

# The ECLIPSE

December  
2014

*The Newsletter of the Barnard-Seyfert Astronomical Society*

**Next Membership Meeting:**  
December 17, 2014, 7:30 pm  
Cumberland Valley  
Girl Scout Council Building  
4522 Granny White Pike

**Annual Potluck and  
Silent Auction  
at 6:30 pm**

**Program Topic:**  
*Dr. Tracie Prater*  
*Marshall Space Flight Center*  
*details on page 7*

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## From the President:

As I write, it is a (mostly) clear but rather chilly night. Winter is when we often get some of our best night skies as cold high pressure moves in. So I hope that you will occasionally brave the cold to enjoy the bright stars of winter!

There are a couple of opportunities coming up to help others enjoy the winter skies! We have a star party scheduled for December 13th at the Warner Park model airplane/special events field. If you are new to the club or have never brought a telescope to a star party, come on out! We are on a paved field there so it is a good place to get started. You don't have to be an expert on anything other than setting up your telescope. Everyone will enjoy the view that you provide. There are a lot of nice, bright, easy to find objects in the sky to show off. Bring a step stool for the short guests, and have fun.

Want darker skies? Pickett State Park would like for any club member interested to come out to the park on New Year's Eve. Ranger Monique Johnson will put you up in a bunkhouse at the group camp (heated!), and she will feed you! Plan to arrive before 4pm so that there is someone in the office, and let me know if you are going so I can give her a head count for food. They have an annual First Night Hike and Star Party, but after the public leaves you get to enjoy the great skies. The outreach they do is helping that park in their effort to be officially designated a Dark Sky Park by the International Dark Sky Association. If it is clear, it is worth the drive!



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## Observing Highlights December and January

### Multiple Star Systems

Gamma Delphini  
Polaris

### Globular Clusters

M15, M2  
M72, M75  
M30, M79

### Open Clusters

M73, M29,  
M39, M52,  
NGC457 (ET),  
M103, NGC654,  
NGC663,  
NGC884/869  
(Double Cluster),  
M34, M45,  
M36, M37, M38

### Galaxies

M31 (Andromeda),  
M32, M110,  
M33 (Triangulum),  
M74, M77

### Nebulae

NGC7000 (North America),  
IC5146 (Cocoon),  
NGC7293 (Helix),  
M76 (Little Dumbell),  
NGC1499, (California),  
M1, M42 (Orion),  
M43, M78

### Variable Stars

Mu Cephei  
(Herschel's Garnet Star),  
Beta Persei (Algol),  
Omicron Ceti (Mira),  
R Leporis

## Upcoming Star Parties

Sat 12/13 7:00 - 9:00 pm	<a href="#">Edwin Warner Park</a>
Sat 12/20	Private Star Party <a href="#">Natchez Trace Parkway mile marker 433.5</a>
Fri 1/9/2015 7:30 - 9:30 pm	<a href="#">Bells Bend Outdoor Center</a>
Sat 1/17	Private Star Party <a href="#">Natchez Trace Parkway mile marker 412 (Water Valley Overlook)</a>



Dec 21  
Jan 20



Dec 28  
Jan 26



Dec 6  
Jan 4

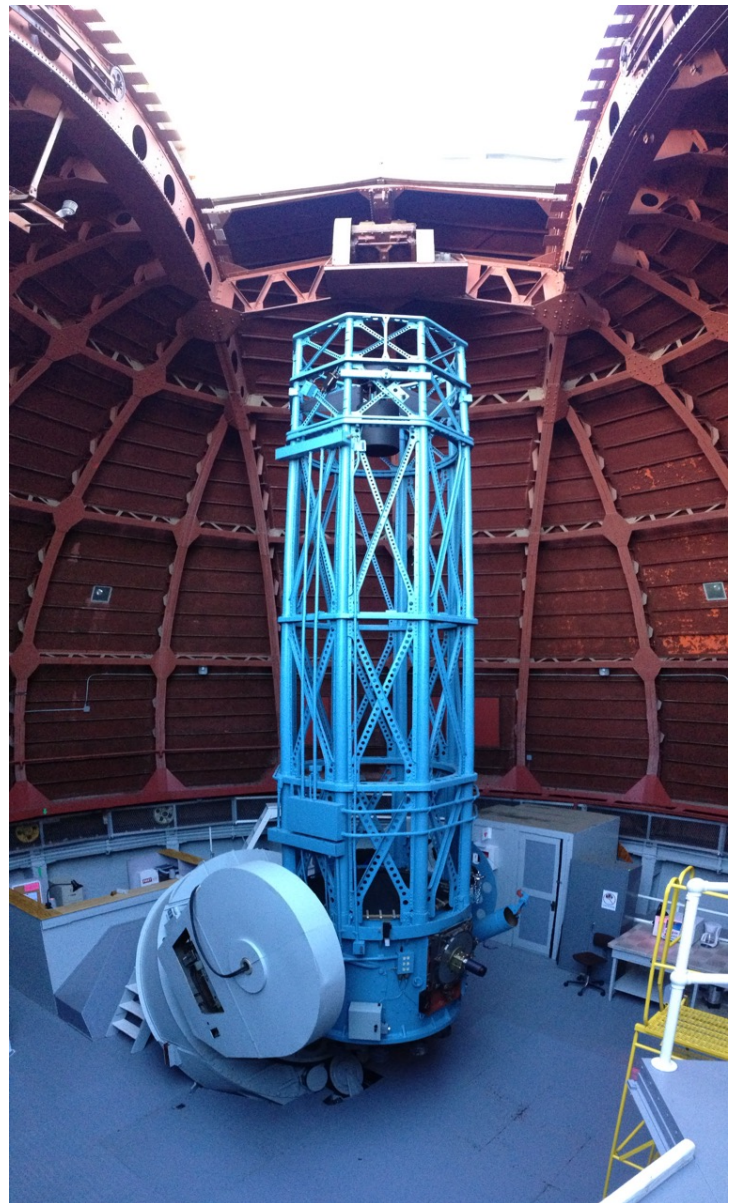


Dec 14  
Jan 13

## Happy Birthday Mount Wilson Observatory by Robin Byrne

This month, we celebrate the birthday of a major astronomical institution. It was the dream of George Ellery Hale to build a solar observatory on the 5,710 foot peak overlooking the, then, small town of Los Angeles, California. It had the advantage of steadier and more clear skies than Hale's previous location in Wisconsin at Yerkes Observatory. The land was leased from the Mount Wilson Hotel with the stipulation that the public must have access to the observatory. The funding was provided by the Carnegie Institution of Washington on December 20, 1904.

Hale's first priority was to use the location to observe the Sun, so the original name was Mount Wilson Solar Observatory. The first telescope put into use was the Snow Solar Telescope, which Hale brought from Yerkes, along with several scientists and engineers. Hale's plan was for Mount Wilson to be the first observatory dedicated to the "New Astronomy" (now known as astrophysics). In particular, Hale wanted to understand the workings of the Sun and stars by analyzing their light. Using the Snow Telescope, studies of the Sun began in earnest in 1905. The Snow Telescope was used to better determine the solar constant, and the temperature of sunspots. Today it is used for public outreach and education. In 1908 the 60-foot solar tower was completed. Using this instrument, Hale detected the Sun's magnetic field, which was the first time any magnetic field was discovered beyond the Earth. In 1912, the largest of the solar telescopes, the 150-foot telescope, was completed. Two years later, Hale discovered that sunspots reverse their magnetic polarity every 11 years. Later discoveries related to the Sun include



60 inch telescope at Mount Wilson  
Credit: [Heven729](#)

measuring the Sun's change in size every 5 minutes and other oscillations that occur on the Sun.

In 1896, Hale was given a 60-inch mirror blank from his father. Weighing 1,900 pounds, grinding of the disk of glass didn't begin until 1905, now that an observatory

## From the President, continued from page 1

If you do not want to go that far, Henry Horton State Park has also asked for anyone interested to come out there on the same night. So if you are down south of town, that's another possibility.

For a few more days you can put in a request for an RASC Observers Handbook (\$20) and/or the Deep Space Mysteries calendar from Astronomy Magazine (\$10) and/or the Astronomical Calendar by Guy Ottewell (\$20)! Email us asap: [info@bsasnashville.com](mailto:info@bsasnashville.com)!

Don't forget to clean out your astronomical closets and get out items for the silent auction at the annual member potluck! This month is our annual dinner, bring side dishes - the club will provide meat and drinks. If you haven't been to a meeting for a while, this is the one you don't want to miss. Enjoy a nice evening, maybe take home a new to you book, and get excited about astronomy in the new year.

The program this month will be presented by Dr. Tracie Prater from Marshall Space Flight Center. She has worked on several engineering projects, ranging from flight certifying equipment to a proposal for a portable welder for use in orbit. This is the nuts and bolts work that will keep us in space!

Clear skies,

Theo Wellington



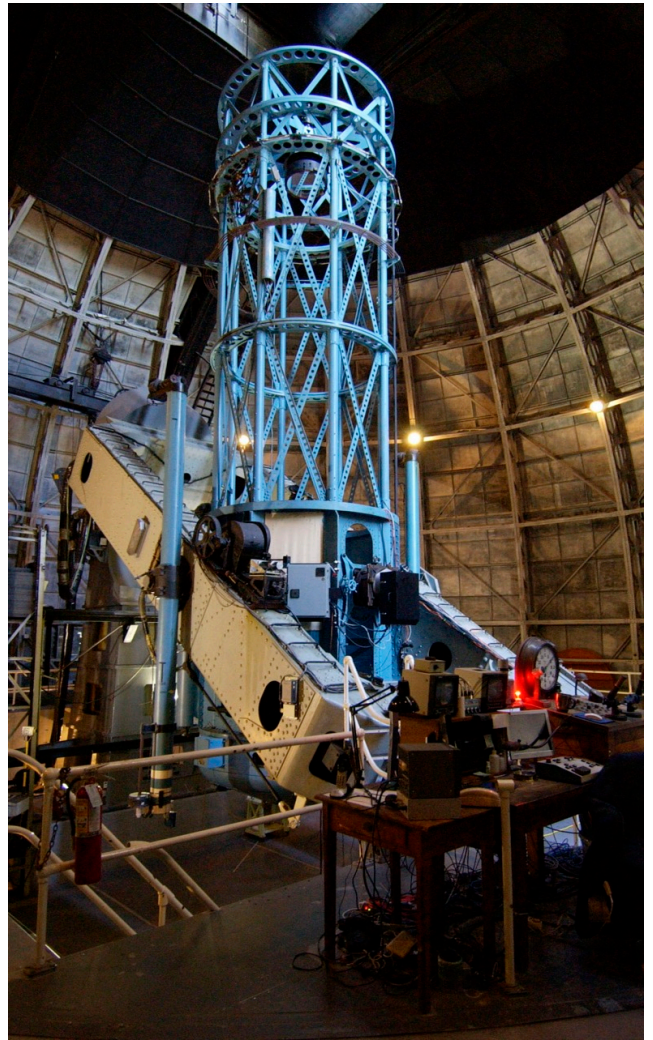
*Member Tom Murdic braved a cold night to get a nice shot of NGC 1333, a reflection nebula in Perseus lit by young stars forming in a molecular cloud. Great job!*

## Mount Wilson Observatory, continued from page 3

existed to house it. After two years of grinding, plus surviving the 1906 San Francisco earthquake, first light of the world's largest telescope finally occurred in December of 1908. The Cassegrain designed telescope was used for spectroscopy, measuring parallax, photographing nebulae and photometry. In 1917, Harlow Shapley used the 60-inch to plot distributions of globular clusters, which allowed him to determine the location of the center of the Milky Way. In 1992, it became one of the first telescopes equipped with adaptive optics, increasing the resolving power from 0.5 arc seconds to 0.07 arc seconds. Today, the telescope, using custom made 4" eyepieces, is the largest used for public outreach. If you happen to have \$1700 waiting to be spent, you, and up to 24 of your friends, can book the scope for an entire night.

Hale, with a classic case of aperture fever, didn't wait long after the 60-inch telescope was begun before he started making plans for an even larger telescope. With funding from John D. Hooker, the blank for a 100-inch mirror started the casting process in 1906. Made of more than 2 tons of glass, after melting it into one piece, it took over a year to slowly cool without any cracks forming. In November of 1917, the 100-inch Hooker Telescope saw first light. Two years later, with the direction of the observatory clearly moving to areas beyond the Sun, "Solar" was dropped from the name of Mount Wilson Observatory. Probably the most famous work conducted with the Hooker Telescope was in the 1920's by Edwin Hubble. Using this instrument, Hubble proved that galaxies exist beyond the Milky Way, and discovered that the universe is expanding. It wasn't until the construction of the 200-inch Hale Telescope at Mount Palomar in 1948 that a larger telescope was built, ending the Hooker's reign as world's largest.

For the same reason that L.A. has a constant layer of smog, the inversion layer over Mount Wilson makes the air incredibly steady. The steady skies make this location ideal for interferometry. Interferometry involves observing the same object from two or more locations and combining the light into a single image with a much higher resolution than you can get with a single observation. It was in 1919 that Albert Michelson equipped the 100-inch with an optical interferometer. Using this device, he was able to measure the angular diameters of closer stars, including Betelgeuse. Michelson was also able to use the telescope



100 inch Hooker Telescope  
at Mount Wilson  
Credit: [Ken Spencer](#)

## Mount Wilson Observatory, continued

to measure the speed of light. In 1988, interferometry at Mount Wilson took a big leap forward with the Infrared Spatial Interferometer, which is comprised of three 1.7 meter movable infrared telescopes. At their widest spacing of 70 meters, the interferometer can achieve a resolution of 0.003 arc seconds. In 1999, Georgia State University's Center for High Angular Resolution Astronomy (CHARA) interferometer saw first light. Using six 1-meter telescopes with a maximum separation of 330 meters, this array has a resolution of 0.0005 arc seconds.

Over the years, various infrared telescopes have been added to Mount Wilson, including a 24-inch telescope, which, in 1966, was the first to directly image the center of the Milky Way. The first infrared survey of the sky was conducted in 1965 using a 60-inch telescope at Mount Wilson. In 1968, a 62-inch telescope was used to create the first large-area near infrared sky survey.

Light pollution from Los Angeles ultimately made Mount Wilson unusable for research of deep sky objects. In 1986, the facility was taken over by the Mount Wilson Institute, a non-profit organization. The telescopes are still being used for both research and public outreach.

It is sad to think that an observatory that had been responsible for some of the most remarkable discoveries of the 20th century, is now, largely, unusable due to light pollution. However, we can take hope from the fact that some research is still conducted, thanks in large part to the development of adaptive optics and interferometry. And with public access still an important part of Mount Wilson Observatory's mission, who knows how many budding astronomers will be inspired by a visit to this historic institution. George Ellery Hale would be pleased by that thought.

### References:

History of Mount Wilson Observatory

[www.mtwilson.edu/his.php](http://www.mtwilson.edu/his.php)

Mount Wilson's First Century

[www.mtwilson.edu/cent.php](http://www.mtwilson.edu/cent.php)

Mount Wilson Observatory - Wikipedia

[en.wikipedia.org/wiki/Mount\\_Wilson\\_Observatory](http://en.wikipedia.org/wiki/Mount_Wilson_Observatory)

Send your great amateur  
astrophotos to:  
[eclipse@bsasnashville.com](mailto:eclipse@bsasnashville.com)

**Barnard-Seyfert Astronomical Society  
Minutes of the Regular Meeting of the Board of Directors  
Held On Wednesday, November 5, 2014**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held November 5, 2014, at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, TN 37204. Present were Steve Cobb, Bud Hamblen, Melissa Lanz, Kris McCall, Bob Norling and Theo Wellington. Theo Wellington called the meeting to order at 8:00 PM. Theo Wellington asked for a motion to approve the meeting of the October meeting as printed in the November, 2014, issue of the Eclipse. Bob Norling so moved, Steve Cobb seconded, and the minutes were approved by a unanimous voice vote. Bob Norling reported that there were \$1,664.46 in the regular account and \$1,729.12 in the equipment account.

The programs for the next several general meetings were discussed. Spencer Buckner would present at the November meeting, Tracy in December, the January meeting would have members in breakout groups on how to use telescopes and Theo Wellington would present in February. Members will bring side dishes to the December meeting. The handbooks and calendars should be available at the meeting and the silent auction would be held.

There being no further business to discuss, Bob Norling moved for adjournment, Melissa Lanz seconded, and the meeting was adjourned at 8:40 PM.

Respectfully submitted,  
Bud Hamblen, Secretary

**Next BSAS meeting  
December 17, 2014, 7:30 pm  
Cumberland Valley  
Girl Scout Council Building  
4522 Granny White Pike**

*Dr. Tracie Prater from Marshall Space Flight Center will give a presentation on some of the very interesting engineering work she is part of with NASA. From material requirement verification to materials for microgravity, we look forward to hearing about some of the interesting work that will make it possible for humans to build in orbit and elsewhere in space.*

***Don't forget that at 6:30 pm is our annual potluck dinner...  
bring your favorite side dish or dessert to share!***

**Barnard-Seyfert Astronomical Society  
Minutes of the Monthly Membership Meeting  
Held On Wednesday, November 19, 2014**

The Barnard-Seyfert Astronomical Society held its monthly membership meeting for January at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, Tennessee, on Wednesday, November 19, 2014. 21 members were present. Theo Wellington called the meeting to order at 7:30 PM. Theo Wellington recognized Alan as a new member. Theo Wellington asked for a motion to approve the minutes of the October membership meeting as published in the November, 2014, issue of the Eclipse. Mike Benson so moved, Curt Porter seconded, and the minutes were adopted by a unanimous voice vote. Bob Norling reported that there were \$1,664.46 in the regular account and \$1,729.12 in the equipment account.

Upcoming star party dates included November 21 at Bowie Nature Park (probably cloudy), November 22 on the Natchez Trace (probably cloudy), December 13 at Warner Parks, December 20 on the Natchez Trace, December 31 at Pickett State Park and Henry Horton State Park,

Mike Benson presented Theo Wellington with the Astronomical League Outreach Pin.

Spencer Buckner presented his program on astronomy related gifts.

Kris McCall called for members to donate items for the silent auction at the December meeting and dinner.

There being no further business the meeting was adjourned at 8:50 PM.

Respectfully submitted,

Bud Hamblen, Secretary



For Sale: Gently-used (14 times?) Ioptron G-Series GPS Cube & 80 mm refractor. "Go-To" surprisingly accurate & novice-friendly. Standard accessories included. Lowest new, list, price I've seen is \$340. + shipping (Hayneedle). Sell for \$230. OBO. John Walker 931-996-8136. [mcjwwalker@gmail.com](mailto:mcjwwalker@gmail.com)



**Become a Member of BSAS!**

Visit [bsasnashville.com](http://bsasnashville.com) to download and print an application for membership.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Then fill it out and bring it to the next monthly meeting or mail it along with your first year's membership dues to:

**BSAS**  
**P.O. Box 150713**  
**Nashville, TN 37215-0713**

**Annual dues:**

**\$20 Individual**  
**\$30 Family**  
**\$15 Senior (+65)**  
**\$25 Senior Family (+65)**  
**\$12 Student\***

\* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

You can check the status of your membership at [bsasnashville.com](http://bsasnashville.com).

There will be a two month grace period before any member's name is removed from the current distribution list.

**About BSAS**

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at [bsasnashville.com](http://bsasnashville.com). If you need more information, write to us at [info@bsasnashville.com](mailto:info@bsasnashville.com) or call Theo Wellington at (615) 300-3044.

**Free Telescope Offer!**

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact [info@bsasnashville.com](mailto:info@bsasnashville.com).