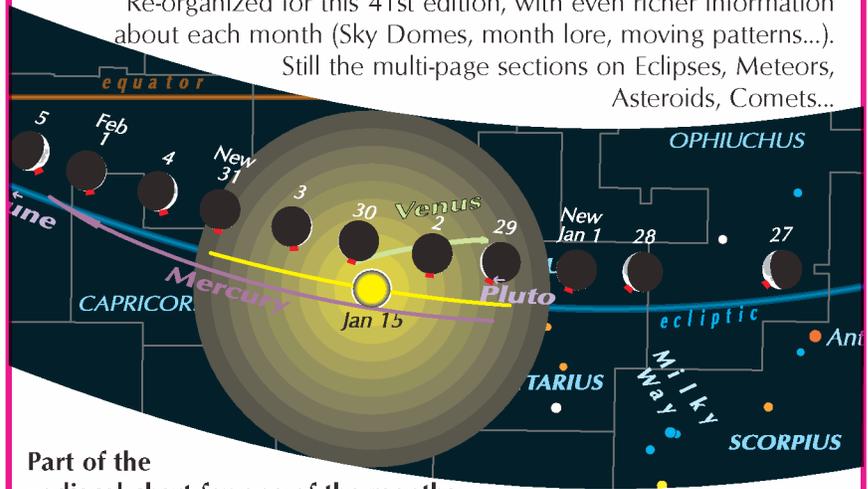
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Part of the zodiacal chart for one of the months

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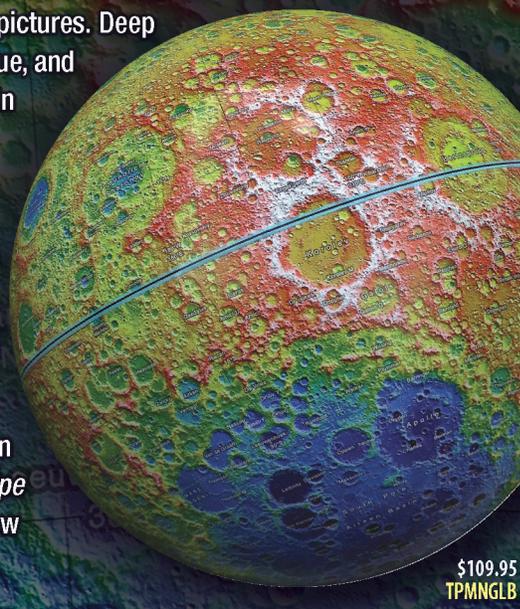
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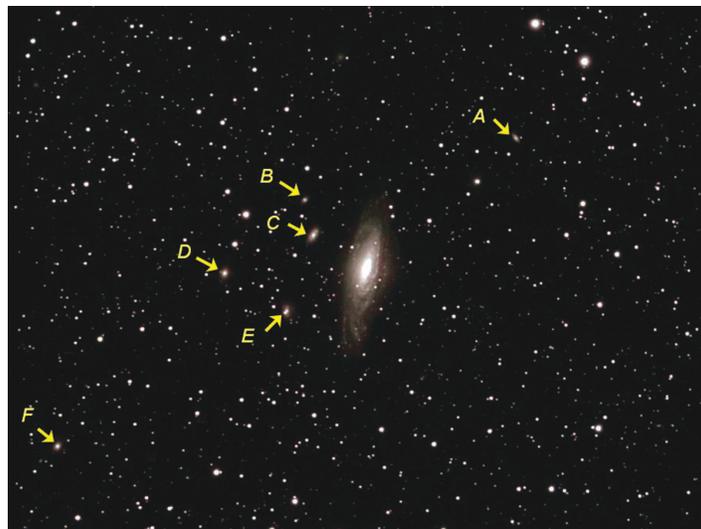
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Pegasus, the winged horse, is best known for its Great Square asterism. Marked by the four stars Alpheratz, Scheat, Markab, and Algenib, this celestial diamond is a landmark in the autumn night sky. Alpheratz is actually just across the border in Andromeda, but the interior of the Great Square definitely belongs to the winged horse. From suburban skies, the interior of the Great Square appears devoid of stars, since no interior stars are brighter than magnitude 4.5. Besides the stars marking the corners of the square, the stars Matar, northwest of the square, and Enif, in the southwest corner of the constellation, are the only other stars in the constellation brighter than third magnitude.

Other than the impressive globular cluster M15, Pegasus is not known for deep space objects reachable with eight-inch telescopes. However, there is one galaxy in Pegasus worth hunting in medium sized amateur instruments: NGC 7331. Discovered by William Herschel in 1784, NGC 7331 is bright enough that it could have been found earlier by Charles Messier—but Messier never happened across the galaxy, so it is not listed in his famous catalogue. More recently, NGC 7331 has been called the Deer Lick Galaxy by astronomy author Tomm Lorenzin, who gave the name to the NGC 7331

DEEP-SKY OBJECTS TWELFTH OF A SERIES PEGASUS'S BEST GALAXY

By Dr. James R. Dire, Kauai Educational Association for Science & Astronomy



A: NGC 7315; B: NGC 7336; C: NGC 7335; D: NGC 7340;
E: NGC 7337; F: NGC 7343.

group of galaxies in honor of Deer Lick Gap in the mountains of North Carolina.

At magnitude 9.3, NGC 7331 is the brightest galaxy in Pegasus. The spiral galaxy is inclined about 20 degrees to edge-on and spans 9.3 by 3.8 arcminutes. The long axis is oriented almost perfectly north-south. The galaxy lies 49 million light-years away and may have a diameter of 30,000 light-years. NGC 7331 is thought to be very similar to the Milky Way in size and shape, although the

Milky Way is actually a barred spiral galaxy.

To find NGC 7331, start at the star Matar (Eta Pegasi) and pan four degrees north and one degree west. There is a pair of sixth-magnitude stars separated by 10 arcminutes located one degree north of the Deer Lick Galaxy that can help you find the proper field. In a six- to eight-inch telescope, the galaxy will appear as an elongated unresolved smudge, with a core much brighter than the outer regions. Larger telescopes will

begin to reveal its spiral nature.

The accompanying image of NGC 7331 was taken with a 190 mm f/5.3 Maksutov-Newtonian. It is a two-hour exposure with an SBIG ST-2000XCM CCD camera. North is up and west is to the right. The brightest stars in the image are the two ninth-magnitude stars in the upper right hand corner. The faintest stars in the image are magnitude 18.

There are six other galaxies in the Deer Lick Group between 13th and 15th magnitudes in this image. The yellow arrows indicate their positions. All six are spiral galaxies and should be visible in 14- to 18-inch telescopes in very steady, transparent, dark skies. The image contains numerous fainter galaxies, many of which are hard to distinguish from myriad faint stars.

About one-half degree south-southwest of NGC 7331, just outside of the field of the accompanying image, lies another galaxy group called Stephan's Quintet. The galaxies in the quintet are all approximately 13th magnitude and lie within a 4-arcminute region. I have seen all five galaxies simultaneously in a 14-inch Newtonian telescope. Four of the five galaxies in Stephan's Quintet are gravitationally interacting with each other and will probably merge together in the distant future. The fifth is a line-of-sight galaxy. ☼

Call for League officer nominations

The two-year terms of the offices of the Astronomical League president and vice president end on August 31, 2014. If you are interested in using your talents to serve in one of these important positions, we would like to hear from you. Please volunteer!

For specific information regarding the duties and responsibilities of these offices, please refer to the League's bylaws, which can be accessed on the League website at www.astroleague.org/all/bylaws/bylawsrs.html.

Candidates should send Nominating Committee chair Ann House, secretary@astroleague.org, background statements explaining why they are interested and photos of themselves for publication in the *Reflector*. Please limit all statements to approximately 250 words. All nomination materials must be submitted by March 15, 2014.

The Astronomical League's 2014 Youth Awards: Prepare Now!

Wouldn't it be great to be young again and to be entering amateur astronomy! Now is the time to start considering the Astronomical League's youth awards for 2014: the National Young Astronomer Award and the four Jack Horkheimer Youth Service Awards.

If you know a young person who has been involved in an astronomy-related research project—either of his or her own doing or through an educational institution—please consider nominating that person for the National Young Astronomer Award. He or she must be between 14 and 19 years old.

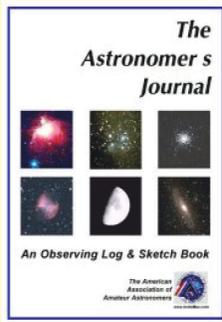
If you know a League member, 18 years old or younger, who has brought amateur astronomy to your club or to the public through outreach, presentations, writing, or observing, please consider nominating that person for one of the three Horkheimer Service Awards. One of these awards—the Horkheimer/O'Meara Journalism Award—is more specialized than the others: it requires a person who is 8 to 14 years old to compose a 300- to 500-word essay on any science related topic.

Since the deadlines are January 31, 2014 for the National Young Astronomer Award and March 31, 2014 for the Horkheimer Awards, now is the time for potential candidates to work on their projects and to participate in various astronomy events.

If you are a club officer, nominate them. **If you don't, no one else will!** Complete information about each award can be found at www.astroleague.org/al/awards/awards.html.

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ASTRONOMY DAY

May 10 & Oct. 4, 2014

The latest tips and information, as well as the Astronomy Day handbook and entry form for the Astronomy Day Award, are available on the League's Astronomy Day website.

Here's your chance to spotlight amateur astronomy while showing off your club!

Displays

- Club information
- Astrophotos
- Light pollution
- Tonight's sky

Discussions

- Relative distances
- Moon landing hoax
- Life elsewhere
- Black Holes

Demonstrations

- Telescope varieties
- Telescope basics
- How to find objects

Telescope Views

- Solar filtered
- Moon
- Daytime Venus
- Daytime Jupiter
- Landmarks

For more information, contact:

Garry Beckstrom

Assistant Astronomy Day Coordinator

810-853-7827

garry@beckstromobservatory.com

President's Notes / from page 4

ALCON 2014 in San Antonio: Mark Your Calendar Now

Mark your calendar now for July 9–12, 2014. The Astronomical League and the San Antonio Astronomical Association have an outstanding conference planned in conjunction with the 40th anniversary of the San Antonio club.

Randy Thompson Honored for His Service to League Sales; Denise Moser New Sales Coordinator in the League Office

It was my pleasure to honor Randy Thompson with a plaque for his several years of service to League Sales at a recent meeting of the Astronomical Society of Kansas City. We are pleased to welcome Denise Moser as the new sales coordinator. You may conveniently order your League sales items online through our webstore at www.astroleague.org/store.

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Astronomical League Sales is open for business.

2013 Astronomical League Webmaster Award

The 2013 Astronomical League Webmaster Award was presented to Ken Slater, webmaster for the Springfield Telescope Makers, sponsor of Stellafane. The award was first announced by Astronomical League president Carroll Jorg, below, at the 2013 ALCon in Atlanta and then presented by him in person during a surprise ceremony at this year's Stellafane Convention.

The Webmaster Award is given to "acknowledge the club webmaster who does an outstanding job of website design and administration." The Stellafane website has 922 pages and is still growing. This large website allows Ken to advance the mission of the Springfield Telescope Makers, which is to preserve the history and advance the art of amateur telescope making.

Ken is a retired electrical and software engineer and engineering manager who lives in Chester, Vermont. At Stellafane, he is the current vice president, mirror class instructor, and chief electrician. He hikes long distances in the warm months, and makes telescopes and adds to the website in the cold months of the year.

You can view the presentation ceremony online at www.youtube.com/watch?v=NdYsM1bqlc.



The 2014 Astronomical Calendar Specially Priced for League Members

The Astronomical League is pleased to announce a special offer from the Universal Workshop, the producers of Guy Ottewell's popular *Astronomical Calendar*. They are making the 2014 edition of the *Astronomical Calendar* available to our members at a discounted price. There are plenty of good reasons why it has been published for 41 years. The 2014 edition will not disappoint!

Packed throughout nearly 84 pages are monthly sky charts, daily celestial highlights, eclipse times and paths, lunar occultation specifics, and charts, tables, and explanations of planetary movements. There are extensive descriptions of the year's meteor showers and periodic comets as well. This calendar explains in clear language what events occur and when they happen.

League members can order this incredible compilation of the year's celestial events for \$19.95, shipping included. Volume discounts for clubs are available. But, to take advantage of these rates and the free shipping offer, you must order by Friday, December 31, and either order via the special website, www.universalworkshop.com/clubs, or call 800-533-5083. Universalworkshop.com accepts MasterCard, Visa, Discover, American Express, and PayPal.

Astronomical League		Astronomical League	
Financial Report		Approved Budget	
July 1, 2012 through June 30, 2013		July 1, 2013 through June 30, 2014	
Beginning Balance July 1, 2012	\$ 164,801	Estimated Income:	
Income	116,137	Membership Dues	\$ 80,800
Expenses	(109,348)	Reflector Advertising	12,000
Bank Balances as of June 30, 2013	\$ 171,590	Donations and Other Income	21,070
		Total Estimated Income	\$ 113,870
Savings Account	\$ 132,812	Estimated Expenses:	
Endowment Fund	1,431	Reflector	\$ 51,250
Checking Account	37,347	League Awards	6,566
		National Office Mailings	200
		National Office Maintenance	20,000
		National Office Consulting	23,000
		All Other Expenses	15,345
Bank Balances as of June 30, 2013	\$ 171,590	Total Estimated Expenses	\$ 116,361

Submitted by Tom Lynch, Treasurer

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ALCON 2013: SUMMER SKIES, SOUTHERN HOSPITALITY

Photography by Bob and Claire Gadbois

All ALCons are different from one another. Unlike recent meetings, the 2013 Astronomical League national convention was an intimate affair with all talks held in the Jim Cherry Memorial Planetarium at the Fernbank Science Center in Atlanta. The planetarium's "in-the-round" setup was conducive for close speaker-audience interaction, allowing everyone to really get to know each other.

At many previous conventions, the Association of Lunar and Planetary Observers (ALPO) joined the Astronomical League by holding their annual meeting. The ALPO talks were normally on a dedicated track and were not generally mainstreamed for League participation. This year, however, all ALPO talks were presented as part of the Astronomical League's general program. That proved to be very fortunate for League members. After all, as someone once observed, "ALPO begins where *Sky & Telescope* ends."

Talks, Papers, and Presentations: a Sample

The lead-off talk covered a major event that occurred just a few months earlier: the spectacular meteor fall near Chelyabinsk, Russia. Dr. Mike Reynolds spoke with aplomb, giving the

facts while inserting humorous anecdotes. He later talked about eclipses, which led nicely into two sessions by Harold Eskildsen covering lunar craters. A host of papers followed about astrophotography.

Ted Blank of the International Occultation Timing Association (IOTA) demonstrated the need for observers to participate in asteroid occultation timing programs that define the silhouette shape of asteroids. He emphasized that amateurs using modest equipment can contribute to the science and that this type of work cannot succeed without them.

Thursday's program continued in a planetary vein with Dr. Richard Schmude discussing Mars, Uranus, and Neptune. Julius Benton continued the planetary emphasis, bringing the audience up to speed on recent observations of Saturn and Venus.

While the talks continued inside the Fernbank Science Center, the Charlie Bates Solar Astronomy Project (www.charliebates.org) was stationed outside. Steve Ramsden assembled and staffed several superb solar scopes, giving detailed views of the solar surface. He also presented two talks in the



Sky and Telescope's Kelly Beatty presents the 2013 Astronomy Day Award to the Oglethorpe Astronomical Association represented by Ben Freiberger.



The Astronomical League's G.R. Wright Award for outstanding service to astronomy is presented to Bill Bogardus by Carroll Iorg.

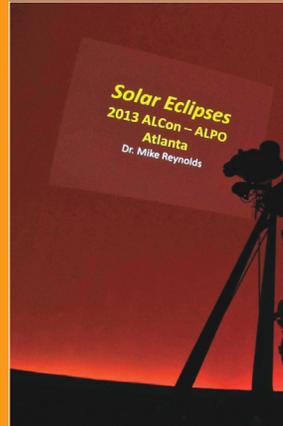


The library telescope is awarded to Bill Eisele of the Auburn Astronomical Society.

Children enjoy solar observing courtesy of Steve Ramsden of the Charlie Bates Solar Astronomy Project.



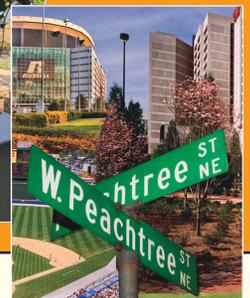
The Agnes Scott College Bradburn Observatory's Star-B-Q.



"Solar Eclipses," one talk out of many at the Planetarium.



Emory Conference Center Hotel



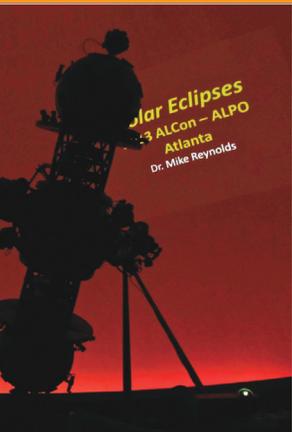
Friday's weather



Bradley Observatory, site of Friday



Mark Banks of the Atlanta Astronomy Club introduces the next speaker.



of many held in the Cherry



John Goss presents raffle winner Mike Reynolds with a Celestron SkyProdigy6 telescope.



Greg Bragg presents Ann House with a new Explore Scientific 2-inch, 20 mm, 100° FOV eyepiece. Since ALCon, Ann used this eyepiece at Capitol Reef National Park. It gave, "beautiful clear, and crisp views of deep-sky objects. It was a delightful evening!"

Wine and cheese reception at the Emory Hotel.



The Fernbank Science Center, home of ALCon 2013.



planetarium, one about club outreach efforts and the other concerned with the equipment used for hydrogen-alpha solar observing.

Maintaining equipment was discussed by Aaron Reid of the Western Colorado Astronomy Club. He covered the care of telescopes and the cleaning of lenses. Aaron availed himself afterwards to answer anyone's questions about maintaining an observatory.

Friday afternoon saw a wide range of topics presented, from a talk on the search for supernovae given by Tim Puckett, to an explanation of Georgia State's incredible Center for High Angular Resolution Astronomy (CHARA) given by Dr. Hal McAlister. Chris Hetlage introduced the audience to the Deerlick Astronomy Village, a dark sky community in Georgia. Outreach methods and opportunities were further discussed by Christi

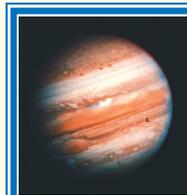
Whitworth of the Pisgah Astronomical Research Institute (PARI), Doug Hrabec, director of the Fernbank Science Center, and Kelly Beatty, senior contributing editor of *Sky & Telescope* magazine.

Annual Astronomical League Youth Awards

The talks given by the Astronomical League Youth Award winners are a popular feature at every ALCon. Mark Moretto, first place finisher in the National Young Astronomer competition led the way with "Deep Impact Spectral Observations of Naturally Occurring Mini-Outbursts." Mark was followed by the Horkheimer/Smith Youth Service Award winner, Sophia Lahey. She discussed her list of reasons why young people are not entering the hobby in the numbers that they once did. The final youth presentation was given by Henry Lin, second

place finisher in the National Young Astronomer competition. As described in the September *Reflector*, he spoke on "Cool Core Bias in Sunyaev-Zel'dovich Galaxy Cluster Surveys."

Friday's Astronomical League meeting included a presentation by John Goss on the Library Loaner Telescope program initiated by the New Hampshire



ALCON
2013
ATLANTA

Astronomical Society. It concluded with a telescope being awarded to Bill Eisele of the Auburn Astronomical Society. Thank you, Orion Telescopes and Ocean-side Photo and Telescope, for making this donation possible.

Door prizes are an exciting part of any convention. Thank you, *Sky & Telescope*, Ottewell's *Astronomical Calendar*, *Infinitees*, *The Year in Space Calendar*, Software Bisque, Dr. Charles Wood, Camera Bug, PARI, Dr. Mike Reynolds, Peter Birren, Woodland Hills Camera, *Astronomy*, Celestron, and Explore Scientific for all of your generous donations.

The Star-B-Q is always a fun time for ALCon attendees and this year it was held in the Bradley Observatory at Agnes Scott College. After a great meal catered by the college, Jasmine Heath and Jessica Botts of the observatory staff gave a planetarium show and observatory tour.

The Awards Banquet

The concluding event for ALCon is the awards banquet on Saturday night. It began a little differently than on most occasions with a wine and cheese reception. People had the chance to mingle and talk astronomy with the friends they made during the week. When people walked into the banquet room they were greeted by the ethereal mood-setting music of Atlanta Astronomy Club member John Serrie.

Continued on next page

ALCon 2013 was dedicated to the memory of **Art Zorka**, long-time member of the Atlanta Astronomy Club and amateur astronomy enthusiast who passed away a year earlier. It was his dream to have ALCon in Atlanta. His wife, Maria, gave a moving talk about what amateur astronomy in the Atlanta area meant to Art.

The Walter F. Barber Observatory was the Atlanta Astronomy Club's observing site for many years. **Carol Camp**, sister of the late Mr. Barber, gave a tribute to him with an account of how he grew to love the hobby.

More door prizes were given away thanks to the generosity of **Dr. Mike and Debbie Reynolds** and **Dr. Charles Wood**. The books and meteorites were greatly appreciated!

The Awards

- Atlanta Astronomy Club Service Award, presented by Rich Jakiel to **Dan Llewellyn**.
- Astronomy Day Award, presented by Kelly Beatty to **Ben Freiberger** of the Oglethorpe Astronomical Association.
- Horkheimer/Smith Award, presented by John Goss to **Sophia Lahey** for her work in public outreach. We thank the Horkheimer family for sponsoring this program.
- National Young Astronomer Awards, presented by Greg Bragg of Explore Scientific to **Mark Moretto** and **Henry Lin**. We thank Explore Scientific for generously sponsoring this award.
- ALPO Peggy Haas Service Award, presented by Ken Poshedly to **Larry Owens** in recognition of his service and expertise in managing the ALPO website.

- ALPO Walter Haas Award, presented by Harold Eskildsen to **Brian D. Warner** for his pioneering contributions to the discovery and analysis of minor planets.
- G.R. Wright Service Award, presented by Carroll Iorg to **Bill Bogardus** in recognition of his many contributions to the Astronomical League over the past few years. Thank you, Bill, for your service!

Dr. Charles Wood, planetary scientist and *Sky & Telescope* contributor, captivated the audience with his presentation, "The Most Fascinating Object in the Night Sky: Learning to Read the Moon." The Moon requires careful observation to understand its history and Dr. Wood showed how to do just that. He discussed rays, modified craters, pie crust craters, crustal ruptures, tilting and lava

flooding, mare fracturing, and shield volcanoes. Dr. Wood concluded with the thought "once you learn to read the Moon, the Moon will never be the same." (The League's Lunar Observing Club is a great place to start learning to read the Moon.)

The Astronomical League thanks the members of the Atlanta Astronomy Club, including **Sharon and Peter Macumber, Marie and Tim Lott, Mark Banks, and Phil and Beverly Johnson**, for all their volunteer efforts, and especially **Ken Poshedly** for his many hours spent organizing ALCon 2013. The Astronomical League also thanks **Doug Hrabe** and the **Fernbank Science Center** for all their assistance before and during the event. Without everyone's contributions, ALCon 2013 would not have been a success. ☀



1) Awards banquet keynote speaker Charles Wood describes the events that created the Moon we see today. 2) Christi Whitworth of the Pisgah Astronomical Research Institute. 3) Ted Blank of IOTA describes the new AL Observing Program. 4) AAC's Pixie Bruner discusses the role of women in astronomy's early years. 5) ALCon 2013's co-chair Ken Poshedly fields a question from the audience.



Winners of the Astronomical League's Youth Awards: Mark Moretto, left; Sophia Lahey, center; Henry Lin, right.

Right: ALPO's Harold Eskildsen shows off the Walter H. Haas Award given to Brian Warner. Below: Steve Ramsden covers outreach opportunities in solar observing. Below right: Larry Owens receives ALPO's Peggy Haas Award from Ken Poshedly.



Star-B-Q: Let the serving begin!



FALLING IN LOVE WITH THE UNIVERSE

By Kaleesha Williams, Eastern Ozarks Astronomical Society

It's been years since I have been able to pick out anything in the sky but the Sun, Moon, my buddy Orion, the Dippers, and the few visible planets. When I was in my teens I roamed the neighboring fields at night, the stars and a dog for company. I would lie on my back in the prickly grass marveling at the immense dome above me. "Like being in a snow globe without the snow," I thought. Even when I began hanging out in the city at night, the stars were my connection to nature, to the country. I could pick out several prominent constellations and knew what to expect when I glanced in any direction at any time of night.

Well, life happens. Between raising a biggish family and running a smallish farm, somehow night has come to mean "time to stay home and get every wink of sleep you can before the Sun rises and demands you pick up where you left off." Not bad, just fact. When I get a glimpse of the night sky I enjoy the moment, maybe chat with the Moon or Orion, acknowledge the stirring in my heart, and go on my way.

Last Thursday evening the Sun was just sinking over a clear horizon as I headed out with two of my seven children, Aтира (age 11) and Blue (age 7), for the first meeting of the Eastern Ozarks Astronomical Society (everybody say, "ooooh!"), at the Lake La Motte Astronomy and Science Outpost (a.k.a. Denny's cabin). I don't know what the temperature was exactly, but it was below freezing and only getting colder.

Our local librarian had introduced us to Denny after we had discussed with him our interest in astronomy. Denny basically has extended a



Aтира and Blue under the stars, photo courtesy Russell Middleton Imagery.

standing invitation on clear nights: come view the Universe through the telescope. He is passionate and knowledgeable about astronomy, loves to share, and is simply wonderful at communicating. Several weeks ago we took him up on his invitation. Our whole family went and took a guided tour through some beautiful astronomical hot spots. I admit that just seeing them through the scope is not mind-blowing. Interesting, but not mind-blowing. It's the information Denny shares that seals the deal.

Your first viewing goes something like this: "Okay," Denny says when he has some object lined up in the eyepiece of his 8-inch Dobsonian reflector. "This is the such-and-such galaxy. You're going to see a bunch of stars and a fuzzy little cloud-looking thing. It's not as exciting as the photos you've seen on the Internet." He steps back from the telescope and you step up. You peer into the lens and see the fuzzy little cloud-looking thing that usually looks as though whoever had painted the light-dots of stars on the sky had dripped and smudged some light-paint. You say "wow," because maybe you were expecting something more impressive but you can at least

appreciate that this is an object you can't see with your naked eye.

You step back. Then Denny tells you a little bit about what you saw: age, distance, how it formed, how it was discovered, how just viewing it is a form of time travel. And he's so in love with the details that even if you really didn't care two bits about it to begin with (although you must have, because you gave up who-knows-how-many winks of sleep just for this) you can't help but catch his enthusiasm. You are drawn back to the telescope. You put your eye to the lens and take another look. A good long look. Wow. Sincerely, really and truly, wow. New respect for the fuzzy little cloud-looking thing. A galaxy. Bigger than our own, maybe smaller, maybe older, maybe younger, maybe a different shape, likely containing billions of solar systems like ours, billions of planets orbiting billions of suns, certainly the likelihood of other life forms. Maybe someone just like you, standing with some bearded hippie geek in the freezing dark in a clearing in the woods by a lake, falling in love with the Universe.

And before you know it you are up to your ears in whys and hows, rushing through your daily chores so you can read

astronomy webpages, listen to the podcasts at *astronomy cast.com* (which I highly recommend), translating them to your children at lunch, turning their short science lesson into a lengthy astronomy bit, seeing them catch the excitement, watching their eyes as they digest the information.

Your mind is abuzz with cosmic microwave background radiation, dark energy, newborn stars. You have a new appreciation for sci-fi flicks. There's a whole universe out there for you to explore (and to think you had limited yourself to the world!) and you can't suck up knowledge fast enough. Thank the stars Denny enjoys answering your questions!

And then the Eastern Ozarks Astronomical Society is born. A few people with a passion for astronomy, who want to share it with their community. Regular viewing sessions with a telescope or three, discussions on Facebook, discussions in person, sky parties when the weather turns warm, membership to national astronomical societies, monthly presentations at the library. Meanwhile you're still trying to wrap your mind around dark matter and remember where in the sky you last saw Draco.

So, yeah, it was cold the other night, our second night at the telescope. Cold but beautiful. There was a bit of moonlight, not ideal for viewing other objects but magical in its own way. Aтира and Blue spent half the time in Denny's cabin staying warm, but they did observe some galaxies and nebulae and we will write about them in our astronomy logbooks.

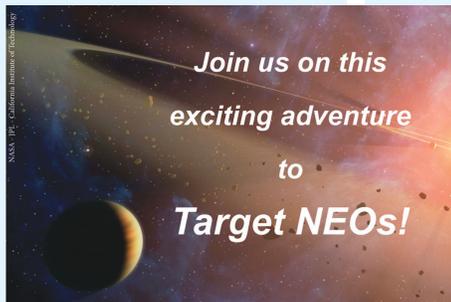
I suspect this is just the beginning of a beautiful, life-long relationship with the Cosmos. ☀

Ten years from now, NASA's OSIRIS-REx spacecraft will return a precious payload to the Utah desert. Its arrival will herald the United States' first asteroid sample return. Scientists at NASA's Johnson Space Center are preparing laboratories to receive this ancient material that will be studied by scientists around the world for many years to come. You can be a part of this adventure now by observing asteroids on the Target NEOs! list.

The League's new Target NEOs! observing program is an exciting opportunity for amateur astronomers to participate in a long-term citizen science project that will contribute to our basic understanding of near-Earth objects (NEOs). We invite observers to collect data about asteroids on a selected list by submitting images with corresponding reports. Your observations will directly support NASA's OSIRIS-REx asteroid sample return mission and aid future mission designers and scientists.

The Mission

NASA's OSIRIS-REx is an acronym that describes the science objectives of the mission: Origins Spectral Interpretation Resource Identification Security-Regolith Explorer asteroid sample return mission. This mission to potentially hazardous asteroid (101955) Benu*, a carbonaceous NEO holding material left over from the early Solar System, will launch in 2016, with an encounter in 2018, sample return in 2023, and continuing laboratory analysis thereafter.



The Astronomical League's New Observing Program

Dolores H. Hill and Carl Hergenrother

How would you like to participate in a NASA space mission and make a real contribution to planetary science?

OSIRIS-REx will map the somewhat-round 500-meter Benu with an assortment of optical cameras, laser altimeter, LIDAR (light detection and ranging), and visible and infrared spectrometers. It will examine prospective sample sites and eventually collect the 60-gram sample without actually landing on the asteroid. Along the way, the science team will measure Benu's orbit and any changes and compare the data and returned sample to telescope observations ("ground truth"). There are many details we do not understand in this regard. Many asteroid spectra can be matched to different mineral combinations with no unique solution. And it is difficult to match in detail asteroid spectra to meteorites in our laboratories.

Because OSIRIS-REx is a long-term mission, it is a great opportunity for young people to "grow up with the mission" and eventually work on the mission in many different capacities. For more information about the mission see osiris-rex.lpl.arizona.edu (updates frequently).

Why target Benu?

There are more than 500,000 known asteroids. Benu met all the criteria for an optimal orbit for sample return. It is more than 200 meters across and rotates slowly enough (4.3 hours per rotation) to retain its surface soil or regolith. It is a carbonaceous-type asteroid that will shed light on carbon-rich and volatile materials from the early Solar System. And it is small enough to help us understand NEOs and small changes to their orbits that compound day after day, year after year, that may affect the security of Earth's inhabitants.

While we do have observations of Benu, it is important to collect observations of other NEOs over a long time to better understand their orbits, properties and relationships. This helps the OSIRIS-REx science team better understand their target.

How are Target NEOs! and Target Asteroids! related?

Target NEOs! is the Astronomical League's new observing program through which observers may earn an intermediate certificate for imaging and reporting 10 asteroids and an advanced

certificate and pin for imaging and reporting 25 asteroids. For reference, 5 to 12 asteroids per year are brighter than 18th magnitude. Target Asteroids! is the citizen science program of NASA's OSIRIS-REx asteroid sample return mission. It provides the list of asteroids to be observed. Requirements, resources, and reporting methods are the same between the companion programs, but only Target NEOs! offers an award certificate.

Target NEOs! provides ample opportunities for observers to attain the highest level of achievement over the course of several years. Unlike other League programs, observers submit their observations as they are collected. Go to the Target NEOs! page (www.astroleague.org/node/4017) for the current list of targets.

Why does the OSIRIS-REx mission need amateur astronomers' observations?

The Target NEOs! list was originally compiled primarily to include carbonaceous NEOs accessible to spacecraft. Non-carbonaceous and main-belt asteroids have been added to assist with calibration of the phase function (brightness vs. phase angle) for asteroids with different albedos, compositions, shapes, and surface textures.

Although many of the NEOs on the Target NEOs! list are faint, some recently added asteroids are bright and reachable by most backyard telescopes. The largest, brightest main belt asteroid, (1) Ceres, is now on our list as a reference for carbonaceous NEOs. These asteroids are more accessible to amateurs with

*Benu is the new name for (101955) 1999 RQ36. More than 8,000 names were submitted by school children to the OSIRIS-REx and Planetary Society's "Name That Asteroid!" contest. Nine-year-old Michael Toler Puzio suggested the name because the OSIRIS-REx's touch-and-go sampler evokes Benu's image as a heron. Congratulations, Michael!

backyard telescopes. We do not expect amateurs to be able to observe the entire list or provide continuous coverage. Observe whenever you can. Some amateurs have access to large telescopes, local club and college observatories, or remote telescope networks to supplement backyard observing.

Why can't the big observatories do this work?

Every observation of NEOs and main-belt asteroids on the Target Asteroids! list is valuable. Your observation may be the only one of a particular asteroid at a low phase angle (Sun–asteroid–observer) that some professional observatories cannot reach due to physical limitations. Also, very large telescopes have trouble with bright asteroids that saturate their images. It might be cloudy for other observers. So we welcome all observations of any asteroids you are able to reach.

What do I need to start?

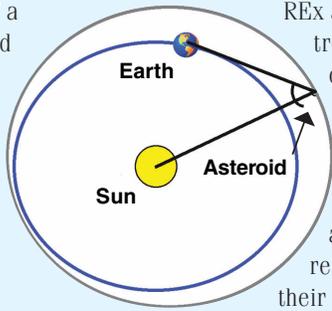
The most important qualification is a desire to learn about and observe asteroids. Observers gain experience and continue to learn as they observe asteroids on the Target NEOs! list, starting with easier, brighter asteroids and moving on to more challenging targets.

An 8-inch (20 cm) aperture is the minimum size telescope; the bigger the aperture the better to capture these faint objects. The ideal set up is a telescope with

color-calibrated CCD camera and an Internet connection. We can use data from almost any telescope and camera combination, including DSLR images. To go fainter, observers can supplement with the commercial telescope networks of our partners, Sierra Stars Observatory Network and iTelescope, who provide access to world-class telescopes with CCD cameras and filters under dark skies at a reasonable cost.

How will my data be used?

Carl Hergenrother, OSIRIS-REx asteroid astronomy lead, and other science team members will reduce the data, analyze the observations, and include the results in some of their scientific



publications. The data will be available to other asteroid astronomers who study the orbital dynamics and evolution of NEOs and asteroid families, and also to spacecraft mission planners looking for suitable targets.

What can the data tell us?

Bennu is just one asteroid. In order to learn more about the entire asteroid population, we must be able to place Bennu in context. By observing other near-Earth asteroids we will learn how Bennu is similar to or differs from other asteroids that may have a shared history. Observations help fill in the holes of our knowledge of Bennu. For example, we do not have any very low or very high

phase-angle observations of Bennu. Observations of similar objects at these missing phase angles will shed light on what type of surface we will encounter on Bennu.

The Targets

Target NEOs! is built around a dynamic compilation of objects

selected by Dr. Hergenrother. He selects NEOs that are more than 200 meters across and easily reachable by sample return spacecraft. Currently, there are more than 80 objects on the list, most 15 to 21.5 in absolute magnitude (H) and up to 6 kilometers across. Don't let the faint ones discourage you! New objects added include Ceres, the largest asteroid, which gets as bright as 7th magnitude.

I can't wait to start! Where do I sign up?

You can register your interest at osiris-rex.lpl.arizona.edu/?q=target_asteroids/register so that you can receive occasional Target NEOs! and Target Asteroids! updates and information. List your Astronomical League member club so you can start earning credit for your Target NEOs! certificate and pin.

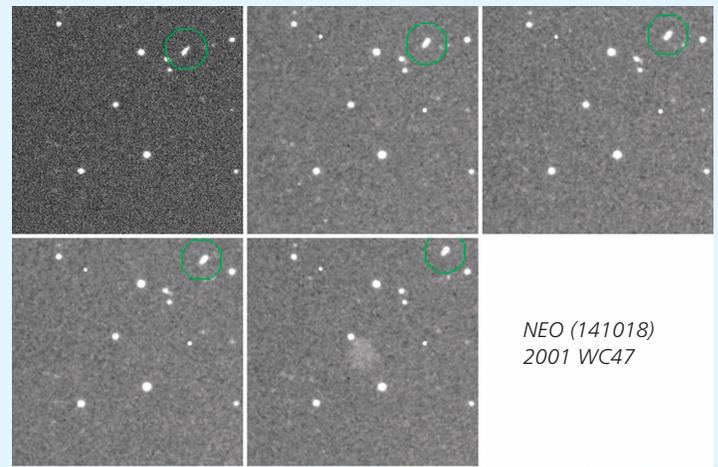


Be sure to check out the instructions page for how-to guidelines and the FAQ page for helpful information and links. Submit observations whenever you are able over the course of the program. Remember: every observation is important!

For more information check out the Target NEOs! website at www.astroleague.org/node/4017.

For additional questions contact Target NEOs! coordinators Dolores Hill and Carl Hergenrother at Target_asteroids@lpl.arizona.edu.

Below is an example of data submitted to the Astronomical League's Target NEOs! observing program and NASA's OSIRIS-REx Target Asteroids! citizen science program. The observations consist of images and a report. Green circles are added here for easy identification of the asteroid.



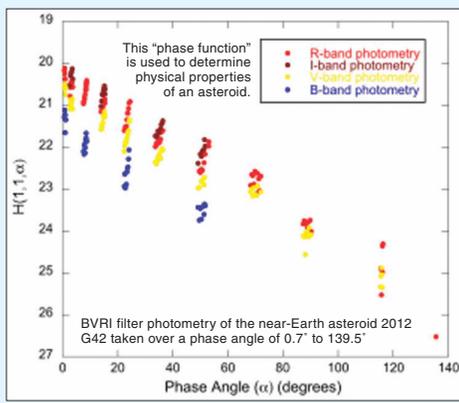
NEO (141018)
2001 WC47

Target Asteroids! observer Mark Henrichs of Texas captured these five images of NEO (141018) 2001 WC47 on May 22, 2012 using a 9-inch (23 cm) refractor and SBIG ST-8XE CCD camera. The asteroid's magnitude was 17.5 to 17.8. Notice the asteroid's motion against the star background during only a few minutes.

The corresponding astrometry report is below. The observer determines the astrometry after the images are captured. Specialized software creates astrometry reports that are ready for submission. See the Target Asteroids! FAQ for more information on software for asteroid observing.

COD H06; OBS M. Henrichs; ACK Report received; AC2 pmark@swbell.net (141018) 2001 WC47

T00006	C2012 05 22.23559	13 50 15.10 +02 53 28.2	17.6 R	H06
T00006	C2012 05 22.23979	13 50 15.85 +02 53 14.3	17.5 R	H06
T00006	C2012 05 22.24398	13 50 16.43 +02 53 02.8	17.8 R	H06
T00006	C2012 05 22.24818	13 50 17.18 +02 52 48.2	17.7 R	H06
T00006	C2012 05 22.25238	13 50 17.82 +02 52 36.4	17.5 R	H06



Comet ISON wasn't in

my observing plans when a fellow astronomy club member emailed an invitation to join in a competition to be the first club member to photograph ISON. It had been unobservable for over two months because of its proximity to the Sun, and during this first week of August it was still low in the morning sky when dawn made observing impossible. This was an observing challenge, and when a thing is difficult I tend to say "yes."

Truth be told, I felt a little silly committing to this observing challenge. First, I had never observed a comet with serious intent, and I prided myself on only doing observing that had a potential for scientific value.

I even considered myself a semi-professional since I had observed exoplanet candidates for pay for a university a few years ago, and five decades ago I worked as a radio astronomer at JPL. Surely those "pretty-picture guys" in the club would claim the prize, and I'd be left wondering why I had wasted a few mornings trying something I wasn't prepared for.

One of my challenges was that my main scope, a Meade 14-inch, had a drive problem, so I was forced to use a backup telescope, a Celestron 11-inch. This one had an obstructed view below 11 degrees; at 6 degrees I'd lose half the aperture, rendering it equivalent to an 8-inch. Another difficulty was that my observing site is in southern Arizona, and July and August are the monsoon season with cloudy skies almost every night. Sometimes it clears before sunrise though, so my goal was based on the luck of a morning clearing.

I got Comet ISON coordinates from the JPL Horizons website, but didn't notice that the coordinate type had defaulted to "apparent" instead of the usual "astrometric" (J2000) that the site had always remembered I wanted. Fortunately, my backup telescope had a larger field of view than my main telescope did, and this dumb luck meant that the correct location was included in my images.

The first two mornings showed nothing because the sky became too bright for imaging before the comet's part of the sky rose above a few degrees elevation. But on August 12 there was a 15-minute "window" when the region of interest was more than five degrees above the horizon and the dawn sky was still dark enough to not saturate my 20-second exposures. I stacked 23 images, deleting a few that were ruined by cloud layers, and I counted 116 stars. I

RECOVERING COMET ISON

Story & photography by Bruce Gary

used the C2A planetarium program, showing the UCA4 catalog of stars as faint as 17th magnitude, and proceeded to identify each as "belonging" in the stacked image. There was no star at the location where I expected the comet, but a faint smudge was present that wasn't in the star catalog. It was broader than the other stars, and had an approximate magnitude of 14.

At this point I was 50 percent convinced that this was the comet, and it had escaped detection



August 16, 2013, field of view is 12.5 x 9.3 arcminutes, north is up, east is to the left, median combination of seventeen 20-second exposures aligned using the comet.

by the other observers because it was in the wrong location. So I emailed a JPL celestial mechanics expert, Don Yeomans, and asked if he was aware of an updated ephemeris that called for the comet to be located at the location of my broad smudge. JPL's Richard Miles replied that my smudge was at the exact location that the current ephemeris predicted for the comet. I quickly checked the JPL Horizons prediction, and noticed the mistaken default choice of coordinate system; when I specified "astrometric" I got the coordinates of my smudge—Comet ISON.

To verify the comet identification, I carefully measured coordinates for several of the best images and showed that the smudge was moving in the right direction and at the right rate for the comet! The identification was confirmed.

I notified Doug Snyder, the local astronomy club member who had issued the comet observing challenge, and he notified his contact at NASA's CIOC (Comet ISON Observing Campaign). My casual magnitude estimate was included in his communication, almost as an afterthought. Soon I began to receive emails showing a greater interest in my comet magnitude than in the fact that I had a "recovery" image. So I began a more elaborate

photometric analysis, one of my favorite tasks, and within a few hours I had a very accurate R-band magnitude based on

APASS r' -2-band magnitudes for seven nearby stars. This magnitude was 14.1 ± 0.1 for an aperture corresponding to a 55,000 km coma diameter. Others more knowledgeable of comets interpreted this to mean that Comet ISON was not brightening as it neared the Sun in accordance with a model that had led some to predict that it would become the "comet of the century." The comet's faintness became the headline for blogs and articles: "Comet ISON Spotted Again, Faintly" was the way *Sky & Telescope* an-

nounced the recovery.

Good! There was indeed some scientific payoff for the observing task I had belittled while wavering about taking it on. I therefore redoubled my efforts, because each day brought a longer window for observing the comet. Four days later the sky was again sort of clear. On this date I obtained more images, of better quality, allowing the creation of an animation (for fun—no science), and a more accurate plot of magnitude versus coma size. There was no change in magnitude, which further fed belief that Comet ISON may not live up to expectations.

This morning, August 16, another local astronomy club member, Dennis Whitmer, observed the comet, and our magnitude measurements of his image gave the same result as the others. So far he seems to be the second observer worldwide to recover the comet. What a coincidence that the first and second observers for the recovery were both amateurs, and live within three miles of each other! Let it be known that southern Arizona's Huachuca Astronomy Club is a place where serious astronomy can take place.

I've learned from this experience that sometimes a newbie to an astronomical task can produce something of scientific value if the floundering is compensated by sufficient good luck. Thank you, Lady Luck! And thanks to Doug Snyder for mobilizing our club members to compete with each other on a challenging observing task in which the winner unexpectedly became the first anywhere to recover Comet ISON and to measure a magnitude that reset expectations for how spectacular the comet will appear during its passage closest to Earth in December. ☀

Website with Comet ISON pictures, graphs, and links: www.brucegary.net/ISON.

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 April 20 to 29
 May 19 to 28
 June 17 to 26

July 16 to 25
 August 15 to 24
 September 15 to 24
 October 14 to 23
 November 12 to 21
 December 11 to 20

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Editor's Note: Congratulations to all these outstanding astronomical observers! All awards, except the Herschel 400, require current Astronomical League membership for eligibility. If you have questions about an award, please contact the corresponding Observing Program chair. Their contact information can be found on the Observing Program website at www.astroleague.org/observing. If further assistance is required please contact either of the national Observing Program coordinators.

Analemma Award

No. 6, Jim Barbasso, North Houston Astronomy Club

Arp Peculiar Galaxies Award

No. 73-V, John Robinson, Astronomical Society of Southeast Texas; No. 74-V, Robert Chapman, Member-at-Large; No. 75-V, John Kutney, Astronomical Society of Las Cruces; No. 76-V, Bruno Pancorbo, Member-at-Large; No.

77-V, Richard Karohi, San Antonio Sidewalk Astronomers

Asterism Award

No. 6, Aaron Clevenson, North Houston Astronomy Club; No. 7, Vincent S. Foster, Member-at-Large; No. 8, Brad Young, Astronomy Club of Tulsa; No. 9, Jim Ketchum, Astronomical Society of Kansas City; No. 10, Steve Bookout, Member-at-Large

Asteroid Award

Gold: No. 47, Steve Jaworiwsky, Howard Astronomical Society

Binocular Double Star Award

No. 55, Marilyn Sameh, Wabash Valley Astronomical Society; No. 56, Ken Gourley, Member-at-Large; No. 57, Bill Sanders, Central Arkansas Astronomical Society

Binocular Messier Award

No. 991, Gaston Leu, Member-at-Large; No. 992, Stephen Snider, Albuquerque Astronomical Society; No. 993, Nick Anderson, Back Bay Amateur Astronomers; No. 994, Wyatt Walker, Island County Astronomical Society; No. 995, Christopher Westphal, Northeast Florida Astronomical Society; No. 996, Stephen Jones, Houston Astronomical Society

Bright Nebula Award

No. 1, Michael A. Hotka, Regular, Denver Astronomical Society

Caldwell Award

No. 25, Bradley Schaefer, Gold, Baton Rouge Astronomical Society; No. 199, Thomas Gazzillo, Silver, Chesmont Astronomical Society; No. 200, Bradley Schaefer, Silver, Baton Rouge Astronomical Society; No. 201, Bob Scott, Silver, Island County Astronomical Society; No. 202, Clark M. Thomas, Silver, Roanoke Valley Astronomical Society

Carbon Star Award

No. 34, Mark Johnston, Austin Astronomical Society; No. 43, Gilbert Raineault, Member-at-Large; No. 44, Larry E. Madison, Member-at-Large; No. 45, Martin Dukeshire, Yakima Astronomical Society

Comet Award

No. 23, Al Lamperti, Gold, Delaware Valley Amateur Astronomers; No. 66, Steve Bookout, Silver, Member-at-Large; No. 67, Michael D. Stewart, Silver, Astronomical Society of Kansas City

Constellation Hunter:

Northern Skies Award

No. 126, Jerry Persall, Member-at-Large; No. 127, Joseph Michail, Member-at-Large; No. 128,



Grant Martin, Astronomical Society of Eastern Missouri; No. 129, Bob Scott, Island County Astronomical Society; No. 130, Eric Johnson, Member-at-Large; No. 131, Jonathan Poppele, Minnesota Astronomical Society; No. 132, Art Russell, Northeast Florida Astronomical Society; No. 133, Ken Gourley, Member-at-Large; No. 134, Jack Fitzmier, Atlanta Astronomy Club

Constellation Hunter:

Southern Skies Award

No. 4, Vincent S. Foster, Member-at-Large

Deep-Sky Binocular Award

No. 342, Jonathan Poppele, Minnesota Astronomical Society; No. 343, Edward Wiley, Astronomical Society of Kansas City; No. 344, Stephen Peacock, Member-at-Large

Double Star Observer Award

No. 493, Darrick Gray, Astronomical Society of Kansas City; No. 494, Zachary Lammi, Steele County Astronomical Society; No. 495, Jim Twellman, Astronomical Society of Eastern Missouri; No. 496, Jim Pedersen, Longmont Astronomical Society; No. 497, Steve Boerner, Astronomical Society of Eastern Missouri; No. 498, Edward Fraini, Houston Astronomical Society; No. 499, William R. Carney, Twin City Amateur Astronomers, Inc.; No. 500, Martin Dukeshire, Yakima Astronomical Society; No. 501, John Dorio, Texas Astronomical Society of Dallas; No. 502, Laquetta Karch, Northern Virginia Astronomy Club; No. 503, Jim Tallman, Back Bay Amateur Astronomers; No. 504, Lloyd Watkins, Cumberland Astronomical Society; No. 505, Roger Rohback, Member-at-Large; No. 506, Linda Hoffmeister, Olympic Astronomical Society; No. 507, Bill Kowalczyk, Jr., Houston Astronomical Society

Earth Orbiting Satellite Award

No. 1, Chris Earley, Colorado Springs Astronomical Society; No. 2, Scott Kranz, Astronomical Society of Kansas City; No. 3, Anthony Ayiomamitis, Member-at-Large, Athens, Greece; No. 4, Russell F. Pinizzotto, Astronomical Society of Kansas City; No. 5, Katrina DeWitt, Neville Public Museum Astronomical Society; No. 6, Jim Ketchum, Astronomical Society of Kansas City; No. 7, Roger Rigby, Richmond Astronomical Society; No. 8, Jerry Loethen, St. Louis Astronomical Society; No. 9, Don DeWitt, Neville Public Museum Astronomical Society; No. 10, Bruce Bowman, Colorado Springs; No. 11, Aaron Clevenson, North Houston Astronomy Club; No. 12, Sue Wheatley, North Houston Astronomy Club; No. 13, Gary Frerking, Colorado Springs Astronomical Society; No. 14, Anthony J. Kroes, Neville Public Museum Astronomical Society; No. 15, Brad Young, Astronomy Club of Tulsa; No. 16, Michael A. Hotka, Longmont Astronomical Society; No. 17, Patrick Scott MacDonald, Fort Worth Astronomical Society;

No. 18, Curtis Roelle, Westminster Astronomical Society; No. 19, Bill Sanders, Central Arkansas Astronomical Society; No. 20, Preston Pendergraft, Member-at-Large; No. 21, Ken Kopczynski, Tallahassee Astronomical Society; No. 22, Marcello Napolitano, Rose City Astronomers; No. 23, Bryan Tobias, San Antonio Astronomical Association; No. 24, Jacob DeWitt, Neville Public Museum Astronomical Society; No. 25, Matt Vann, West Texas Astronomers Club; No. 26, Denise Terpstra, Member-at-Large; No. 27, George Robinson, Member-at-Large; No. 28, Jeremy Baker, Astronomy Associates of Lawrence; No. 29, Dick Francini, Neville Public Museum Astronomical Society; No. 30, Becky Ramotowski, Albuquerque Astronomical Society; No. 31, Mark Simonson, Everett Astronomical Society; No. 32, Denise Moser, Astronomical Society of Kansas City; No. 33, Vincent S. Foster, Member-at-Large

Galaxy Groups & Clusters Award

No. 27-DA, Wyatt Sanford, Jackson Astronomical Association; No. 28, Ted Forte, Huachuca Astronomy Club; No. 32-DA, Bruce Scodova, Richland Astronomical Society

Globular Cluster Award

No. 237, Tom Gazzillo, Chesmont Astronomical Society; No. 238, Frank Colosimo, Chesmont Astronomical Society; No. 239, Ed Wiley, Astronomical Society of Kansas City; No. 240, Stephen L. Snider, Albuquerque Astronomical Society; No. 241, RoxAnne Peters, Member-at-Large; No. 242, Martin Dukeshire, Yakima Astronomical Society; No. 243, Bob Scott, Island County Astronomical Society; No. 244, Kevin Johnson, Minnesota Astronomical Society; No. 245, Janet Pullen, Island County Astronomical Society; No. 246, Marilyn L. Michalski, Delaware Valley Amateur Astronomers; No. 247, Mark Prouty, Olympic Astronomical Society

Herschel 400 Award

No. 490, James Twellman, Astronomical Society of Eastern Missouri; No. 491, Ed Wiley, Astronomy Society of Kansas City; No. 492, Brian Barling, Twin City Amateur Astronomers; No. 493, Bill Smith, Member-at-Large; No. 494, Mark Simonson, Everett Astronomical Society; No. 495, Richard H. Rhodes, Indiana Astronomical Society; No. 496, Christen K. Slotten, Olympic Astronomical Society; No. 497, Doug Lively, Raleigh Astronomy Club

Lunar Award

No. 830, Ken Gourley, Member-at-Large; No. 831, Chris Lamer, Kansas Astronomical Observers; No. 832, Charles Dzelah, Warren Astronomical Society; No. 833, Edward Wiley, Astronomical Society of Kansas City; No. 834, Karlis Lubkans, Member-at-Large; No. 835, Bill Sanders, Central Arkansas Astronomical Society; No. 836, Linda Hoffmeister, Olympic Astronomical Society; No. 837, Carolyn Alter, Rose City Astronomers; No. 838, Jim Fordice, Albuquerque Astronomical Society; No. 839, Nick Anderson, Back Bay Amateur Astronomers; No. 840, Ronald A. King, Northern Virginia Astronomy Club

Master Observer Award

No. 133, Timothy T. Meyer, Astronomical Society of Southeast Texas; No. 134, Lee Green, Twin City Amateur Astronomers; No. 135, Joseph R. Goss, East Valley Astronomy Club; No. 136, Bob Vickers, West Kentucky Amateur Astronomers; No. 137, Gregory M. Brown, Member-at-Large; No. 138, Lloyd Watkins, Cumberland Astronomical Society; No. 139, Grant Martin, Astronomical Society of Eastern Missouri; No. 140, Douglas Smith, Tucson Amateur Astronomical Association; No. 141, Art Russell, Northeast Florida Astronomical Society



TITLE PHOTOGRAPH: M64, THE BLACK EYE GALAXY; NASA AND THE HUBBLE HERITAGE TEAM (AURA/STSC)

Messier Award

No. 2639, Tom Gazzillo, Honorary, Chesmont Astronomical Society; No. 2640, Michael Hrivnak, Honorary, Chapel Hill Astronomical and Observational Society; No. 2641, Jean Napp, Honorary, Iowa County Astronomers; No. 2642, Nancy Rauschenberg, Honorary, Minnesota Astronomical Society; No. 2643, Stephen Snider, Honorary, Albuquerque Astronomical Society; No. 2644, David Lloyd, Honorary, Astronomical Society of Eastern Missouri; No. 2645, Stephen Andrews, Honorary, Kern Astronomical Society



Meteor Award

No. 151, Grace Aikman, 12 hours, Member-at-Large; No. 160, Dean R. Specker, 6 hours, Astronomical Society of Kansas City

Open Cluster Award

No. 57, Nelson Walker, Basic, Member-at-Large; No. 58, Larry E. Madison, Advanced, Member-at-Large; No. 59, Ted Forte, Advanced, Huachuca Astronomy Club

Planetary Nebula Award

No. 4, Frank Colosimo, Imaging, Chesmont Astronomical Society; No. 57, Martin Dukeshire, Advanced, Manual, Yakima Astronomical Society; No. 58, Nick Anderson, Advanced, Manual, Back Bay Amateur Astronomers

Sky Puppies Observing Award

No. 32, Chiann Safflarski, City Lights Astronomical Society for Students; No. 33, Jake Aikman, Member-at-Large; No. 34, Ullas Hanabe, North Houston Astronomy Club

Solar System Award

No. 77, Vincent S. Foster, Member-at-Large

Southern Arp Award

No. 5-V, Aaron Clevenson, North Houston Astronomy Club

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Southern Binocular Award

No. 81, Ron Probst, Tucson Amateur Astronomer Association

Southern Planetary Nebula Award

No. 2, Aaron Clevenson, Basic Award, North Houston Astronomy Club

Southern Sky Award

No. 40, Ron Probst, Tucson Amateur Astronomer Association

Sunspotter Award

No. 153, Willie K. Yee, Amateur Observers Society of New York; No. 154, Thomas Pennino,

Amateur Observers Society of New York; No. 155, Tristan Schwartz, Colorado Springs Astronomical Society; No. 156, Edward Fraini, Houston Astronomical Society; No. 157, Slava Muryhin, Westminster Astronomical Society; No. 158, Gilbert Raineault, Member-at-Large; No. 159, Janet Pullen, Island County Astronomical Society

Urban Observing Award

No. 151, Carol Ogden, Island County Astronomical Society; No. 152, Bob Scott, Island County Astronomical Society



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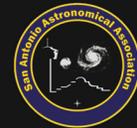
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Coming Events

Compiled by John Wagoner. To have your star party or event listed, please send the details, including dates, sponsors and website, to astrowagon@verizon.net.

January 25

Regional Meeting of Amateur Astronomers
Gardner-Webb University
Boiling Springs, North Carolina
www.ccastro.org

January 29-February 2

International Orange Blossom Special Star Party
Withlacoochee River Park
Dade City, Florida
www.stpeteastronomyclub.org/obs.php

February 23-March 2

Winter Star Party
West Summerland Key, Florida
www.scas.org/wvsp2014.htm

February 28-March 1

Dark Sky Festival
Harmony, Florida
www.darkskyfestival.com

March 1

Tri-Star
Guilford Technical Community College,
Greensboro Astronomy Club,
and the Cline Observatory
Jamestown, North Carolina
www.gtcc.edu/observatory/tristar.aspx

March 26-29

Mid-South Star Gaze and Astronomy Conference
French Camp, Mississippi
www.rainwaterobservatory.org/rainwater

March 26-30

Hodges Gardens Star Party
Hodges Gardens State Park
Florien, Louisiana
www.braastro.org/hgsp.html

March 29-April 5

OzSky Star Safari
(a.k.a. Deepest South Texas Star Safari)
Coonabarabran, New South Wales, Australia
www.ozsky.org

April 12-13

Northeast Astronomy Forum (NEAF)
Rockland Astronomy Club, Suffern, New York
www.rocklandastronomy.com/neaf

May 25-June 1

Texas Star Party
Ft. Davis, Texas
www.texasstarparty.org

June 6-8

MSRAL
St. Louis, Missouri
www.slasonline.org/MSRAL2014

June 25-28

Green Bank Star Quest
National Radio Astronomy Observatory,
Green Bank, West Virginia
www.greenbankstarquest.org

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This benefit is made possible by the efforts of League volunteer Marilyn Unruh, proprietor of Star 'N Space Books. She is also an avid amateur astronomer. Like many of the League's

members, she desires to help others enjoy our fascinating avocation. Marilyn notes, "This service allows me to give back to the astronomical community by doing something that I love to do – deal in books!"

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Earth and Planetary Sciences Department
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Keynote Speaker:
Dr. Ray Arvidson

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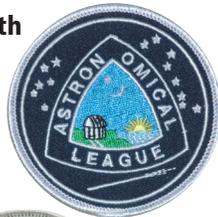
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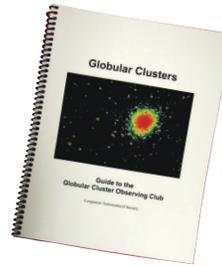
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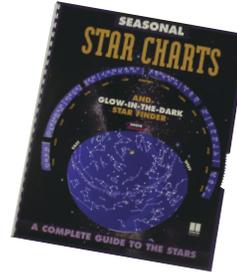
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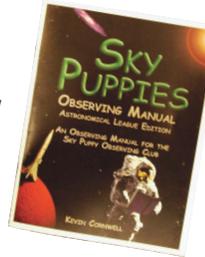
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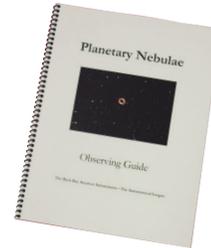
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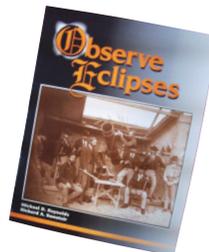
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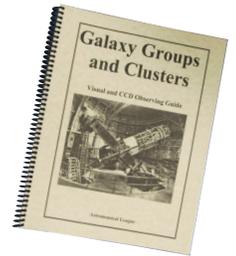
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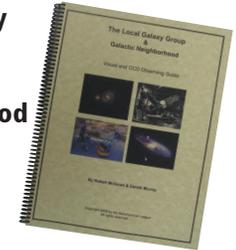
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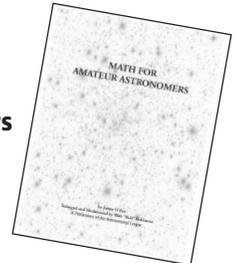
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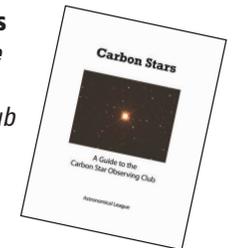
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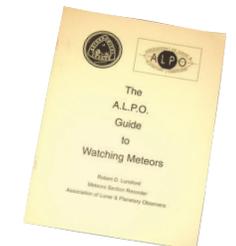
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This image of the annular eclipse on May 20, 2012, was taken by Matt J. McCullar, a member of the Fort Worth Astronomical Society. He used a Canon PowerShot digital camera, with no filters, processing, or optical aid. He thought the accompanying towers framed the crescent Sun very nicely. His society held an eclipse-watching party near the top of the dam at Benbrook Lake in southwest Fort Worth, Texas. That location offers a relatively unobstructed view of the western horizon and is still accessible to the general public.

The Astronomical League invites its members to submit astrophotography for publishing in the *Reflector*. When sending photos, please include a brief explanation telling us when and where the photo was taken, your club affiliation, what equipment was used, and any computer processing that was involved.

