

# Reflector

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September 2014



**The Changing Face of the Sun**  
**2014 Horkheimer Youth Service and Journalism Awards**  
**2014 Mabel Sterns Newsletter Editor Awards**  
**Star Sisters—Observing Twins**

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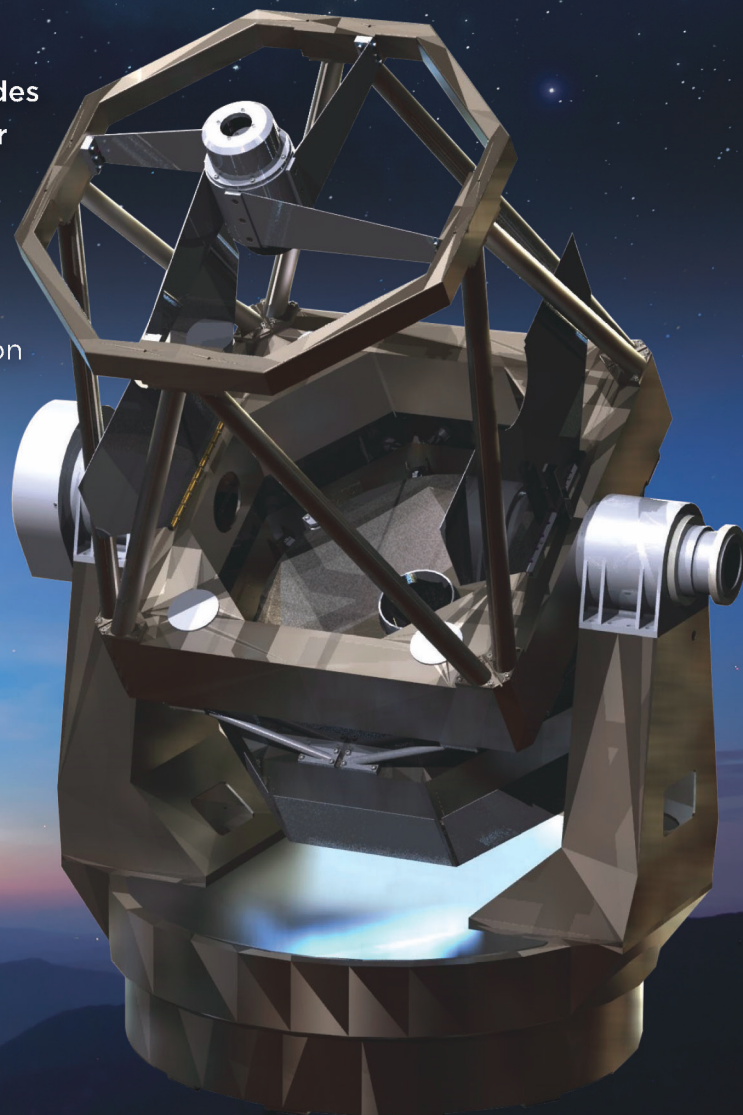
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**Sharpless 101**, probably better known as the **Tulip Nebula**, is a nice emission nebula located approximately 6,000 light-years away in the constellation Cygnus. This image, submitted by Dan Crowson, shows several additional objects in the field: Barnard 144—dark nebula throughout the field (darkest at center), Barnard 146—dark nebula near the two stars at the right center, and LBN 174—all of the nebulosity that doesn't include Sharpless 101. Image specifications: H-alpha, 12 x 30 minutes, binned 1x1; RGB, 8 x 5 minutes each, binned 2x2. Total exposure 8 hours. Imaged from Dardenne Prairie, Missouri, over three nights in June 2014 with a SBIG ST-8300M on an Astro-Tech AT90EDT at f/6.7.

To our contributors: The copy and photo deadline for the December 2014 issue is October 15. Please send your stories and photos to our magazine editor, **Ron Kramer** ([editor@astroleague.org](mailto: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

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## Looking Back At My League Tenure

What an incredible gift I have had these past four years while serving as your president. One of the major goals on my list was to visit as many societies, star parties, etc., as possible, where we haven't had a presence for many years.

To a large extent I believe we have accomplished that, whether it was an impromptu "mini regional" meeting at the



Incoming president, John Goss, left, presents a commemorative award to Carroll Iorg.

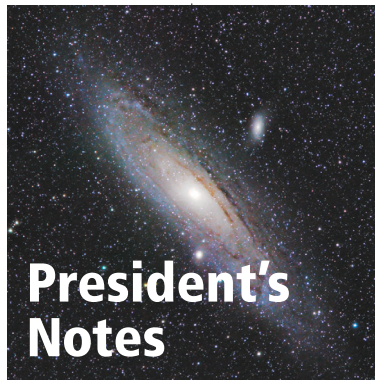
Grand Rapids Public Museum to present Astronomy Day awards to winners who couldn't attend the ALCon convention to receive them in person, or a visit to the Ames (Iowa) Area Amateur Astronomers meeting to present an award of thanks to a former member of the *Reflector* staff.

Other opportunities included a visit to



Carroll Iorg passes the gavel to John Goss.

Stellafane to present the League's Webmaster Award and attend the Northeast regional meeting. Another was presenting a certification of appreciation to the Okie-Tex Star Party for their many



years of sponsoring a successful star party.

Recent visits have included setting up a League booth at the first annual **Starlight Festival** in Big Bear, California, organized by a major sponsor of the League; representing the League at the **Texas Star Party** and Southwest regional

meeting; taking the League Sales inventory to the North-Central regional meeting; visits to NEAF and the **Arizona Science and Astronomy Expo**; special visits to member societies including the Atlanta, Omaha, St. Louis, and Salt Lake City astronomical societies; a visit to the AAVSO meeting to present the League's **Leslie Peltier Award**; and a visit to League Astronomy Day sponsor *Sky & Telescope* in Cambridge, Massachusetts.

For you who attended the recent ALCon 2014 in San Antonio, you may have caught the comment I made regarding the quote that it takes a village to raise a child (paraphrased for effective operation of the League) when I presented an award to my wife for the tremendous support she has given me with my service to the League. None of us can be effective without the outstanding support of those family members and friends closest to us. Without the tremendous amount of volunteer help in addition to the national office staff, we could not do it. I have been privileged to serve with the two national observing award coordinators, the entire website team, and the observing award coordinators who are so dedicated to processing your submissions for the various programs in a timely manner. Also thanks to the entire *Reflector* staff and layout personnel who have improved the quality and appearance of the publication to a very high level. Our national office staff of Mitch Glaze, Joe Alburty, and Denise Moser are most dedicated to making our members' communication with the national office as efficient and pleasant as possible. Finally, I appreciate all the help and support of the executive committee and League council members.

My direct connection with the League started in 1994 when I chaired my first ALCon convention. Since then, I have chaired my region—the Mid-States region—several times, served as League awards coordinator for approximately eight years, served as vice president for four years, and now have concluded my two

terms as president.

Some of the important changes we have made in the past four years include making a digital version of the *Reflector* available online, expanding the use of council conference calls to conduct important business in between ALCon council meetings, improving the vetting process for new observing award coordinators, and electronically submitting dues statements and election ballots for more economical processing.

The **Longmont (Colorado) Astronomical Society** recently signed a lease with the League to use the ISS/AT telescope in their outreach programs, and I am also pleased to report that we will begin a trial international society membership shortly with three organizations.

There were challenges along the way, and we had to make some tough decisions at times, but it was still an incredible experience, one that I will always have fond memories of.

## Astronomy Day Awards for 2014

The **Kalamazoo (Michigan) Astronomical Society** has won the best event honor in the medium-population category. The **Travelers Science Dome Planetarium** (Connecticut) is the winner for the small-population category. The **Popular Astronomy Club—Quad City**, located in Moline, Illinois, won the award for quality events year after year. Prizes of \$150, \$150, and \$50, respectively, were given. We give many thanks to our co-sponsors of Astronomy Day, the American Astronomical Society and *Sky & Telescope* magazine.

## ALCon 2014

I offer my thanks to the **San Antonio Astronomical Association** for co-chairing a great convention. Other Southwest Region societies assisted at the convention, including the **San Antonio League of Sidewalk Astronomers**. Three youth award winners were honored and are covered in a separate article.

## G.R. Wright Service Award

I was honored to present the League's 2014 **G.R. Wright Service** to **Aaron Clevenson**, one of our two national observing award coordinators.



Aaron Clevenson receives his award from Carroll Iorg.

Aaron has done an excellent job of vetting new people for observing award positions and handling problems with observing awards that happen from time to time. In addition, he helps members submit proposals for new observing award programs, making sure each is a strong candidate based on such items as potential demand for the new program and ensuring that there is not excessive duplication with an existing program.

**Leslie C. Peltier Award**

The 2014 Leslie C. Peltier Award for outstanding astronomy observations of



ADRIAN NEW

James Fox receives his award from Carroll Iorg.

lasting significance was awarded to **James Fox**. In the 1990s, he began submitting photo-electric photometry (PEP) observations to Howard Landis and Phil Manker of AAVSO. In 2008, the AAVSO honored him with recognition for over 1,000 PEP observations of variable stars. Since moving to better skies in New Mexico, he now contributes an average of 200 PEP observations annually to AAVSO and chairs its PEP section. Jim also has submitted many PEP observations of Uranus and Neptune to the Association of Lunar and Planetary Observers. Last but not least, he was president of the Astronomical League from 1990 to 1994.

**Astronomical League Award**

The Astronomical League Award for 2014 was presented to **Dr. David Hough**, professor of physics and astronomy at Trinity University in San Antonio. Dr. Hough has been a good friend and supporter of the Astronomical League for over 20 years. His



ADRIAN NEW

Dr. David Hough receives his award from Carroll Iorg.

support for the National Young Astronomer Award program is appreciated very much.

His research is in astrophysics, focusing on distant galaxies with powerful cores known as



JOHN GOSS

Observing award coordinators meeting at ALCON.

active galactic nuclei (AGN). Arrays of radio telescopes are used to image AGN at high resolution.

These include two instruments operated by the National Radio Astronomy Observatory: the Very Long Baseline Array (VLBA) and Very Large Array (VLA). The VLBA and VLA allow study of the physics of relativistic “jets” that begin near supermassive black holes in AGN and transport energy to immense “lobes” a million light-years away. Forty-one of his university students have participated in this work, which has been funded by NASA, the National Science Foundation, the Research Corporation for Science Advancement, and the American Astronomical Society.

Dr. Hough has given numerous talks on astronomy and hosted observatory visits for various school and scout groups. He has also assisted with youth sport and musical activities.

He has contributed in many areas at his university, including serving as chair of the Department of Physics and Astronomy.

**Observing Award Coordinators Meeting at ALCon 2014**

We scheduled a reception for observing award coordinators at ALCon this year. We had great attendance, and it was useful to meet other coordinators and share best practices with them. Plans are to schedule meetings at future ALCons.

**Looking to the Future**

Congratulations to newly elected president John Goss and vice president Bill Bogardus! During the past four years, our leadership team took the League to a higher level of functioning. I feel confident the new leadership team will improve our organization of over 15,000 members even more.

So, I’m now going to take life just a little easier. Thanks for allowing me to serve as your president.

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*Carroll Iorg*

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# Reflector

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Subject line: "Letter to Editor"

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## Dear Editor:

Don't know whether anyone at AL knows about this, but Ed Halbach was instrumental in founding the AL and served as its first president in 1947. I'm sending you a link to the AAVSO site because there's an interesting story there regarding Ed. He recently had an asteroid named in his honor. Coincidentally, his daughter lives a few blocks from me, and she took me to meet him shortly before he passed away at age 101 in 2011. She passed this information along. His daughter would be a willing resource if you wanted additional information about Ed.

## Reflector Mail

### Robert Kerr

[www.aavso.org/iau-names-asteroids-prominent-aavso-observers](http://www.aavso.org/iau-names-asteroids-prominent-aavso-observers)

## A Meeting with Evered Kreimer

I had the opportunity to meet Evered Kreimer, the famous astrophotographer who first used the cooled emulsion camera.

Evered Kreimer was a big name in amateur astronomy back in the 60s and 70s. He had a contract with *Sky & Telescope* magazine and had his photos included monthly. He became interested in astronomy when he was a teenager. He moved to Prescott, Arizona, in 1962 and built his observatory, housing a Cave 12.5-inch f/7 Newtonian. Later on he moved to another part of Prescott and built another observatory. He also had his own imaging processing room, to process and develop the Kodak Tri-X film that he used on his photographs.

One of his biggest contributions was being co-author of the book, *The Messier Album*, published in 1978. This book included information, sketches, and photos of all the Messier objects as well as the history of Charles Messier. This is a popular book among astronomers looking for a quick reference on any Messier object. Kreimer contributed all the photos and John Mallas contributed the sketches of all the objects as seen through his 4-inch Unitron refractor. This book is still available today.

He hasn't been heard from for the last several years. During a trip visiting my grandparents in Prescott, we managed to get hold of him and he invited us down to visit him. Kreimer showed us his photos and told us his story.

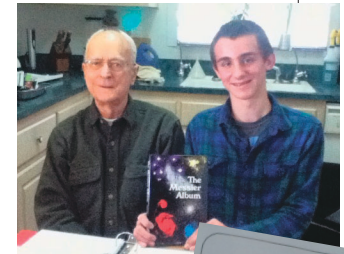
About 5 years ago, Kreimer gave away his telescope and sold his house. The observatory was torn down. He moved to a quiet,

beautiful neighborhood in Prescott. He still is into photography; while he can't get out under the stars anymore, he photographs birds, and has since switched to digital. He has a small spotting scope that he carries around now.

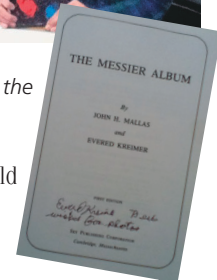
Kreimer is still sharp as a tack, and he knows his

stuff. He is 92. My grandpa and he really connected; he worked in a photo lab for over 30 years and did some astrophotography of his own with his 12.5-inch f/6 Newtonian. They were both talking about how they did all the image processing, chemicals used, etc. Kreimer took a particular liking to my sketches, and it was fun comparing sketches with his photos. He told me that in the 36 years *The Messier Album* has been out, he never received one letter, one phone call, nothing. I'm the very first.

It was a real honor to talk with him, and is a really kind man. This is the only signed copy of *The Messier Album*, and I'm so honored to have it be my copy. Thanks to all who made this possible, my parents, my grandparents, and, of course, Mr. Kreimer.



Justin, Mr. Kreimer, and the signed book.



### Justin Balderrama

[theyoungastronomer.wordpress.com](http://theyoungastronomer.wordpress.com)

## To the Editor:

After spending one year completing the Analemma Club and two years in an appeal process up to the AL president, I have finally received notification that I will not be awarded the certificate. The deficiencies given for denying the award did not match the requirements as listed on the AL website. After completing 47 previous clubs, I had believed that the Astronomical League observing programs maintained a good reputation with amateur astronomers.

Before I resigned as an observing coordinator due to this fracas, I had the pleasure of reviewing several applications for one of the observing clubs. In all cases the applicants saw things differently than I did. However, I tried to remember that the

*Continued on page 8*

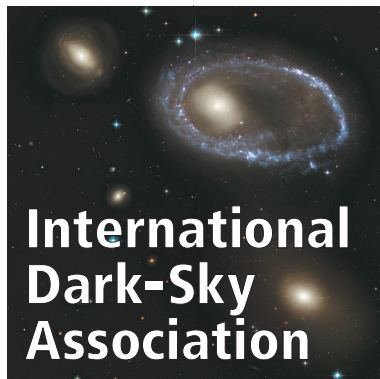
## Light-Emitting Diode (LED) Fixtures

Major cities—New York, Pittsburgh, Oakland, Berkeley, and San Francisco, amongst others—are replacing their current street lighting systems which use high-intensity discharge lamps (high-pressure sodium or metal halide) with light-emitting diode (LED) fixtures. LED technology has

matured to the point where the installation and operational costs are no longer prohibitive, and LEDs can lead to savings in energy and maintenance costs. High-pressure sodium, low-pressure sodium, and metal halide high-intensity discharge lamps have been the mainstay of outdoor lighting systems for many years. Sodium lamps are quite energy efficient, but bulb replacement is time-consuming and expensive, and high-intensity discharge lamps are either on or off. They cannot be dimmed.

LEDs have a number of advantages: long lifespan, better directional control of the light, little deterioration of illuminance over a fixture's lifetime, and the ability to dim or turn off the fixture individually through remote-control software. A typical LED fixture contains many tiny LED emitters arranged in a square, rectangular, or circular pattern. Each emitter has a tiny micro-lens that controls its light. Thus, most LED fixtures produce a good downward distribution of the light and, for the most part, can be considered full-cutoff fixtures. However, like any lighting system, they can be poorly designed and/or poorly aimed. Ideally, the LED light source should not be visible to drivers, bicyclists, or pedestrians unless they are directly under the fixture.

The LED revolution has a good news—bad news aspect. The good news is that these fixtures are able to produce excellent lighting with minimal light trespass and light pollution if properly designed, situated, and maintained. They are reasonably energy efficient, do not deteriorate for many years, have lifespans of a decade or more, and can be easily dimmed or otherwise controlled. It would be possible, for example, to have an LED lighting system on a busy highway fully lit early in the evening when traffic is high. As the traffic diminishes in the later evening, individual fixtures could be dimmed or shut off. After midnight when there is only an occasional car, the system could be shut off but sensors could note the presence of a car and turn lights on ahead



## International Dark-Sky Association

of the car's path and turn the lights off behind the car's path as it proceeded down the road.

The bad news is that LED fixtures can be misused. The small micro-lenses produce sharp, well-defined beams of light which are very bright when viewed from certain angles.

Therefore, an overly bright LED fixture can produce considerable glare, particularly as one is approaching the fixture or looking up into it. There is also the tendency to "overlight" with these fixtures, as they are perceived incorrectly as being so energy efficient that one can bump up the lighting levels to far beyond what is reasonable or necessary to the task.

There is also considerable evidence that the color temperature of the light is very important for human comfort, safety, and well-being. The higher the color-corrected temperature of an emitter, the more blue light is emitted. The terms "warm" and "cold," applied to the color of light that LED bulbs produce, are really misnomers. Although the LEDs and bulbs with higher temperatures are bluer to the eye and appear "colder," they are actually warmer from a blackbody physics point of view. The LEDs and bulbs with lower color temperatures appear "warmer"—more yellow or reddish—as we think of warm as red, glowing heating coils or burning logs. In fact, the "warmer" emitters have less emission and lower temperatures from the blackbody physics point of view.

Most LEDs come in a color range from 2800 Kelvin to 5000 Kelvin, the latter appearing very "blue" and metallic. The latter produces more glare, may be more harmful to wildlife and human health, and its light is often considered too stark. Unfortunately, early LED systems often used LEDs with temperatures above 4000 Kelvin and their light is considered "cold." The light from LEDs with color temperatures around 3000 to 3500 Kelvin is considered "warmer." This light has a more natural white rendition with less blue and more yellow. LEDs in the "cooler" 4000 Kelvin range and above are more readily available, somewhat more energy efficient, and somewhat less expensive. However, the technology is rapidly changing, with "warmer" LEDs now becoming available at competitive prices.

*Continued on page 8*

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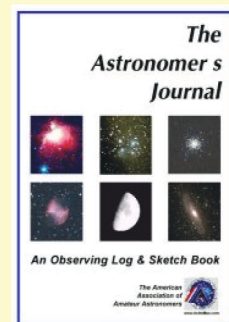
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Cepheus is an ancient constellation representing the mythological King Cepheus of Aethiopia, husband of Queen Cassiopeia and father of Andromeda. The constellation lies between Cassiopeia and Draco and spans declinations from 55 to 88 degrees north, making it circumpolar for most Northern Hemisphere observers. The constellation is best viewed from August to December when it is high above the horizon at the end of astronomical twilight.

Cepheus is situated on the edge of the Milky Way. However, unlike many Milky Way constellations, Cepheus does not contain a plethora of star clusters or nebulae. The constellation has no Messier objects and contains only 36 of the 7840 NGC objects (the average is 89 per constellation).

That being said, Cepheus does contain an excellent and fascinating object known as the Iris Nebula. The Iris Nebula is an example of a reflection nebula associated with an open star cluster. The star cluster is known as NGC 7023, although often that designation is applied to the nebula, too. Like its host constellation, NGC 7023 is circumpolar for most of the Northern Hemisphere and best viewed in the autumn months when it is highest above the horizon.

The Iris Nebula is found six degrees north and slightly west of the bright star Alderamin (Alpha Cephei). Perhaps the best way to star hop to NGC 7023 is to follow a line from the

# DEEP-SKY OBJECTS

## THE IRIS NEBULA

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



star Errai (Gamma Cephei) through the star Alphirk (Beta Cephei) another three and a quarter degrees southwest. For reference, Errai and Alphirk are eleven degrees apart.

NGC 7023 is a fairly bright nebula surrounding a 7th-magnitude star known as V380 Cephei. The Iris Nebula is essentially the dusty molecular cloud out of which V380 and other stars formed. This massive, hot, spectral-class-B star's radiant output provides the illumination making the nebula visible. V380 varies slightly in brightness from magnitude 7.10 to 7.36. The star and nebula are roughly

1300 light years away and the bright reflection nebula spans six light years. The Iris Nebula is just a small region of a much larger complex visible with long exposure astrophotography.

The Iris Nebula is very irregularly shaped. Its brighter regions are easily seen using medium sized amateur telescopes. Careful observations, especially with larger light buckets, reveal very dark lanes within the nebular glow. Although the eyes only capture shades of gray at the eyepiece, pictures of the Iris Nebula display blue hues, indicative of starlight reflecting off of dust grains. The nebula's bright

filaments trace the shape of flower petals. The petals along with the blue color resemble the iris flower, the nebula's namesake.

The accompanying image of NGC 7023 was taken with a 102 mm f/6.3 apochromatic refractor with an SBIG ST-2000XCM CCD camera. The exposure was three hours. The image is 60 x 40 arcminutes. In the image, the brightest region of the nebula has drowned out V380 Cephei, but the star can easily be seen when viewing through a telescope. Other fainter stars in the NGC 7023 star cluster are visible in the image and in a telescope.

Just west (right in the image) of the westernmost blue "petal" lies a dark keyhole-shaped region surrounding a very faint star cluster. Known as Collinder 427, this star cluster is very faint (magnitude 13.8) and will challenge a 14-inch telescope except under the most pristine sky conditions. The cluster contains a dozen 14th- and 15th-magnitude stars.

Dark obscuring clouds of molecular gas and dust abound beyond the bright regions of the Iris. The clouds trick the eye into seeing a multitude of various shapes. The lack of background stars compared to other regions around NGC 7023 may be the only clue to the presence of these dark nebulae. Infrared observations of NGC 7023's molecular clouds indicate that the nebula may contain polycyclic aromatic hydrocarbons. ☼

### Reflector Mail/*from page 6*

intent of these clubs is to foster renewed interest in our hobby, or different facets of it that had not been explored before by the observer. It was my understanding that unless the specific requirements of the club, as defined on the website, were not met, the observer should be awarded the certificate. The Astronomical League, its coordinators, and officers need to remember that they are in the service of the amateur astronomers that pay dues and support the League. When people have invested a significant portion of their lives (and/or money) in completing one of these programs, I believe they should be given the benefit of the doubt, or at the very least that the rules should be applied equally and to the letter.

**Brad Young, P.E.**

### International Dark-Sky Association/*from page 7*

The goal of IDA and professional lighting engineers attuned to protecting dark skies is for the LED revolution to have improved outdoor nighttime lighting with less light being produced but more effectively used on the ground where it is needed for public security and safety. The goal is for the color rendition to be around 3000 Kelvin and not to exceed 3500 Kelvin so that the light is pleasing and less likely to produce excessive glare or the harmful effects of a more blue emission.

**Tim Hunter**

Co-founder, IDA

3223 N. First Avenue; Tucson, Arizona 85719-2103

Phone: 520-293-3198; Fax: 520-293-3192

Email: [ida@darksky.org](mailto:ida@darksky.org); [www.darksky.org](http://www.darksky.org).



Due to increased processing costs, the annual dues rate for a Domestic Member-at-Large membership increases to \$40 and for an International-at-Large membership increases to \$50 effective January 1, 2015. Be sure to pay your MAL dues today to lock in the previous rate!

### Star parties are for you!

If you've never been to a star party, check out the list on page 22 and pick one that is close to you. Before you go, here is a sampling of what you can do there:

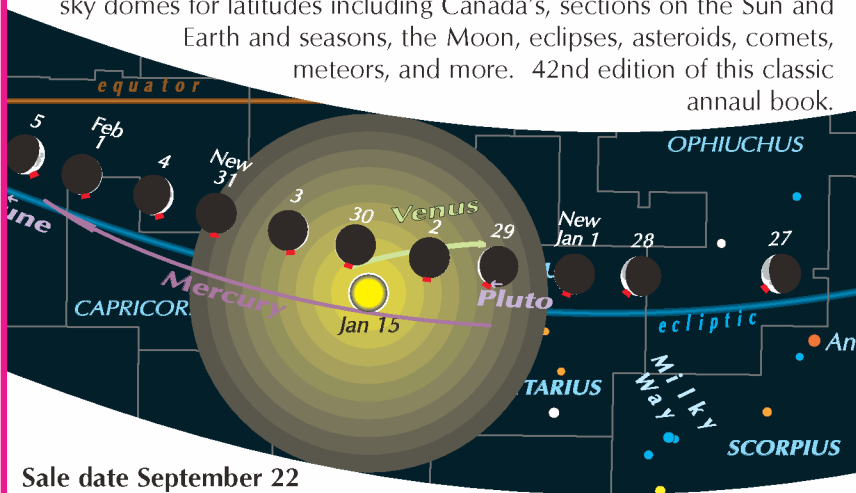
- Visit vendor booths to see first hand the equipment you want.
- Look for a new scope. See the full variety surrounding you.
- Discover something. Take in a talk given by those who enjoy the subject.
- Observe something new. You're surrounded by those who have been there already.
- Meet like-minded people with whom you can talk shop.
- Learn about other clubs and how they do things.

Are these reasons enough for you? Well, here's one more: Experience the great camaraderie you'll find among people who enjoy what the sky offers. Star parties are made for amateur astronomers. They are made for you.

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# THE CHANGING FACE OF THE SUN

By Vincent S. Foster

The Sun is one of the most exciting objects in the sky to observe. Solar observing in hydrogen alpha light is one of the few areas of amateur astronomy where you can see changes happen by the minute, rather than over hours or days. All events on the Sun are unique and will never be repeated exactly. Whether you follow the growth and decay of a sunspot group, the rapid emergence of a solar flare, or the spray of an erupting prominence on the Sun's limb, one thing is certain: the Sun will present a uniquely different face, each and every day.

Although observing the Sun can be fascinating and even addictive, it is critical to exercise extreme caution before viewing it. Use filters and telescopes only from reputable sources and always check your filter for damage before each use. Observing the Sun is the only inherently dangerous observing an amateur astronomer can do. Always remember this and take the necessary precautions.

If you do not know that a filter or procedure is safe then do not use it! Always err on the side of safety. Filters that let too much infrared light through can burn an eye if used visually, and there is no pain when this happens. Burned retinas cannot be repaired. So be very careful. Remember to cap or remove your finder scope before observing and never use a "solar filter" that screws into an eyepiece.

Once you've addressed these safety concerns, you need to learn to identify and understand the dynamics of the many features that occupy the Sun's chromosphere, which is the middle layer of its atmosphere. Among these are prominences—dense clouds of material suspended above the surface of the Sun by loops of the solar magnetic field, seen extending beyond the limb, or edge, of the Sun. These are some of the most stunning features on the Sun. *Filaments*

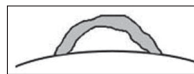
are prominences seen face-on against the disk of the Sun. Both filaments and prominences can remain in a quiet or quiescent state for days or weeks. However, as the magnetic loops that support them slowly change, filaments and prominences can erupt and rise off the Sun over the course of minutes or hours.

Eruptive prominences and active regions can give rise to surges, sprays, Ellerman bombs and Moreton waves—these can change before your eyes in less than a minute. A *surge* is a transient prominence produced by flares or very active regions, appearing as a moderate to large collimated jet of gas rising up from the surface. Surge-ejected gas will often fall or draw back onto the Sun along magnetic field lines, while at other times it will rise and disperse, fading from view.

A *spray* is a transient prominence produced by the most violent flares, as pre-flare elevated material flies off in many directions. An *Ellerman bomb* is a tiny, bright, transient point of light that usually lasts less than five minutes and is most often found on the edge of a sunspot where magnetic field lines break the surface. A *Moreton wave* is a chromospheric shock wave from a large solar flare that can expand across the solar surface at about 1000 kilometers per second.

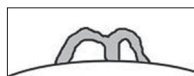
**Prominences take many shapes and forms as seen here:**

**Single arch**—This is one of the most common shapes of a prominence, representing charged



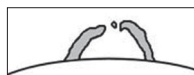
solar material flowing up from and down to the solar atmosphere along local magnetic field lines.

**Double arch**—Much less common than a single arch, the



two arches of a double arch are connected to each other by a center stream of material.

**Broken arch**—Probably an evolutionary stage of a single arch, a broken arch features



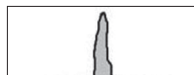
gaps in the stream of material where the plasma density is too low to be detected or the material has been dispersed or disrupted by the solar wind.

**Unconnected arch**—One end of the arch has not reconnected to the solar surface. This is also likely



to be an evolutionary stage of a single arch, where material is still traveling down the magnetic field lines to the surface.

**Straight pillar**—This appears as a vertical eruption from the solar surface, and is quite common. It could also be an arch seen



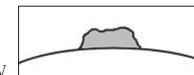
edge-on. **Curved pillar**—A pillar that is bent by magnetic or other forces, and could also be the early stages of an arch seen at an angle.



**Inclined pillar**—The material at the base of the eruption and throughout the prominence is inclined at a low angle to the surface.



**Mound**—Another fairly



common type of prominence, seen as a low eruption. A mound is wider than it is high.

**Hedgerow**—A grouping of many smaller prominences that may have come from the same source of activity.



**Pyramid**—This common type looks like a combination of a pillar and a mound, with a wide base that converges to a fairly sharp point.



**Broken pyramid**—A pyramid with holes in its plasma stream or sections of plasma that have broken off. It is probably an evolutionary stage of a regular pyramid.



**Fork**—Two prominences, typically of pyramid or pillar form, that are close together. The



width between them is usually less than the base width of the thinnest prominence.

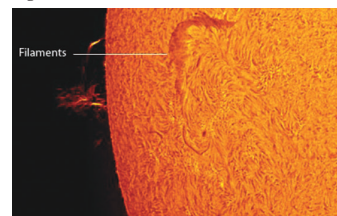
**Detached**—Here the material has lifted off the surface entirely and appears to be completely disconnected from the



surface. Some low-density interconnecting material may be there, but it is not detectable by the observer.

**Anomalous**—Some prominences cannot be placed in a distinct category. Due to the random, complex nature of solar surface eruptions and magnetic fields, these kinds of prominences are relatively common. Other features often seen in the chromosphere include the following:

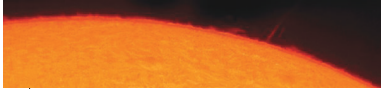
**Filaments**—Prominences seen against the face of the Sun,



JACK NEWTON

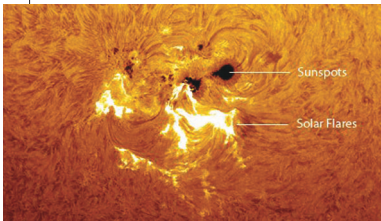
appearing as long, narrow dark streamers or diffuse, complex dark areas. Filaments often mark areas of magnetic shearing.

**Spicules**—Small jets of gas less than 10,000 kilometers high, usually seen as a mass of tiny, bright spike-like features



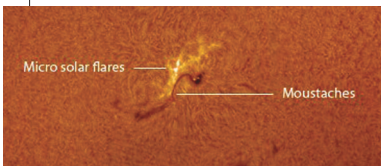
on the limb or as tiny, dark spikes coming out of network elements.

**Flares**—Intense, abrupt releases of energy, which occur



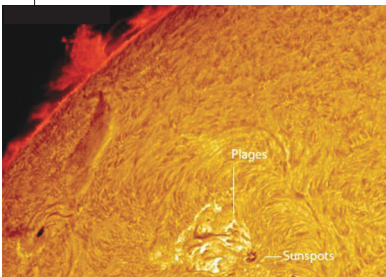
in areas where the local magnetic field is rapidly realigning or changing because of magnetic field stress.

**Ellerman bombs**—“Micro” solar flares that appear as tiny, bright, transient points of light (usually less than 5 arcminutes across), most often found in



emerging flux regions or at the edges of sunspots where the magnetic field is breaking the surface. Ellerman bombs are also called Severny moustaches.

**Plage**—Patchy H-alpha brightenings on the solar disk, usually in or near active



regions. Plages can last for several days, are irregular in shape, and are variable in brightness. They mark areas of

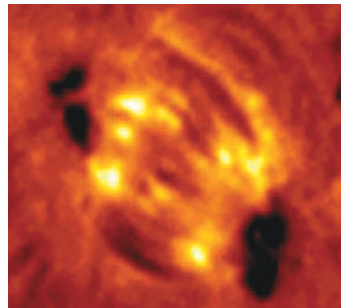
nearly vertical emerging or reconnecting magnetic field lines.

**Field transition arches**—Filament-like fibrils that cross the polarity inversion line of a



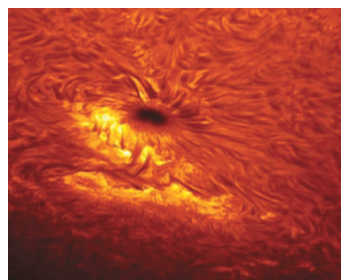
bipolar magnetic region. A polarity inversion line is a line halfway between two areas of opposite magnetic polarity.

**Emerging flux region**—An area on the Sun where a magnetic



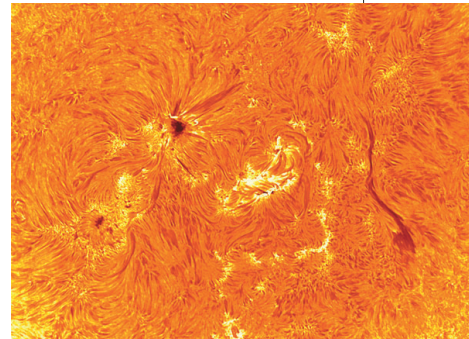
dipole or flux tube is surfacing on the disk and will eventually produce a bipolar sunspot group. Pores or small developing sunspots often mark each pole of an emerging flux region. Growth is rapid, forming in just a few hours.

**Sunspots**—Temporary spots that appear dark compared to their surroundings. They are caused by intense magnetic activity, which inhibits convection and forms cooler areas on the solar surface. Although sunspots are normally consid-



ered a white light feature, they are visible in H-alpha, but their penumbrae are lower in contrast in H-alpha than in white light.

**Active region**—A local, transient volume of the solar atmosphere in which plages, sunspots, filaments, flares, and related features may be observed. Active regions result



from enhanced magnetic fields; they are bipolar and may be complex if a region contains two or more bipolar groups.

Before setting up your equipment, you may want to see how the Sun looks in H-alpha light by checking out the National Solar Observatory's Global Oscillation Network Group website at [gong.nso.edu](http://gong.nso.edu)—a global system of telescopes keeps constant vigil on the Sun with images and movie loops that are updated every minute.

The Astronomical League offers a colorful pin and certificate for observing and imaging or drawing hydrogen alpha features of the Sun through its Hydrogen Alpha Solar Observing Program. Since the program began last year, eight members of the Astronomical League have qualified for the award. Additional

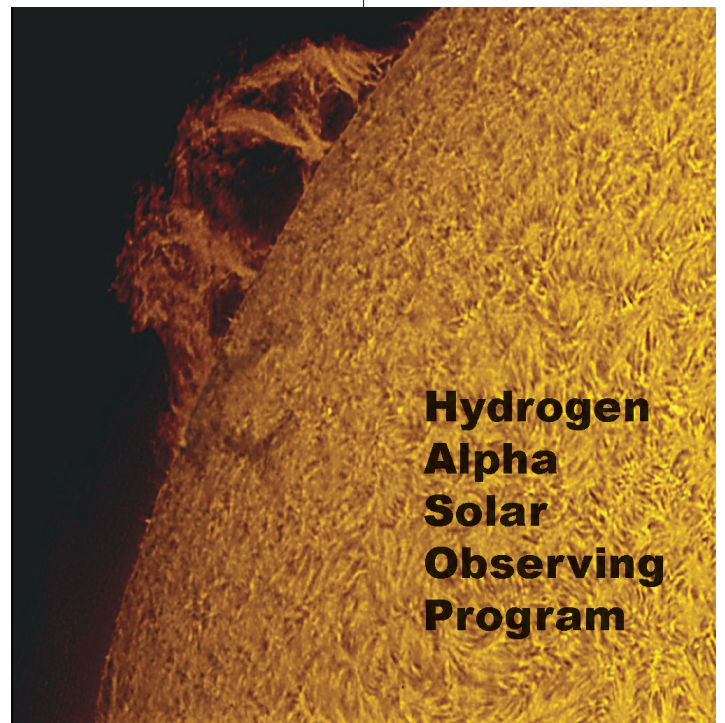
information is at: [www.astroleague.org/content/hydrogen-alpha-solar-observing-program](http://www.astroleague.org/content/hydrogen-alpha-solar-observing-program).

Daytime observing of the Sun has its advantages. There's no lost sleep as with nighttime observing.

You won't trip in the dark and you won't freeze when the temperature plunges at night. And you won't be eaten alive by mosquitoes as often happens at night. But best of all, you'll enjoy fantastic views of the Sun! ☀️ *Vincent Foster is coordinator of the Astronomical League's Hydrogen Alpha Solar Observing Program.*

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*Email: grantfinder1@aol.com*



## Hydrogen Alpha Solar Observing Program

By Bob Kerr

**M**y introduction to twin sisters Melinda Hopper and Melissa Adams was by way of their observing logs for the Globular Cluster and Binocular Double Star observing programs. I was impressed by their thoughtful log entries, attention to detail, and extraordinary enthusiasm. Their passion for the hobby flows from, and is strengthened by, their close relationship. But further, their story illustrates how the true satisfaction of observing can have more to do with the motivation and dedication of the observer than the complexity or aperture of their instrument.

Melissa Adams was 34 when she first tentatively

peered into the 4.5-inch Tasco reflector's eyepiece to witness a sight that would transform her life. Her eye found the crescent Moon. "I was absolutely astonished," she recalls.

The telescope was a gift to her family from a brother-in-law visiting from New York. Since Melissa and her husband farm in southwest Iowa, he thought they might get some occasional enjoyment from the scope under their dark, rural skies. He had no way of knowing the extraordi-

nary spark he had ignited that evening, not only in Melissa, but ultimately in her twin sister Melinda Hopper as well. Now, years later, both have qualified for the Astronomical League's coveted Master Observer Award.

After that first view through the new telescope, clouds prevented further stargazing during the remainder of the visit, but soon thereafter, Melissa once again had the Tasco in the backyard. Determination defines these twin sisters, and that night Melissa

was determined to see Saturn. Growing up, she and Melinda had looked through their grandfather's binoculars and witnessed a solar eclipse through their

father's welder's glasses, but nothing had prepared her for the views through a telescope. She pointed the scope at one of the brightest objects in the sky, looked in the eyepiece, and even though the image wasn't yet in focus, she knew she'd found Saturn.

"I quickly focused the eyepiece, and a chill went up my back, it was so outstanding," she says. "I could see the rings! I was totally awestruck. I thought it was just the most

beautiful thing I had ever seen."

With that amazing view, Melissa was hooked and spent every night she could out under her dark Iowa skies observing Saturn, Jupiter, Mars, and the Moon. Since she hadn't yet learned her way around the sky, she stayed with bright objects and found them fascinating targets for a beginner. As she methodically taught herself about the night sky and the constellations, she began to investigate the brighter Messier objects. The Tasco was equipped with a 0.956-inch focuser, starter 6 mm and 20 mm eyepieces, and a

small finder. She struggled to track down her first deep-sky object, and when she finally bagged her quarry, it was M57, the Ring Nebula. It's still one of her favorites, but she points out that her favorite tends to be the one she's observing at the moment. Without the benefit of a local club or other amateurs in her area, in time she taught herself how to navigate the night sky and how to find deep-sky objects. Her biggest thrill was locating Omega Centauri gliding very low from her 40.7° north latitude location one evening late in May.

Like most twins, Melissa and Melinda are close in both mind and spirit, enjoying the camaraderie that comes from being life-long co-conspirators. Although they've both raised

families and have lives apart, they remain in close touch and have similar interests. They thrive on challenges and trying new things. For instance, when Melinda learned to fly, Melissa learned to fly. Now, some 20 years and hundreds of hours later, they both still fly regularly. Melinda is the proud owner of a restored 1946 Aeronca Champion. Both sisters are as accomplished at flipping a propeller by hand to start a plane, called "propping," as they are at collimating their reflectors.

So, it wasn't long after Melissa had been captivated by the views through her telescope that she sent a little book of sky charts to her twin sister, suggesting it was time Melinda learned the constellations. "I

Melissa writes Haiku, a 17-syllable, three-line Japanese poetic form, in which she elegantly reveals her wonderment of the night sky.

*Soft night sounds, cool earth  
Heavenly treasures revealed  
Through the telescope*

*Falling up, up, up  
So exquisitely drowning  
In a sea of stars.*

# STAR S



Melinda Hopper (left) and Melissa Adams



Astronomical League observing awards, pins, notes

# ISTERS



telescopes and explained what could be seen with them. If it was clear, she'd set up the 4.5-inch with a solar filter and show the kids sunspots. She enjoyed those visits to school and thinks the kids did, too.

Soon after a visit to Melissa and a first look through her telescope, Melinda sent for a 60 mm equatorial refractor and some astronomy books. As her sister had experienced with her first scope, the 60 mm had its limitations: an under-sized focuser, 20 mm and 4 mm starter eyepieces with a 2x Barlow lens, and

a small finder. "I eventually made friends with the little scope and really enjoyed using it," she remembers. "Now it amazes me that I could find anything at all with those minimal accessories!" She recalls the wonderful night, after searching for what seemed like hours, she finally found her quarry: the Whirlpool Galaxy. "Was I ever excited!"

Over the next several years, the sisters slowly upgraded their telescopes with 1.25-inch focusers and eyepieces, swapping equipment back and forth, and they now sport a variety of serviceable scope types and apertures. In addition to her original Tasco 4.5-inch, Melissa acquired a 60 mm refractor, a 4-inch Celestron refractor with a drive, and an 8-inch Orion SkyQuest. She

worked on the Lunar Program using only the 60 mm and 7x35 binoculars, because she had read on the Astronomical League website that it could be done specifically with these optics. Melissa explains her point of view: "I enjoy using minimal equipment at times as it proves you don't need expensive equipment to enjoy astronomy! Look at all you can observe just with binoculars."

Melinda, in turn, has the original 60 mm scope and purchased a Tasco 4.5-inch equatorial like her sister's. She added an 8-inch SkyQuest and a used, homemade 10-inch Dob to her collection. Although she upgraded the focuser on her 4.5-inch, a used 15 mm homemade 0.965-inch eyepiece she acquired is still in service. Melinda reports, "I'm still using the 15 mm eyepiece after more than 25 years, it's that good. It's the one I use for the majority of my observations. I got a 1.25-inch adapter for it, and the metal of the eyepiece eventually welded itself into the adapter!"

They've been Astronomical League members for over 12 years. Because of her rural location, Melissa is a member-at-large. Melinda is a member of the Astronomical Society of Kansas City, although she's a couple hours' drive from there. They are ardent supporters of the League's observing programs, each with ten awards to their credit, most recently the Herschel 400.

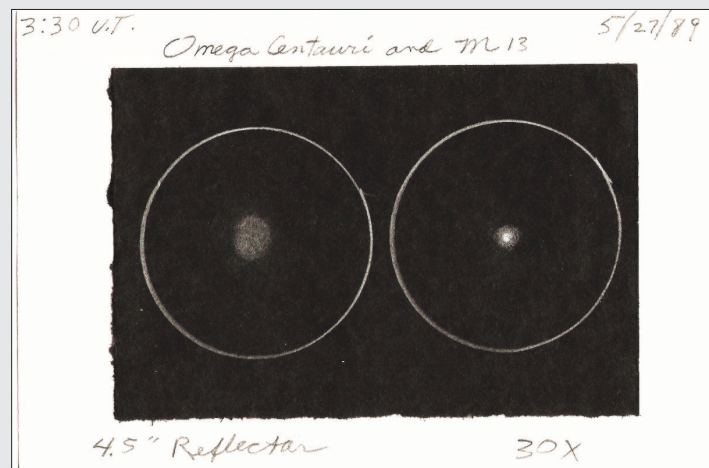
"After joining AL and finding out about the observing programs, I was excited," Melissa recalls. "Having goals to work toward makes observing much more rewarding. All the different programs are wonderfully varied and interesting."

Melinda agrees the programs offer something for everyone. Even though she began observing in 1986, it wasn't until much later she heard about the League's Messier program. She feels as though she may have wasted some time aimlessly wandering the sky, but knows she learned about the sky and its different kinds of objects. According to Melinda, "I enjoy the programs so much. There's no better way to begin observing or to expand your observing experiences."

They both began with the Messier Program. Melissa finished in 2003 and Melinda in 2004. "I was so proud of that!" Melissa said. Melinda was also excited. "When I finished, I looked for another to start right away." Following this first taste, the sisters dove into the menu of assorted Astronomical League observing programs big time. "Melissa and I did one after the other, sometimes working on the same one, sometimes on different ones. Sometimes we had two or more going at the same time."

After she had completed the Sunspotter program, Melinda encouraged her sister to work on it, thinking it would be easy

3:30 UT. Omega Centauri and M13 5/27/89



Melinda's sketches comparing Omega Centauri and M13

because it is daytime observing. But since she and her husband are busy with farm work during the day, Melissa thought she wouldn't be able to find the time. "Well, I wouldn't let go. I had done the Sunspotter, so she had to do the Sunspotter!" Melinda notes. "I actually nagged her over and over to get at it, to her occasional annoyance. But she finally did it."

"I was so glad she kept after me to try it," Melissa says. She thoughtfully adds she really

they are quite competitive, but in a good-natured way.

They explain it this way: "We tend to do the same programs at the same time and have a friendly competition going on regarding the number of objects we find. Of course, we never share observations, but when we talk on the phone, it's fun to compare, with the 'winner' for the moment enjoying a brief period of 'bragging rights.' Even though we like to get ahead of each other, we don't like to get too far ahead. And we certainly don't rush through our observations. We want to feel like we have really *seen* the objects we are looking for, because after all, isn't that the purpose of the programs?"

Over the years, their interests in flying and astronomy have enabled some special occasions, like the 1994 annular solar eclipse. Melissa flew her children and Melinda in a rented Piper

Cherokee 160 to Marshall, Missouri, where they observed the annularity. They waved airport employees over to observe with them right there next to the runway. "The light really got weird that day—it was wonderful," Melinda recalls. Melissa agreed: "What an awesome experience."

Melinda has a practical way she mixes flying and astronomy. Although she keeps her 4.5-inch reflector at her house for quick access under moderately light-polluted skies, her 8-inch and 10-inch are kept at the airfield in her Aeronca's hangar. She does most of her serious dark-sky observing on the grass field adjacent to it. Besides enjoying the celestial sights, she says she loves being outdoors at

night and hearing the night sounds. She's kept company by owls and coyotes, and even the occasional deer whooshing at her from behind one of the hangars. However, she says she's always hopeful the mountain lion whose tracks she's seen doesn't come around.

The sisters have visited Mount Palomar over the years. When Melinda visited in 2007, she experienced a memorable event that would thrill any astronomy enthusiast. It was getting late, and she wanted to get one more photograph of the Hale 200-inch from the gallery window when she saw one of the astronomers preparing for the night's observing session. Noticing her, he came to the nearby door, opened it and said, "You can get a better picture of it from in here." Melinda was stunned. "Oh, wonder of astronomical wonders! I actually got to go inside with the great telescope and stand beneath it while the astronomer took my picture! What a grand experience!" She ranks this event right up there with the day she flew the Aeronca into a Missouri airport and had a chance to meet and speak with John Glenn, who had also landed there with his wife.

The enthusiastic approach Melinda and Melissa take to visual astronomy reminds us that this hobby can provide ample rewards for those who favor the easy portability, straightforward features, and commonsense value of small and mid-sized apertures. Between them, the sisters' largest scopes are non-go-to 8-inch and 10-inch Dobbs, and with them they have so far completed ten observing programs apiece, including the recent Herschel 400, to achieve the status of Master Observers.

Melissa speaks for them both when she states emphatically that she prefers star-hopping

and that go-to scopes take away the thrill of discovery. "It's absolutely the best way to really become familiar with the night sky. And what a reward when you finally track down that elusive object, and you know exactly where it's located in the sky!"

Melinda points out everything she's observed in the deep-sky telescopic programs was seen with her 8-inch scope under somewhat light polluted skies, with the exception of some of the fainter Herschel 400 objects, for which her larger 10-inch aperture was needed.

If she's having a problem finding an object, she adds magnification or pans the scope slowly back and forth while using averted vision. She encourages other observers not to be discouraged and to try these programs even if they don't have large telescopes. For anyone starting out, they should be able to see all the Messiers with a 4-inch scope, and she says she found a lot of them with her 60 mm refractor. "Remember, the Herschel 400 list was compiled using 6-inch and 8-inch scopes," she emphasizes, referring to the introductory information posted on the Astronomical League's Herschel 400 web page.

Concerning women in astronomy, Melissa says she's always loved nature, and astronomy is a wonderful hobby that fits perfectly with her enjoyment of the outdoors. She finds the serenity of night, along with the beautiful and varied objects there are to observe, relaxing and enjoyable. She encourages any woman with even a mild interest to give it a try (not surprisingly, she gives the same advice to women about flying). "I had no idea I was really interested in astronomy until the gift of our telescope, and now I have been observing for 28 years!" she exclaims. "I hope Melinda and I continue to enjoy it for a long time to come." ☀



Melinda and the Hale 200-inch (photo by anonymous astronomer)

appreciates the dedication and hard work that go into making up the programs, as well as the time invested by the coordinators checking the work and sending awards. The sisters both display their pins on dark, sparkly, star-like fabric in shadow boxes on their walls. The certificates get neatly filed in thick binders with their observing records for each program.

Although separated by about 100 miles, the sisters don't see each other as often as they would like, but information and updates flow regularly by phone, text, and email. They realize they enjoy a special relationship, and encouraging and helping one another come naturally. On the other hand,

# WHY DO THE LUNAR OBSERVING PROGRAM?

By Barbara Biever

Rancho Bernardo/Murrieta Astronomical Society (RBMAS)

Even though we probably think much alike, I expect that you could have avoided every one of the blunders I made with this program, and you might even wish you had been there to prevent the train wreck. Not to look for excuses, but when I undertook the program, I only had about two years of observing experience. I thought that the Moon, a rather boring, static, self-contained single object, would be much easier and quicker to target than far-flung objects requiring moonless nights, sky atlases, and often-laborious star-hopping. I figured that the Astronomical League's Lunar Observing Program offered an easy conquest with few demands and a low learning curve to build the confidence of new observers and encourage them on to more difficult fare.

Few of these assumptions proved true.

The first night out, when I used only binoculars to find the maria (plural for "mare"), my suppositions remained comfortably ensconced in complacency. The second night (when I began trying to use the telescope) was the shocker. I promptly ran into all kinds of frustration with what is actually a great little scope, Orion's marvelous 6-inch tabletop StarBlast reflector. I suddenly couldn't make heads or tails of what I was looking at, since the view didn't match my *Sky and Telescope's Moon Map*. Most of the session was spent discovering that my previously well-mannered telescope had suddenly turned hostile, rudely depicting an inverted view of the Moon, instead of a correct-image view politely coinciding with the map. I had no clue how to hunt tiny craters and mountains without an easy-to-find jumping off point that would quickly refer me to my target.

Smarting from what I felt was my totally undeserved failure, I realized that the

seemingly innocuous program had slapped me in the face with something I had neglected to absorb from reading the manual: the image presented by my reflector was inverted.

Because I had previously been viewing objects I had located using a red-dot finder, and then only carelessly observing them when I found them, I overlooked that my scope was displaying them upside-down. Some "observer" I was! I suddenly was confronted with the two-fold problem of flipping the target upright in my mind to match the map, and then figuring out how to maneuver to it using my telescope.

Since the map was easier to manipulate than my imagination, I tried dialing it around on my observing table into a position that best matched what appeared in my eyepiece. I experienced instant relief as soon as Mare Crisium appeared on the upside-down map's left side, since that landmark was at least on the same side now as it was in my eyepiece. Because the mare was so dark in comparison to craters, it was very easy for me to find. Then the revelation hit me: I could locate targets by finding the mare nearest to them. (Later I also learned that lunar shadows are another way of recognizing craters that might otherwise be too low-contrast to distinguish from their surroundings, and that I needed to schedule viewing low-contrast targets for the first and third quarters of the lunar cycle, when their shadows are most helpful.)

This "follow-the-mare" technique required me to take notes and frequently consult the map. I had to list the target, the

nearest mare, which side of the mare the target was on, and perhaps which other crater or helpful feature it was near. At first, I got a pencil and paper, and with my flashlight, did some of this work in the dark.

Then it dawned on me that I needed to do this preparation ahead of time in the house, instead of wasting a precious observing session because I hadn't done my homework.

Gratitude set in. My smugness might have been deflated by my second lunar session, but in relatively short order, and without real injury, the "Lunar 100 Program" had taught me the view orientation of my telescope, the trick of using the maria to locate targets, and the need for prior preparation. These skills, I realized, were visual astronomy at its most basic—lessons to be transferred and embellished in the programs ahead. Most importantly, I had replaced my floundering with an effective approach that let me recognize my targets and to make progress on the list.

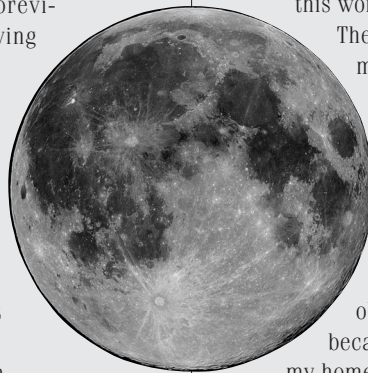
After that, the Moon herself became my instructor. She not only moved swiftly through my eyepiece's field of view, but I was dumbfounded to see that the ever-shifting light on her face was as restless and fluid as she was. In other words, the sunlight on her was changing, rendering her—massive as she was—quicksilver. A crater I had looked at only ten minutes ago looked different now. The expressions on her face were changing subtly and slyly, like those of a stubborn friend in a staring contest. The only way she could be rendered unchanging was the same way an earthbound creature could be rendered unchanging: by taking a

picture. Although a picture is pretty, to be sure, the dynamic sensation of seeing her animated—alive—was gone. *La Luna*, like all great divas, was best experienced in the moment, in person.

Doing the Lunar 100 program precipitated a relationship with a piece of nature I've ignored most of my life, and has spurred me to explore, via the other fine observing programs offered by the Astronomical League, other neglected features of the sky. To connect with the Cosmos (let alone my far more nature-aware ancestors) through the indisputably intimate, immediate medium of visual astronomy has been to rediscover the pieces of my soul that went missing when the need to educate myself and have a career robbed me of sufficient time to accommodate wonder. The Lunar 100 was the gateway to that sacred reunion, a deceptively scientific way of encountering the connectivity of all that exists and, for me, the beginning of a spiritual pursuit.

Even if inner cultivation wasn't enough, satisfying curiosity is another reason to persevere. For instance, who are the people the craters are named after? Also, since it is unlikely that the United States will be sending people back to the Moon anytime soon, what are the stories behind the lunar landings? Are we so diverted by our toys and devices that we'll ignore not only a possible realization of spirituality, but also marginalize the culmination of one of the longest-held aspirations of humanity?

Bottom line: those new to the hobby can't do better than begin with the Lunar Observing Program. They would do well to continue on to other programs and eventually return to the Moon with Lunar II. The minds of all who do this program, perhaps along with the forgotten or disregarded parts of themselves, can only be the better for it. ☀

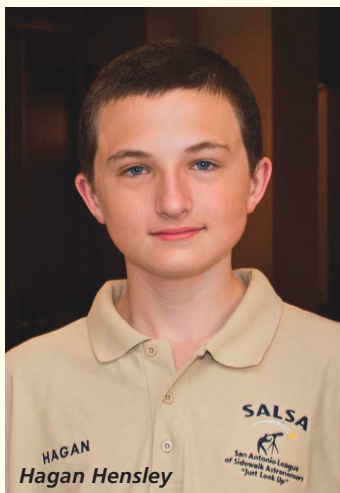


# HORKHEIMER YOUTH SERVICE AND JOURNALISM AWARDS

The Astronomical League is pleased to announce the winners of the **2014 Jack Horkheimer Youth Service and Journalism Awards**. This marks the 17th year of the program, which is made possible by the generous sponsorship of the family of television's *Stargazer*, the late Jack Horkheimer. The winner of the Horkheimer/Smith Award receives an expenses-paid trip to ALCon, a commemorative plaque, a telescope courtesy of Celestron, and a \$1000 check. The winner of the Horkheimer/O'Meara Journalism Award receives a \$1000 check.

**First Place Finisher, Horkheimer/Smith Award: Hagan Hensley, San Antonio League of Sidewalk Astronomers (SALSA).**

For the past two years, Hagan Hensley has been a whirlwind of activity, organizing a school astronomy club, holding star



parties for the young, and frequently participating in outreach for the public while assisting members of the San Antonio League of Sidewalk Astronomers (SALSA). When not directly observing, Hagan has studied the science of astronomy, and placed fourth in

the Texas State Science Fair with his project, "The Secrets of Solar Flares: Trends in Solar Flare Distribution based on Magnetic Classifications and Latitudinal Positions of Parent Active Regions." His instructors have commented that he can teach them astronomy!

His observing capabilities have led him to participate in Messier Marathons, helping others all the while, and to receive the Astronomical League's Messier certificate. Naturally, he has tried his hand at astrophotography, capturing images of the Venus transit and Comet PanSTARRS. Moreover, to help him be a better observer, Hagan has created detailed, accurate celestial sketches, including color renditions of Jupiter and Mars. As one of his supporters said, "he knows his stuff."

Hagan Hensley lives in San Antonio, Texas, attends Keystone School, and is 13 years old.

**Horkheimer/O'Meara Journalism Award: G.E. Austin, Rose City Astronomers (Portland, Oregon).**

Good communication is a skill that is essential in today's world. In his essay, "The Mass of Life," G.E. Austin demonstrated his ability, in less than



500 words, to convey the complex information of the importance of confirming the Higgs boson. Mr. Austin is twelve years old, is home-

schooled, and is an active member of the Rose City Astronomers in Portland, Oregon. He is currently participating in college-level programs.

**The Mass of Life** *By G.E. Austin*

The Higgs boson, first theorized in 1964, is the evasive particle of the century and a fundamental component to our existence. Though Peter Higgs, François Englert, and others predicted its existence in 1964, scientists did not receive their first glimpse of this long-sought particle until 2012. Scientists worldwide worked together to operate the 17-mile-long Large Hadron Collider (LHC) at CERN, the world's largest particle physics laboratory, that staged this fateful glimpse. On July 4, 2012, scientists observed unknown particles in the collider believed to be Higgs bosons. When the particles were confirmed to be Higgs bosons in March 2013, the world burst into applause.

One reason the Higgs boson eluded scientists for so many decades is that it decays in a matter of milliseconds before scientists are able to identify it. Often, it decays into quarks (fundamental particles that make up basic particles such as protons and neutrons). Quarks are commonly found in the LHC so when a Higgs boson decays into quarks, the particles are lost in a sea of identical quarks. It's like trying to distinguish one candle from another on the birthday cake of the Methuselah bristlecone pine tree (about 4800 years old!). It's impossible to tell one candle from another.

Thankfully, the boson decays into other particles as well. One in one thousand times, the Higgs decays into two photons. Photons are different from quarks in that they have differing energy levels from each other. In the LHC, the photons emitted have different energy levels from other sources of the same kind. The Higgs's photons protruded off this curve thus making it possible for scientists to identify these photons as the products of Higgs boson decay.

Much like a photon is a carrier of light for the electromagnetic field, the Higgs boson carries the Higgs field to other particles. The Higgs field works to exaggerate the mass of particles, allowing them to slow enough to combine with other particles and form more complicated structures such as atoms, molecules, cells, stars, and even human beings.

The field acts as the glue of the Cosmos. Let's say we have an endless number of little pieces of paper sliding on a sheet of cardboard in a kindergarten art class. There is nothing to stop the pieces from sliding around. Only when the teacher adds glue do the pieces of paper stay in fixed spots creating an image of a star or a human being. The same applies to the Universe. Without the Higgs field, the Universe would be a jumbled mess of particles, endlessly floating without the ability to assemble and create actual stars and human beings.

While we know more about the Higgs boson, Higgs field, our Universe, and even ourselves with this discovery, unanswered questions remain. Each breakthrough leads to more questions and the pursuit for knowledge continues.



# MABEL STERNS NEWSLETTER EDITOR AWARDS

## Astronomical League's 2014 Mabel Sterns Newsletter Editor Awards

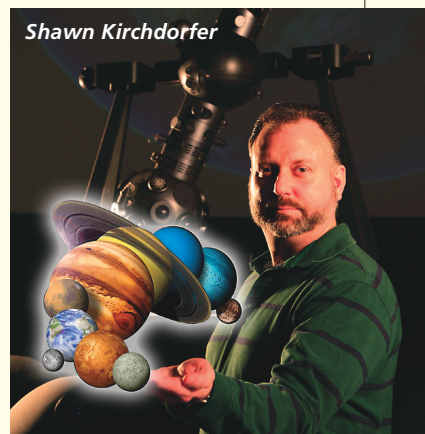
Mabel Sterns was the Astronomical League's first newsletter editor and this is the seventeenth year of granting the Newsletter Editor Award in her honor. The award recognizes one of the most important people in any club, a person who is a primary source of beneficial information to club members: the newsletter editor.

Most of the time, newsletter editors don't get much recognition while they do their steady tasks of keeping the membership informed about what goes on in their astronomy clubs. They publish newsletters despite often not having enough material to fill each edition, magically creating interesting articles at the last minute.

With this competitive award, the strengths and weaknesses of each newsletter must be weighed. Many different attributes might be considered—from specific forms of content such as membership information, meeting information, or astronomical calendars to more subjective ones such as the appearances of its masthead and layout.

## First Place: Karl Henry, Delaware Valley Amateur Astronomers, *Amateur Astronomer*.

One of the key components of a well-read newsletter is an engaging masthead. The *Amateur Astronomer* sports a colorful, artistic, and clean banner, letting the reader know what the newsletter is all about. The first page captures the reader's attention with the monthly planner in plain sight so readers can easily find what's important over the next few weeks. Through great organizational skills, Karl Henry manages to bring all the newsletter



articles forward in an orderly, logical fashion. It is a pleasure to read.

The club president, Bill McGeeney, explains that members can obtain the *Amateur Astronomer* through several means: "During his tenure, Mr. Henry boosted the accessibility of our newsletter for all club members by way of electronic archiving and multiple delivery options." He has an eye for innovation.

Karl handles all the steps in creating the newsletter and does so in a professional manner while inciting curiosity in the reader. That makes a great newsletter editor!

## Second Place: Shawn Kirchdorfer, Fort Worth Astronomical Society, *Prime Focus*.

The first page of Shawn Kirchdorfer's *Prime Focus* grabs the reader with a superb astronomical image. Overlaying it is an enticing list, "In This Issue," letting the reader know what is to come. The table of contents, located on the second page, gives complete details of what is in the newsletter and where it can be found—and such a table is necessary because of the wealth of material contained within *Prime Focus*'s seventeen pages. It is a very complete publication, with a "magazine" look and feel.

## Third Place: Paul Tartabini, Back Bay (Virginia) Amateur Astronomers, *Observer*.

Can you imagine joining a club, then almost immediately assuming responsibility for the newsletter? That is what Paul Tartabini did! He is a brave man.

Paul took an already successful publication and redid its look and operation in just a few issues. He enhanced the newsletter capabilities by improving the embedded links and improving its overall impression with an uncluttered feel. Back Bay President Jim

Tallman sums it up: "It truly looks professional and exhibits the fun, enjoyment, and camaraderie our club offers."

**2015 Mabel Sterns Nominations**  
For complete information about the 2015 Mabel Sterns Award program, please see [www.astroleague.org/al/awards/sterns/sternss.html](http://www.astroleague.org/al/awards/sterns/sternss.html).

It is strongly recommended that the Astronomical League's logo be prominently displayed in the newsletter, preferably on the front page.

The deadline for submissions is March 31, 2015. The names of both the newsletter editor and the nominating club officer must appear on the general

membership roster of the Astronomical League.

The nomination package should contain a letter from the club president or vice president explaining why their newsletter editor should be considered for



the award, a recent issue of the newsletter, and a photo of the newsletter editor taken in an astronomical setting. Listing the club's website where electronic copies of past newsletters are posted is also helpful. In addition, the postal address of the newsletter editor should be included.

The newsletter nomination materials may be submitted by any of these three methods:

The preferable method is emailing the materials. The supporting club letter and an issue of the newsletter should be attached in Adobe PDF format, although Microsoft Word format is acceptable. The editor's photograph should be attached as a high-resolution JPEG. Please email entries to [SternsNewsletter@astroleague.org](mailto:SternsNewsletter@astroleague.org).

If electronic submission is not possible, paper copies may be mailed to the League's national office. Four copies of the letter of recommendation and four copies of the newsletter are required. Only one copy of the photograph is needed.

If the newsletter is available on the club's website, then its web address should be given along with any password required to access it. The editor's photograph (JPEG) and club recommendation letter (PDF) can be submitted by email as instructed in method 1. ☼

# 10, 25, and 50 Years of the Astronomical League's Newsletter

By Mike Stewart

## September 1964—A.L. Book Service

The Book Service has completed 10 years of service to the League. A check for \$100 has been sent to the treasurer, bringing total income for the period 1954–1964 to \$485. One hundred dollars of this repaid a loan from the Astronomical League to start the Book Service.



G.R. Wright originated the idea of a book service during his term as president of the League. He contacted publishers in person and by mail to make arrangements for

discounts to members. A committee, composed of Grace C. Scholz, chairman, Helen S. Federer and Elizabeth M. Fazekas completed plans for the service. The first report was given at Madison, Wisc., in 1954 and showed a profit of \$14.61.

Margaret E. Kobs, Portland, Ore., served as chairman 1959–1960; Virginia S. Cummings, Tacoma, Wash., 1960–1962; and Marie T. Cain, Geneva, N.Y., 1962–1964. Ralph K. Dakin, Pittsford, N.Y., is the new chairman.

*The book service continues to offer League members a ten percent discount.*

## August 1989—Announcing The Astronomical League's New Bulletin Board Service

In following up on its policy of continually adding new services to benefit its membership, the Astronomical League is happy to announce

the addition of a Bulletin Board Service (BBS) for the League's computer users. The purposes of this new service are many. First and foremost, it will give our membership immediate access to the latest in Public Domain astronomy software. Second, the BBS will offer a place for League members to conduct a national forum on astronomy, to meet and discuss various topics on a regular basis, and to communicate with and leave messages for their friends around the country.



Third, the BBS will offer a place where national, regional, and local AL officers can meet, exchange information, conduct League business, and have access to E-Mail.

And last but not least, there will be a special area on the bulletin board for the Astronomical League newsletter, the *Reflector*. National and regional officers, regional editors and others can upload files . . . to the BBS so that the editor can then download them to his system. In this manner, we won't have to rely on the mails to meet deadlines.

*John Wagoner served as SYSOP of the Stargate BBS. The system offered 24–7 access via long distance dial-up at 300, 1200, and 2400 baud.*

## September 2004—Have Transit Will Travel

On a Friday night in the spring of 2000, while

## ADVERTISING RATES

The following is a listing of the advertising rates for the *Reflector*. If you are interested in promoting your products, consider placing an ad with us. With a circulation of 16,000 astronomers, we offer a highly targeted market.

Rates for the inside front cover, inside back cover, and back cover are negotiable.

The rates below are for B&W ads; color ads are 10% additional.

Number of Issues	Full Page 7-1/2" H x 10" V	1/2 Page 7-1/2" H x 5" V	1/3 Page 5" H x 4-1/2" V or 2-3/8" H x 10" V	1/6 Page 2-3/8" H x 5" V or 4-1/2" H x 2-3/8" V	Mini-Ad 2-3/8" H x 2-3/8" V
1	\$1,000	\$500	\$400	\$200	\$150
2	\$900 each	\$450 each	\$350 each	\$175 each	\$125 each
4	\$800 each	\$400 each	\$300 each	\$150 each	\$100 each

H = Horizontal  
V = Vertical

Deadlines:

March issue: January 15  
September issue: July 15

June issue: April 15  
December issue: October 15

To submit advertisements or for further information, please contact:

Mary Riley, Reflector Advertising Representative  
P.O. Box 221094, Chicago, IL 60622-1094  
advertising@astroleague.org

Note: Ad pricing is subject to change without notice.

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# 2015 Year In Space Wall Calendar

"This calendar not only reckons time, it plants seeds of inspiration, because space exploration brings out the best in us." *Bill Nye, Planetary Society CEO*

The collage features various space-related images and text. On the left, there's a section titled 'MESSENGER Reveals Mercury' with a picture of the planet. In the center, 'The First Spaceplane X-15' is shown in flight. Below that, 'A FIRST SPACE WING' is depicted. On the right, 'Electrified Atmospheres Aurorae' is shown with a vibrant aurora image. Other sections include 'STORM CHASERS', 'Fast Facts', 'ROCKET SCIENCE', 'AURORAL FOOTPRINTS', 'BIRD TO LIFTER', and 'PLANET TRAILER'. At the bottom, there are two calendar grids for March 2015 and November 2015. The bottom left corner features the title 'The Year In SPACE' and '2015 Calendar' with the Planetary Society logo.

The award-winning large-format *Year In Space Wall Calendar* is published in cooperation with **The Planetary Society**.

The *Year In Space Wall Calendar* combines a stunning visual design, hundreds of fascinating facts, and more than **120 images** to create a guided tour of a different exciting space topic each month.

## Group Discounts

Use the "Club" discount and pay less than the \$17.95 retail price, even on a single copy!

- 1 copy @ **\$13.95** (save \$4 ea)
- 2–9\* @ **\$12.95** (save \$5 ea)
- 10–35\* @ **\$11.95** (save \$6 ea)
- 36+\* @ **\$10.95** (save \$7 ea)

\*Shipped to the same address

**YearInSpace.com**

checking out the astronomy section of my favorite bookstore, a new title jumped out at me: *Venus In Transit, June 8, 2004*, by Eli Maor. I was vaguely aware of this event, coming up in the next few years, and wanting to know more, bought the book.

From the United States, the east coast would be able to see the end of the transit, and from Kansas City, we'd only be able to see the very end, as the sun was rising. That was not going to be good enough for me. I kept reading the ads, and eventually, the one that I had to go on was a trip to Egypt, where the chances of clear skies were the best. In my life, it has always been a good choice to couple an "astronomical event" like an eclipse with a trip to some really cool place. What else could a person ask for? Watching the transit, which no living astronomer had ever seen, from Egypt, a place I had always longed to visit—a perfect fit.

As the predicted time for ingress approached and passed, we were all glued to our eyepieces. Then Vic [Winter] shouted out, "I see it! First contact!" It was another minute [or] two before the rest of us saw that first little black "bite" out of the

edge of the Sun. It was an exciting moment, knowing we were seeing Venus transit the sun for the first time in 122 years. The disk of Venus was much larger than we had expected it to look – twice the apparent size of Mercury during a transit a year or two ago. I looked up from my binocs, and out over the Nile, seeing the Valley of the Kings in the hazy distance, and realized I was one lucky gal. I did one of those self-talks so I would sear this memory into my brain forever.

*Astronomical Society of Kansas City member and former executive secretary for the League Jackie Beucher recounted her experience as a member of an astronomical tour that viewed the Venus transit from the roof of the Sheraton Luxor.*

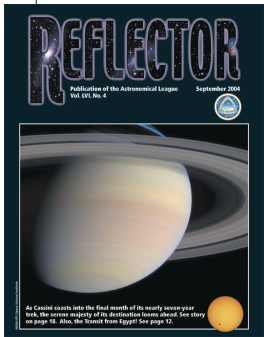
## Digital vs. Paper

As astronomers, we all have an obligation to be "green," which means we do what we can to avoid the waste of our precious natural resources. We are all aware of the pollution of our air, water, dark skies, etc.

In keeping with our "green" policy, we are investigating the possibility of offering either print or digital copies of the *Reflector* to all of our members. As such, we would like any feedback, comments or questions regarding this issue.

Essentially, our members would have the choice of receiving the *Reflector* as a paper copy, which they presently do, having a PDF file available for download, or both. Digital subscribers would receive an email when the next issue is available, along with an access password for that issue. The file would be about 50 megabytes in size, and would take less than a two minutes to download on a broadband Internet connection. The image and text quality will be much better than the existing PDF file on our website.

Please send any comments to [editor@astroleague.org](mailto:editor@astroleague.org), including whether you would prefer the digital or print version. I would like any commentary before October 15.



# ARIZONA SCIENCE & ASTRONOMY EXPO

## November 1st & 2nd, 2014!

SHOW HOURS: SAT 8:30-6 PM, SUN 10-6 PM  
TUCSON CONVENTION CENTER  
280 South Church Street Tucson, AZ 85714  
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- Sci-Fi Panel - Moderated by Geoff Notkin
- Daily Solar Observing - Charlie Bates Solar Astronomy Project
- Planetarium Exhibits for the kids!
- Astronomical Artwork Displays

**Southwest Imaging Conference 2014**

October 29th thru 31st 2014  
At the Tucson Convention Center

The Arizona Science & Astronomy Expo is proud to announce the return of the Southwest Astrophotography Seminar to be held in Tucson, Arizona. SWAP 2014 will be hosted by Warren Keller and classes will be conducted by world class astro imagers!

REGISTER TODAY!  
<http://www.scienceandastronomy.com/swap-2014/>

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October 23-26, 2014

Featured Guest:

**Dr. David Levy, Award-Winning Author and Comet Discoverer**

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For details: [www.hoasp.org](http://www.hoasp.org)  
or, Star Party Chair, Joe Wright:  
[HoASP.ASKC@gmail.com](mailto:HoASP.ASKC@gmail.com)  
See website for pre-registration



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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](http://www.astroleague.org/observing). If further assistance is required please contact either of the national Observing Program coordinators.

**Arp Peculiar Galaxy Observing Program**

No. 80-V, Glen Sanner, Huachuca Astronomy Club

**Asterism Observing Program**

No. 12, Nora Jean Chetnik, Member-at-Large; No. 13, George J. Robinson, Member-at-Large; No. 14, Robert L. Togni, Central Arkansas Astronomical Society

**Asteroid Observing Program**

No. 41, Daniel Otte, Regular, Member-at-Large

**Binocular Double Star Observing Program**

No. 67, Kevin McKeown, The Albuquerque Astronomical Society; No. 68, G.H. Guest, Member-at-Large; No. 69, Pamela Lubkans, all 120 objects, Member-at-Large; No. 70, James Fordice, The Albuquerque Astronomical Society; No. 71, Ted Forte, Huachuca Astronomy Club

**Binocular Messier Observing Program**

No. 1009, Rob Torrey, Houston Astronomical Society; No. 1010, Paul Lennous, Member-at-Large; No. 1011, Rob Fink, Member-at-Large; No. 1012, Todd Sanders, Tallahassee Astronomical Society; No. 1013, Coy Wagoner, Shreveport-Bossier Astronomical Society; No. 1014, Kevin McKeown, The Albuquerque Astronomical Society; No. 1015, Mark Bailey, Member-at-Large; No. 1016, Jeff Wilson, Spokane Astronomical Society; No. 1017, Grant Mills, Member-at-Large; No. 1018, Charles Dezelah, Warren Astronomical Society; No. 1019, Kayce Morton, Tallahassee Astronomical Society; No. 1020, Steve Riegel, The Albuquerque Astronomical Society

**Caldwell Observing Program**

No. 207, Grant Mills, Member-at-Large; No. 208, Doug Lively, Raleigh Astronomy Club

**Carbon Star Observing Program**

No. 49, Diane Ketchum, Middle Georgia Astronomical Society; No. 50, Jeff Haidet, Toledo Astronomical Association; No. 51, John Raymond, Northern Virginia Astronomy Club; No. 52, Bill Smith, Member-at-Large

**Comet Observing Program**

No. 25, Edwin Jones, Gold, Astronomical Society of Kansas City; No. 26, Gregg Ruppel, Gold, St. Louis Astronomical Society; No. 74, Les Rudy, Silver, Member-at-Large

**Dark Sky Advocate Observing Award**

No. 7, Brian Buttafuoco, Museum Astronomical Resource Society

**Double Star Observing Program**

No. 528, John Marchetti, Minnesota Astronomical Society; No. 529, Ryan Behrends, Hill Country Astronomers; No. 530, Fred Gassert, Kansas Astronomical Observers; No. 531, Richard Beaver, Boise Astronomical Society; No. 532, Larry Farrington, Etna Astros; No. 533, Glen Sanner, Huachuca Astronomy Club

**Galaxy Groups & Clusters Observing Program**

No. 37-DA, Anthony Kroes, Neville Public Museum Astronomical Society

**Galileo Observing Program**

No. 30, G. H. Guest, Member-at-Large

**Globular Cluster Observing Program**



No. 253, Brian Reasor, Raleigh Astronomy Club; No. 254, Scott Azmus, Member-at-Large; No. 255, Lisa Judd, Denver Astronomical Society; No. 256, Kevin McKeown, The Albuquerque Astronomical Society

**Herschel 400 Observing Program**

No. 514, David Grimmer, Central Arkansas Astronomical Society; No. 515, Stephen L. Snider, Albuquerque Astronomical Society; No. 516, Ann Bruun, Astronomy Club of Tulsa

**Local Galaxy Group & Galactic Neighborhood Observing Program**

No. 27-DA, Anthony Kroes, Neville Public



Museum Astronomical Society; No. 28-M, Thomas Richter, Austin Astronomical Society

**Lunar Observing Program**

No. 864, Glen Wolford, Member-at-Large; No. 865, William Shackelford, Penobscot Valley Star Gazers; No. 866, Christian Weis, Tucson Amateur Astronomy Association; No. 867, John Marchetti, Minnesota Astronomical Society; No. 868, Willie K. Yee, Amateur Observers' Society of New York; No. 869, John Skillicorn, Member-at-Large; No. 870, Kevin McKeown, The Albuquerque Astronomical Society; No. 871, Glen Sanner, Huachuca Astronomy Club; No. 872, Michael J. Hegedus, Charlottesville Astronomical Society; No. 873, Felix Luciano, Flint River Astronomy Club

**Master Observer Award**

No. 154, Doug Wiese, High Desert Astronomy Club; No. 155, Bob Scott, Island County Astronomical Society; No. 156, John Marchetti, Minnesota Astronomical Society; No. 157, Glenn Sanner, Huachuca Astronomy Club; No. 158, Pamela Lubkans, Member-at-Large

**Messier Observing Program**

No. 2498, Eric Dose, Honorary, Member-at-Large; No. 2638, Ronald A. King, Honorary, Northern Virginia Astronomy Club; No. 2662, Forrest & Joyce Holly, Honorary, Tucson Amateur Astronomy Association; No. 2663, Joseph Acker, Honorary, Trinity Christian Academy Astronomy Club; No. 2664, Jeff Willson, Honorary, Spokane

Astronomical Society; No. 2665, Stephen Jones, Honorary, Houston Astronomical Society; No. 2666, Tom Renn, Honorary, Westminster Astronomical Society; No. 2667, James Granahan, Honorary, Northern Virginia Astronomy Club; No. 2668, Raymond Howard, Regular, Member-at-Large; No. 2669, Ed Ting, Regular, New Hampshire Astronomical Society; No. 2670, Felix Luciano, Honorary, Flint River Astronomy Club; No. 2671, Paul Harrington, Honorary, Member-at-Large; No. 2672, Benito Loyola, Honorary, Back Bay Amateur Astronomers; No. 2673, Kevin McKeown, Honorary, Albuquerque Astronomical Society

**Meteor Observing Program**

No. 159, Barrett Rollen Scott, 24 hours, Member-at-Large; No. 166, Tom P. Mazingo, 24 hours, Barnard Astronomical Society; No. 168, Nora Jean Chetnik, 12 hours, Member-at-Large; No. 169, Les Rudy, 6 hours, Member-at-Large

**NEO Observing Program**

No. 2, Paul York, Intermediate, Member-at-Large; No. 3, Aaron Clevenson, Advanced, North Houston Astronomy Club

**Northern Skies Constellation Hunter Observing Program**

No. 143, Thomas Rocco Pennino, Astronomical Society of Long Island

**Outreach Observing Award**

No. 210-M, Joseph Wagner, North Houston Astronomy Club; No. 360-O, Anthony J. Kroes, Neville Public Museum Astronomical Society; No. 406-M, Will Young, Astronomical Society of Southeast Texas; No. 569-M, Marie Lott, Atlanta Astronomy Club Charlie Elliott Chapter; No. 570-O, David O'Keefe, Flint River Astronomy Club; No. 571-O, Sarah O'Keefe, Flint River Astronomy Club; No. 572-M, Tara Heine, Austin Astronomical Society; No. 573-O, Julie Choate, Astronomical Society of Southeast Texas; No. 574-O, Deborah Cheong, Temecula Valley Astronomers; No. 575-O, Mark V. Baker, Temecula Valley Astronomers; No. 576-O, Donna Wagner, North Houston Astronomy Club; No. 577-O, Truman Boyle, Flint River Astronomy Club; No. 578-O, Edward H. Preston, Charlottesville Astronomical Society; No. 579-O, Michael John Hegedus, Charlottesville Astronomical Society; No. 580-O, Larry Martin, Austin Astronomical Society; No. 581-M, Tony Urzi, Central Florida Astronomical Society; No. 582-O, Dean R. Specker, Astronomical Society of Kansas City; No. 583-O, Rusty Case, Popular Astronomy Club Quad Cities; No. 584-O, Roy Gustafson, Popular Astronomy Club Quad Cities; No. 585-O, Jan Gustafson, Popular Astronomy Club Quad Cities; No. 586-O, Brad Smith, Popular Astronomy Club Quad Cities; No. 587-O, Liz Robinson, Popular Astronomy Club Quad Cities

**Planetary Nebula Observing Program**

No. 61, Elaine B. Osborne, Advanced, Echo Ridge Astronomical Society; No. 62, Bill Smith, Advanced, Member-at-Large

**Solar System Observing Program**

No. 78, Nick Anderson, Back Bay Amateur Astronomers; No. 79, Thomas Pennino, Astronomical Society of Long Island; No. 80, Bill Sanders, Central Arkansas Astronomical Society; No. 81, Kevin Nasal, Neville Public Museum Astronomical Society; No. 82, Frank Melillo, Astronomical Society of Long Island

**Sunspotters Observing Program**

No. 165, Marie Lott, Atlanta Astronomy Club; No. 166, Scott Azmus, Member-at-Large

**Universe Sampler Observing Program**

No. 113, Nora Jean Chetnik, Naked-Eye, Member-At-Large; No. 114, Jean Napp, Telescope, Iowa County Astronomers

**Variable Star Observing Program**

No. 21, William Clarke, Tucson Amateur Astronomy Association

## The Astronomical League's Youth Awards 2015—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 2015: the National Young Astronomer Award (NYAA), the three Jack Horkheimer Youth Service Awards, and the Horkheimer/O'Meara Journalism Award.

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 NYAA. He or she must be between 14 and 19 years of age.

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 four Horkheimer Service Awards. One of these awards is more specialized than the others—the Horkheimer/O'Meara Journalism Award. It requires a person who is 8 to 14 years of age to compose a 300- to 500-word essay on any science related topic.

Since the deadline for the National Young Astronomer Award is **January 31, 2015**, and for the Horkheimer Awards is **March 31, 2015**, now is the time for potential candidates to work on their projects and to participate in various astronomy activities.

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/allawards/awards.html](http://www.astroleague.org/allawards/awards.html).

### Call for League officer nominations

The two-year term of the office of secretary and the three-year term of the office of treasurer will end on **August 31, 2015**. 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 two offices, please refer to the League's bylaws, which can be accessed on the League website at [www.astroleague.org](http://www.astroleague.org).

Candidates should send background statements explaining why they are interested, along with a photo of themselves for publication in the *Reflector* to Nominating Committee Chair Bill Bogardus, [vicepresident@astroleague.org](mailto:vicepresident@astroleague.org). Please limit all statements to approximately 250 words. All nomination materials must be submitted by March 15, 2015.

For those of you who are not aware of it, the Astronomical League is now on Facebook. We continue to build followers week by week, and we are becoming better known as the word spreads. We are also on Twitter: @AstronomyLeague

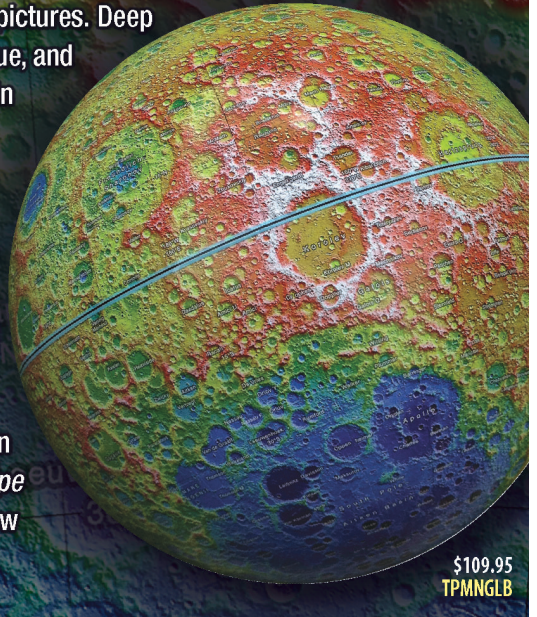
### Space Place Prime app

Space Place Prime is now available on Android! A spinoff of NASA's popular kids' Space Place website ([spaceplace.nasa.gov](http://spaceplace.nasa.gov)), Space Place Prime has timely, educational, and easy-to-read articles and activities from the Space Place and other science websites, the latest and most impressive NASA space and Earth imagery, and a wide array of informational movies. There is plenty to keep everyone occupied and informed. Content is updated daily. [tinyurl.com/lyqme53](http://tinyurl.com/lyqme53)

The new *Sky & Telescope* Topographic Moon Globe shows our home planet's constant companion in greater detail than ever before. This globe is color-coded to highlight the dramatic differences in lunar elevations — differences that are less obvious when seen in pictures. Deep impact basins show up clearly in blue, and the highest peaks and rugged terrain show up as white, red, and orange.

This new globe is based on data from NASA's Lunar Reconnaissance Orbiter. The globe incorporates 4½ billion measurements and shows details less than a mile across.

*Sky & Telescope's* Topographic Moon Globe, along with the *Sky & Telescope* Moon Globe, are the first entirely new lunar globes in more than 40 years.



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## Southern Skies

### Observing Adventure

You are invited to join us for a week of observing under some of the darkest and most stunning skies in the world.

Located near Coonabarabran, (-31° S), in the Astronomy Capital of Australia, numerous large dobsonians from 14" - 30" are provided for your sheer enjoyment.

If you have never seen the Southern Skies, your observing experience is not complete!

Registration and further information is available at [www.OZSKY.ORG](http://www.OZSKY.ORG)

**EMAIL: INFO@OZSKY.ORG**

## Staunton River Star Party - Fall 2014

### October 20–26, 2014

### Staunton River State Park

Scottsburg, VA (near South Boston)

For more information or to register: [www.stauntonriver-starparty.org](http://www.stauntonriver-starparty.org)

Full Party:\$70 WKend:\$35

Sponsored by: **CHAOS**



**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](mailto:astrowagon@verizon.net).**

**September 18–21**

**Great Lakes Star Gaze**  
Gladwin, Michigan  
[www.greatlakesstargaze.com](http://www.greatlakesstargaze.com)

**September 18–21**

**Prairie Skies Star Party**  
Bourbonnais, Illinois  
[www.prairieskies.org](http://www.prairieskies.org)

**September 19–21**

**Idaho Star Party**  
Bruneau Dunes State Park, Idaho  
[www.isp.boiseastro.org](http://www.isp.boiseastro.org)

**September 20**

**Virginia Association of Astronomical Societies**  
Norfolk Astronomical Society  
Norfolk, Virginia  
[www.norfolkastronomical.org/vaas.html](http://www.norfolkastronomical.org/vaas.html)

**September 20–28**

**Okie–Tex Star Party**  
Kenton, Oklahoma  
Oklahoma City Astronomy Club  
[www.okie-tex.com](http://www.okie-tex.com)

**September 23–28**

**Astroblast**  
Oil City, Pennsylvania; [www.oras.org](http://www.oras.org)

**September 24–27**

**Enchanted Skies Star Party**  
Socorro, New Mexico; [www.enchantedskies.org](http://www.enchantedskies.org)

**September 24–28**

**Brothers Star Party**  
Brothers, Oregon; [www.mbsp.org](http://www.mbsp.org)

**September 25–27**

**Illinois Dark Skies Star Party**  
Jim Edgar–Panther Creek State Fish & Wildlife Area, Illinois  
[www.sas-sky.org](http://www.sas-sky.org)

**September 25–28**

**SJAC Fall Star Party**  
Belleplain State Forest, New Jersey  
[www.sjac.us](http://www.sjac.us)

**September 25–29**

**Acadia Night Sky Festival**  
Bar Harbor, Maine  
[www.acadianightskyfestival.org](http://www.acadianightskyfestival.org)

**September 26–27**

**Astronomy at the Beach**  
Kensington Metropark, Brighton, Michigan  
[www.glaac.org/kensington-astronomy-at-the-beach](http://www.glaac.org/kensington-astronomy-at-the-beach)

**September 26–28**

**Jersey Starquest**  
Hope, New Jersey  
[www.princetonastronomy.org/sqmainpage.html](http://www.princetonastronomy.org/sqmainpage.html)

**September 26–28**

**Tennessee Fall Star Gaze**  
Pikeville, Tennessee  
[www.cumberlandastronomicalsociety.org](http://www.cumberlandastronomicalsociety.org)

**September 26–28**

**Craters of the Moon Star Party**  
Craters of the Moon National Monument & Preserve, Idaho; [www.ifastro.org](http://www.ifastro.org)

**September 26–28**

**Connecticut Star Party**  
June Norcross Webster Scout Reservation, Connecticut; [www.asnh.org](http://www.asnh.org)

**October 4**

**National Astronomy Day**  
Worley Observatory, LSU–Shreveport, Louisiana  
[www.shreveportastronomy.com](http://www.shreveportastronomy.com)

**October 17–18**

**New England Fall Astronomy Festival**  
Durham, New Hampshire  
[www.physics.unh.edu/observatory/NEFAF](http://www.physics.unh.edu/observatory/NEFAF)

**October 17–19**

**Bays Mountain Starfest**  
Bays Mountain Park, Kingsport, Tennessee  
[www.baysmountain.com/astromy/astromy-club/?GTTabs=4](http://www.baysmountain.com/astromy/astromy-club/?GTTabs=4)

**October 17–19**

**Custer Jamboree**  
Southold, New York  
[www.custerobservatory.org/jamboree](http://www.custerobservatory.org/jamboree)

**October 18–25**

**Twin Lakes Star Party**  
Dawson Springs, Kentucky; [www.wkaa.net](http://www.wkaa.net)

**October 19–26**

**Peach State Star Gaze**  
Deerlick Astronomy Village, Georgia  
[www.atlantaastronomy.org/PSSG](http://www.atlantaastronomy.org/PSSG)

**October 20–25**

**Eldorado Star Party**  
X-Bar Ranch, Eldorado, Texas  
[www.eldoradostarparty.org](http://www.eldoradostarparty.org)

**October 20–26**

**Staunton River Star Party**  
Scottsburg, Virginia  
[www.stauntonriver-starparty.org](http://www.stauntonriver-starparty.org)

**October 22–26**

**Deep South Regional Star Gaze**  
Norwood, Louisiana  
[www.stargazing.net/dsrsg](http://www.stargazing.net/dsrsg)

**October 23–26**

**Nightfall**  
Borrego Springs, California  
[www.rtmcastronomyexpo.org](http://www.rtmcastronomyexpo.org)

**October 23–26**

**Heart of America Star Party**  
Butler, Missouri; [www.hoasp.org](http://www.hoasp.org)

**October 25–26**

**Solar Eclipse Conference**  
Cloudcroft, New Mexico  
[www.eclipse-chasers.com/SEC2014](http://www.eclipse-chasers.com/SEC2014)

**November 7–9**

**Gateway to Space**  
St. Louis, Missouri  
[www.gatewaytospace.org](http://www.gatewaytospace.org)

**November 17–23**

**CSPG Fall Star Party**  
Chiefland, Florida  
[www.chieflandstarpartygroup.com/fall.html](http://www.chieflandstarpartygroup.com/fall.html)

**November 22**

**Evening Star Party for the Public**  
[www.shreveportastronomy.com](http://www.shreveportastronomy.com)

**April 17–24, 2015**

**OzSky Star Safari, a.k.a. Deepest South Texas Star Safari**  
Coonabarabran, New South Wales, Australia  
[www.ozsky.org](http://www.ozsky.org)  
Attendance is extremely limited—that is why this event is listed so far in advance.

**Pulsar Search Collaboratory Receives Astronomical League Special Award**

Astronomical League vice president John Goss presented the League's Special Award at the Green Bank Star Quest on June 28 to Sue Ann Heatherly, Maura McLaughlin, and Duncan Lorimer of the Pulsar Search Collaboratory (PSC). The PSC introduces high school students to radio astronomy research by having them painstakingly examine data collected by the 100-meter Robert Byrd Green Bank Telescope at the National Radio Astronomy Observatory in Green Bank, West Virginia. Occasionally, the tell-tale signature of a pulsar is uncovered.



On behalf of the Pulsar Search Collaboratory, Sue Ann Heatherly accepts the Astronomical League's Special Award from League vice president John Goss.

**ALCon 2015**  
**Where Space Began...**  
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**July 8 - 11, 2015**  
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To join the Astronomical League as a Member-at-Large, send a check for \$40.00, \$50.00 foreign, made payable to the Astronomical League, to:  
 Astronomical League National Office, 9201 Ward Parkway, #100, Kansas City, MO 64114  
 Phone: 816-333-7759; Email: [leagueoffice@astroleague.org](mailto:leagueoffice@astroleague.org)  
**Or join online at: WWW.ASTROLEAGUE.ORG**



# League Sales are online!

The League's online store is available at the website, [www.astroleague.org](http://www.astroleague.org). Click on the link for the store on the top right of the home page. The online store includes the latest shopping cart technology and accepts credit cards. Shipping & handling (S&H) is calculated at checkout. Merchandise is also available by mail order, payable by check. Please select your items, add the applicable S&H fee, and mail your order to:

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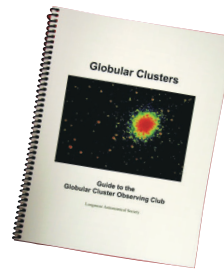
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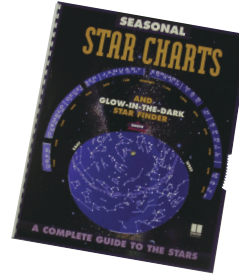
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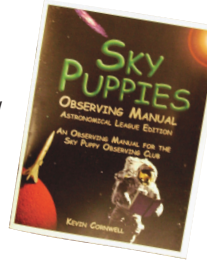
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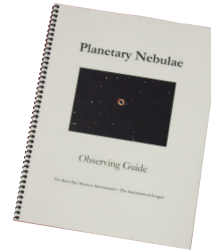
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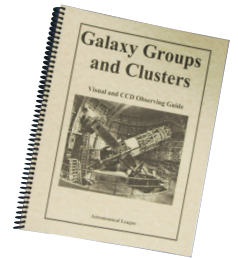
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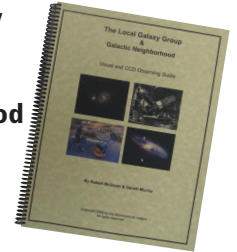
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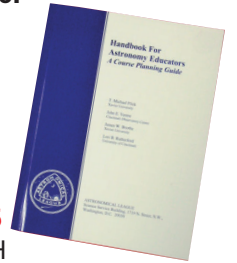
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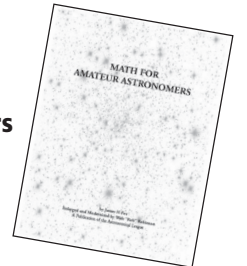
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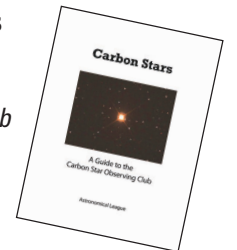
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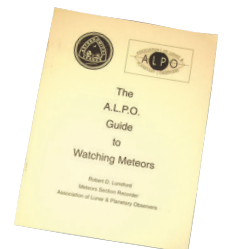
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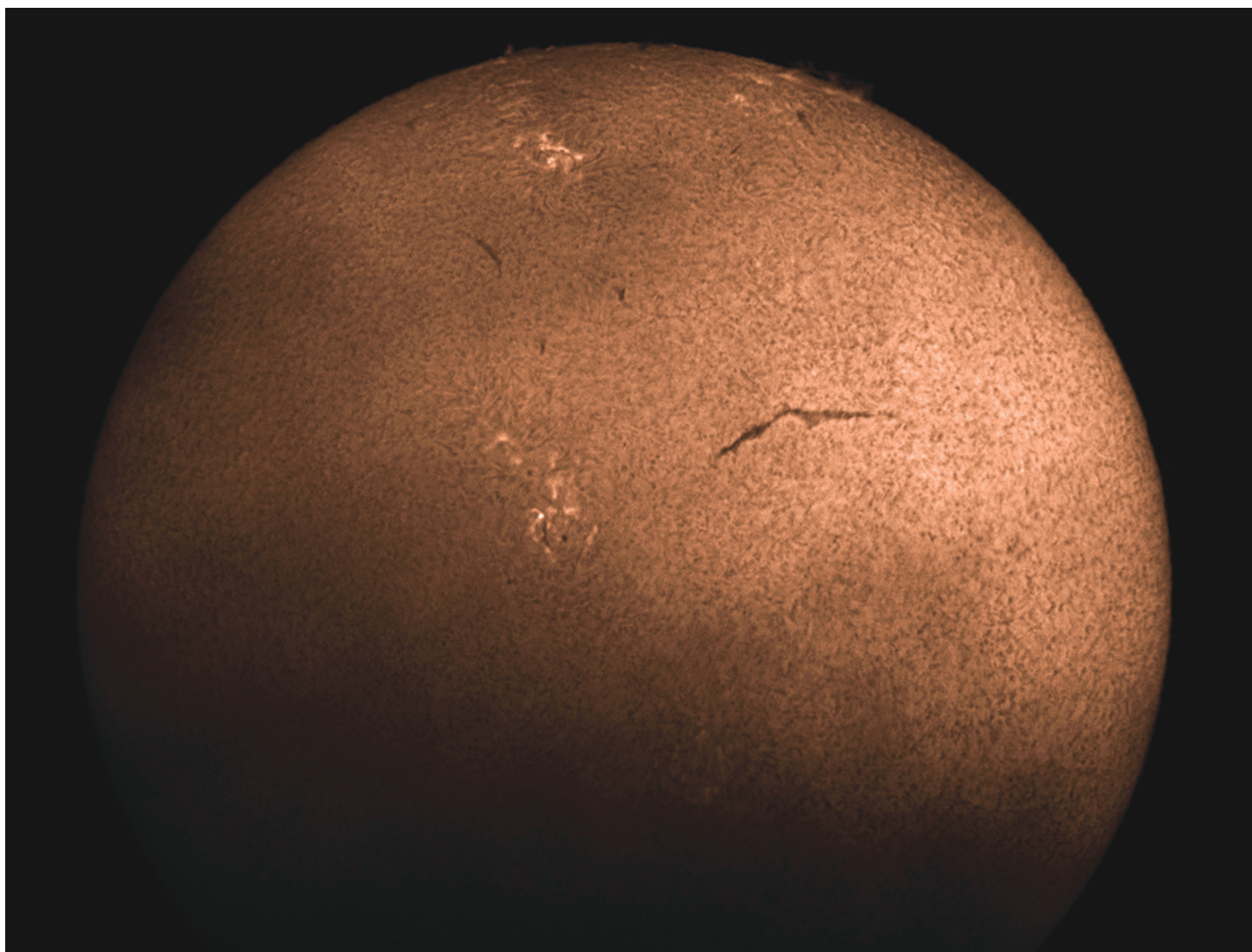


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Phil Whitebloom, a member of the Howard Astronomy League in Howard County, Maryland took this image, which he calls Sun in Cloud. It was taken on July 27, 2014, during Star Quest XI, at the National Radio Astronomy Observatory in Green Bank, West Virginia. As the clouds began to roll in mid-afternoon, he I thought this could be a really awesome picture. Using a tracking mount he captured 288 pictures three of which were used to create this final image. The visual effect of the clouds combined with the sunspots, the scorpion-shaped plage, one large filament, and the prominences at the top to make a dramatic image. The telescope used was a Lunt Hydrogen Alpha LS60T with LS50F Double Stack Filter, while the camera was a The Imaging Source DMK 51 AU02.AS. Image processing was with RegiStax 6, Photoshop CS6, and Photoshop Lightroom 4.

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.