# The ECLIPSE

*The Newsletter of the Barnard-Seyfert Astronomical Society*

*November 2022*

BSAS
Barnard-Seyfert Astronomical Society

## Officers

Tom Beckermann
President

Bud Hamblen
Secretary

Theo Wellington
Treasurer

Keith Rainey
Ex-officio

## Directors at Large

Cory Buckner

Chip Crossman

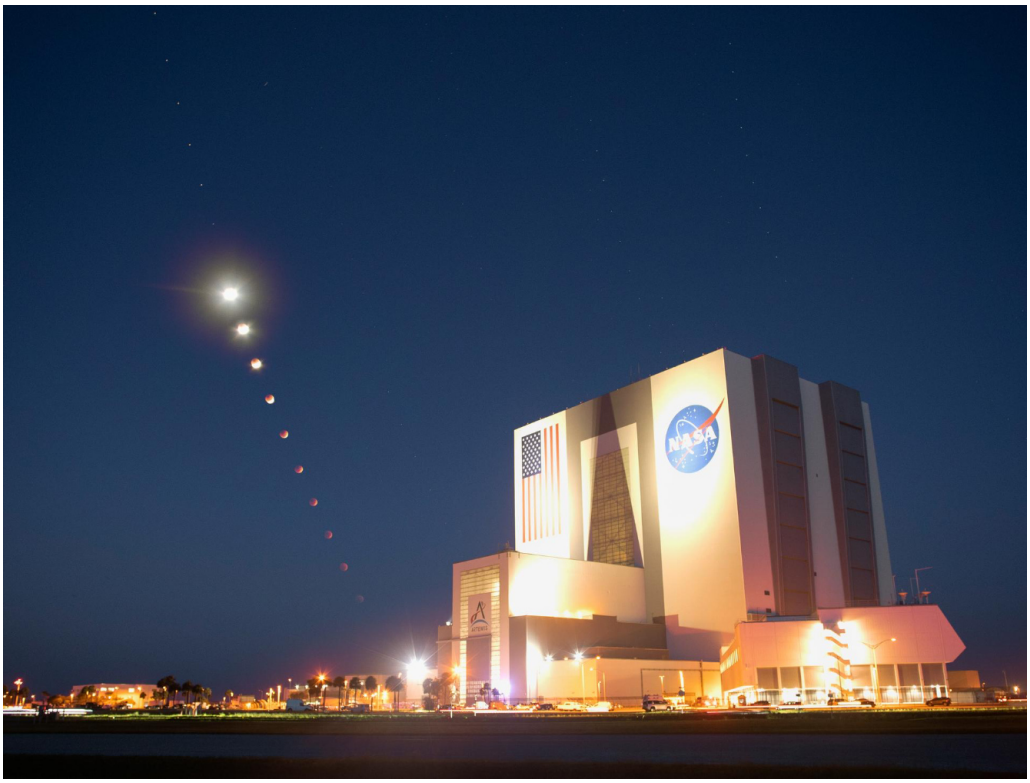
Tony Drinkwine

Osvaldo Gonzalez

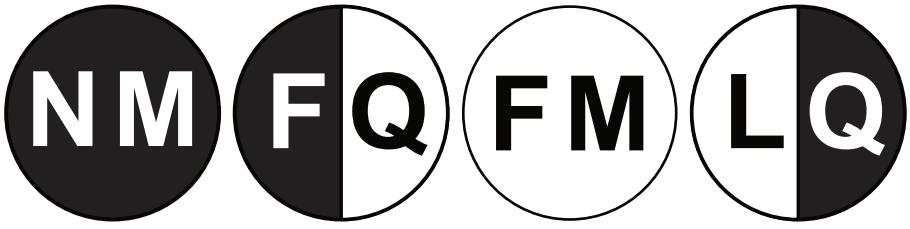
Andy Reeves

Kathy Underwood

Contact BSAS officers at
bsasnashville.com/contact
Or email info@bsasnashville.com



This composite made from ten images shows the progression of the Moon during a total lunar eclipse above the Vehicle Assembly Building, Nov. 8, 2022, at NASA's Kennedy Space Center in Florida. Visible trailing the Moon in this composite is Mars. **Photo Credit:** NASA/Joel Kowsky




**Nov 23**
**Dec 23**

**Nov 1, 30**
**Dec 29**

**Nov 8**
**Dec 7**

**Nov 16**
**Dec 16**

## Happy Birthday Louis Daguerre
## by Robin Byrne

This month we celebrate the life of a man whose work would start the field of astrophotography. On November 18, 1787, Louis Daguerre was born to Louis and Anne Daguerre in Cormeilles-en-Parisis, France.

Not long after his birth, the Daguerre family moved to Orléans, France. The early education of Louis is not known, but he must have shown a talent for art. With what little money his family had, they made sure that Louis could pursue his abilities. He was sent to Paris to be an apprentice for Pierre Prévost. During this apprenticeship, Louis learned about architecture, theatre design, and painting panoramas.

After his apprenticeship, Louis remained in Paris, working as a painter for opera companies, creating scenic designs and sets. It was during this time that he met Louise Georgina Arrow-Smith. They married on November 10, 1810. It is not known if they had children.

In the 1820's Daguerre began experimenting with painting on semi-transparent materials and using different lighting effects. By painting different images on opposite sides of the canvas, and changing whether it was lit from the front, back, or at different angles, you could create the effect of a changing image, resulting in the illusion of motion. This led to his first major venture. With Charles Marie Bouton, a skilled painter, they opened a diorama theatre in a building connected to Daguerre's studio. The grand opening occurred on July 11, 1822. The audience of about 300 people entered into a round room, facing an opening in the wall. Behind the opening was a painting measuring 45 feet tall and 70 feet wide. For the next 15 minutes, the image would appear to slowly transform before the audience's eyes. At the end of the transformation, the floor and wall opening would slowly rotate to reveal a second tableaux with similar changing effects. Some of the scenes included paintings that looked like a train moving across the image, or a town before and after an earthquake. Typically, one of the tableaux would be painted by Daguerre, and one by Bouton. Eventually, Bouton moved on, and Daguerre continued alone.

Around the same time that Daguerre was presenting his dioramas, Nicéphore Niépce developed the process of creating the first photographs. This initial process required exposures of hours to days, which was not practical for photographing anything other than stationary buildings or landscapes. In his work on the diorama paintings, Daguerre frequently

used a camera obscura, which made use of a lens to project an image onto a frosted piece of glass for viewing, but this process did not record the image. In 1829, Daguerre began working with Niépce in the hopes of developing a better way to preserve images. After three years of work, they had developed a process, called Physautotype, that could take a picture with an exposure time less than eight hours. Still a long time, but an improvement.

In 1833, Niépce unexpectedly died. Daguerre continued with the experiments they had begun. He started working with a sheet of copper that was coated with a thin layer of silver. This was exposed to vapor from iodine crystals, which reacted with the silver, creating silver iodide, which is sensitive to light. However, this material still required long exposure times for an image to appear. Unlike more modern photography, there was no development process. The plate was exposed until an image could be seen, at which point the remaining silver iodide was washed off. What Daguerre discovered was a way to cause an invisible image to appear through the process of development. Legend has it that an accident in the lab led to Daguerre's breakthrough. According to the story, a broken thermometer resulted in a partially exposed plate being subjected to mercury vapor. The mercury vapor caused an image to "magically" appear on a plate that still looked blank. This new technique led to the ability to capture an image in 30 minutes, instead of many hours. The Daguerrotype was born!

Daguerre had hoped to interest investors in backing the production of his invention, but couldn't find anyone willing to financially support him. So, instead, on January 7 1839, Daguerre presented his invention at an assembly of the French Academy of Sciences and the Académie des Beaux Arts. Careful to protect his intellectual property, Daguerre described the process in vague terms, but did invite the members to his studio to view examples of the images he captured. Later, Daguerre privately explained everything in detail to the Academy's secretary, the astronomer François Arago. Arago was also a member of the French legislature, and he was able to work out an arrangement in which the rights to the process were purchased by the French government. For this work, Daguerre, as well as the son of Niépce, would receive a lifetime pension. The details of the process were then made public by the French government on August 19, 1839. Only a few days prior to this announcement, Miles Berry, on behalf of Daguerre, had applied for a patent on the process in England. Because of this, while France released the Daguerrotype process "free to the world," England was excluded from the deal and was required to pay license fees to use the method. Daguerrotypes quickly became all the rage around the globe - except in England, where other photographic techniques were implemented instead.

While Daguerrotypes were used mostly for portraits and landscapes, they also opened up the possibility to photograph something never before possible - astronomical objects. It is thought that Daguerre himself was the first to use this method to photograph the Moon, to the great surprise of Arago. His image was reportedly taken on January 2, 1839. Sadly, this and most of his first images were destroyed in a fire that burned down his studio and diorama theatre in March of that year. In America, John William Draper took the first moon image on a Daguerrotype that is still preserved. Draper also partnered with William Cranch Bond to take a Daguerrotype of the star Vega in 1850. A pair of physicists took a Daguerrotype of the Sun which had enough detail to even show sunspots.

As he got older, Daguerre chose a quieter life in the Paris suburbs, where he worked painting dioramas for churches. On July 10, 1851, Louis Daguerre suffered a fatal heart attack at the age of 63. He was buried in Bry-sur-Marne.

Louis Daguerre is not a typical household name, but his contributions to society are well known. His name lives on, not only in the form of his photographic process, but also as one of only 72 notable names chosen to be inscribed on the Eiffel Tower. Now thought of as the father of modern photography, Daguerre could also be called the father of astrophotography. Whether taking a shot of the Moon with your cell phone, or creating amazing stacked images of nebulae and galaxies, take a moment to thank the man who gave us the first tools used to record the beauty of the night sky - Louis Daguerre.

**References:**

Louis Daguerre - Wikipedia

Daguerre (1787-1851) and the Invention of Photography by Malcolm Daniel, Department of Photographs, Metropolitan Museum of Art, October 2004

Louis Daguerre Biography - Invention of Daguerreotype, Photography History Facts

Biography of Louis Daguerre, Inventor of Daguerreotype Photography, ThoughtCo.

This Month in Physics: January 2, 1839: First Daguerrotype of the Moon, January 2013 by Michael Lucibella

**On the Cover:** The Pillars of Creation are set off in a kaleidoscope of color in NASA's James Webb Space Telescope's near-infrared-light view. The pillars look like arches and spires rising out of a desert landscape, but are filled with semi-transparent gas and dust, and ever changing. This is a region where young stars are forming – or have barely burst from their dusty cocoons as they continue to form.

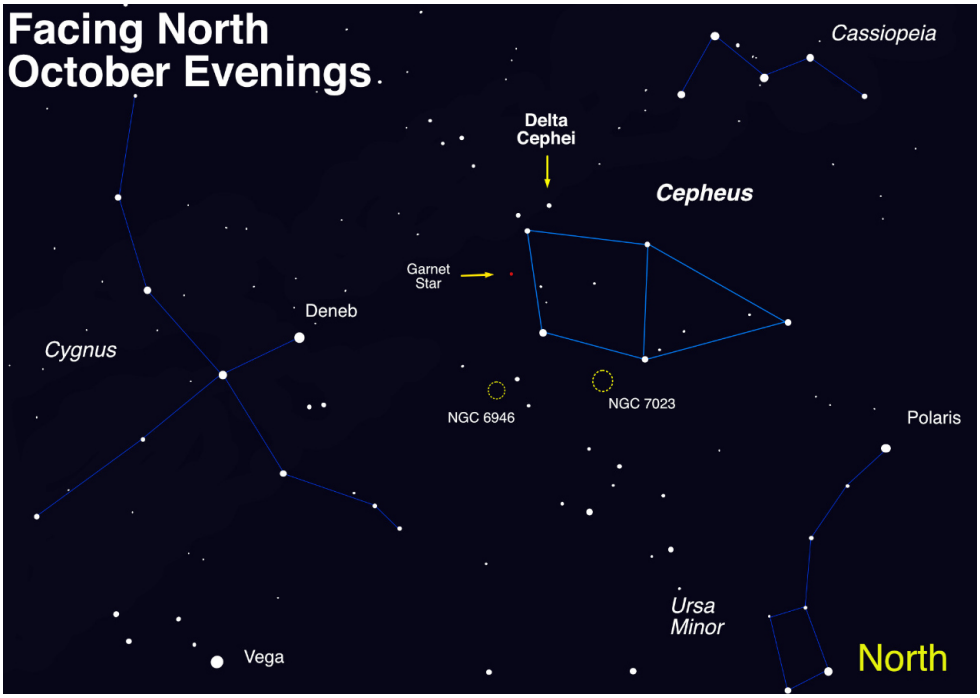
Newly formed stars are the scene-stealers in this Near-Infrared Camera (NIRCam) image. These are the bright red orbs that sometimes appear with eight diffraction spikes. When knots with sufficient mass form within the pillars, they begin to collapse under their own gravity, slowly heat up, and eventually begin shining brightly.

The Pillars of Creation is a small region within the vast Eagle Nebula, which lies 6,500 light-years away.

**Credits:** SCIENCE: NASA, ESA, CSA, STScI
IMAGE PROCESSING: Joseph DePasquale (STScI), Anton M. Koekemoer (STScI), Alyssa Pagan (STScI)

## Cepheus: A House Fit for a King
### By David Prosper

Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of Cepheus for the first time. These stars represent Cepheus, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original Cepheid Variable.




The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: stellarium.org.

Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the "Garnet Star" Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the "Fireworks Galaxy" NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star Delta Cephei. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a

cycle of where it dims and then brightens). Once the period for a Cepheid Variable (or Cepheid) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called "Leavitt's Law.". So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid's distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this "nebula" was actually another galaxy outside of our own Milky Way! You may now know this object as the "Andromeda Galaxy" or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

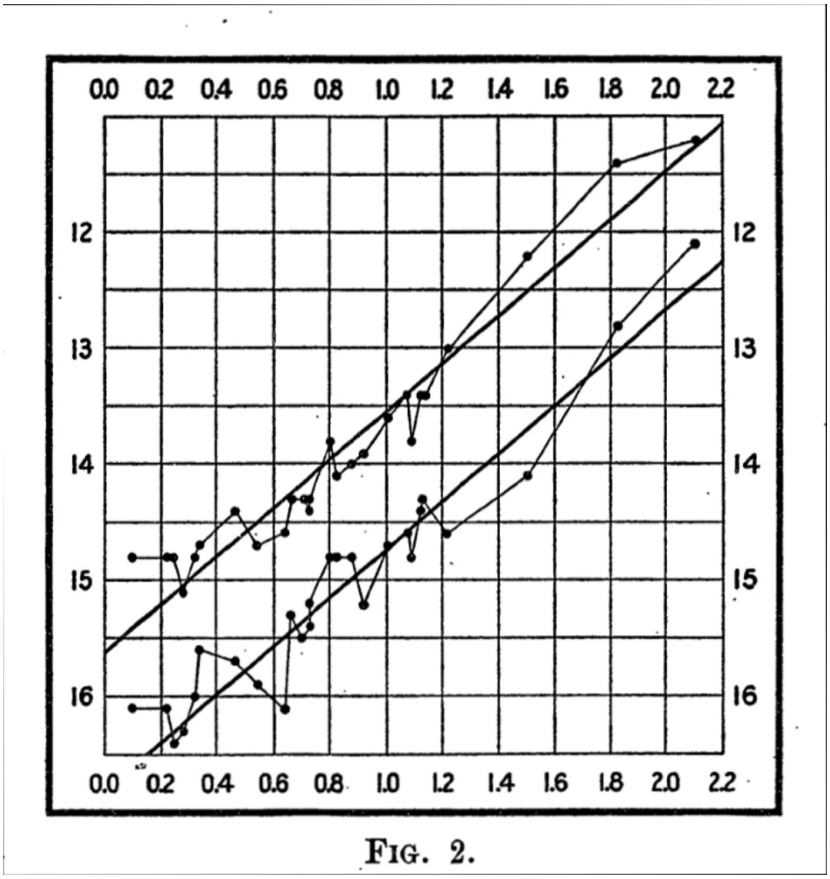


FIG. 2.

This historical diagram from Henrietta Leavitt's revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering's 1912 paper, "Periods of 25 Variable Stars in the Small Magellanic Cloud," a copy of which can be found at: https://ui.adsabs.harvard.edu/abs/1912HarCi.173....1L/abstract

Because of their importance as a "standard candle" in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was even studied in detail by Edwin Hubble's namesake telescope, NASA's Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA's Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA's latest observations of stars and galaxies across our universe at nasa.gov.

*This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!*

# xkcd


IT'S WEIRD MAKING PLANS FOR ECLIPSES.

**Next Membership Meeting:**

Wednesday November 16, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

## Barnard-Seyfert Astronomical Society
## Minutes of a Regular Meeting of the Board of Directors
## Held On Wednesday, October 5, 2022

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held October 5, 2022, online, Dr. Tom Beckermann presiding. Logged in were Tom Beckermann, Cory Buckner, Bud Hamblen, Kathy Underwood and Theo Wellington.

Tom asked for a review of the minutes of the board meeting on September 7, 2022, as printed in the October, 2022, edition of the Eclipse. Noone objected to the minutes.

Treasurer's Report: Theo reported $10,434.86 in the Truist account and $492.58 in the PayPal account.

Social Media: Theo reported that the Facebook page was liked by 2,071 and followed by 2,206. @BSASNashville was followed by 317 on Twitter.

The lanyards for the new BSAS nametags are supposed to be arriving this week. It will be time to order RASC Handbooks soon. If members want nametags or handbooks, they can let the club know on a Google survey form at https://forms.gle/wXDeAVPzAy4qfZ7U6. We need to have orders for at least 10 handbooks to get free shipping from the Astronomical League.

Star parties and outreach: The Bell's Bend event on 9/10/22 was clouded out. The Warner Park event on 10/1/22 had clear weather. Attendance was 150. Six telescopes were available. Chuck Schlemm had a space vehicle display set up under one of the shelters.

Upcoming star parties: Private star parties are planned for Natchez Trace Water Valley Overlook on 10/22, Mile Marker 535.3 on 11/19/22, and Water Valley Overlook on 12/17/22. Public star parties are planned for Bowie Nature Park on 11/5/22, and Shelby Bottoms Nature Center on 12/3/22.

Meetings: Dr Shane Larson is scheduled for a presentation on dark matter at the October meeting. Dr Larson will be presenting in person. The November meeting will be "All I want for Christmas ..." The topic of the December meeting is open. It was planned to poll members on the subject of a potluck dinner. Meetings are now on Night Sky Network and attendees can log on and record their participation in a club event. NASA/JPL credits clubs with event participation.

New business: Ordering eclipse glasses were discussed. The annual eclipse of October 14, 2023, will be over 50% partial in Tennessee. The total eclipse of April 8, 2024, will be nearly 95% partial in Nashville. Eclipse glasses are good sellers.

There being no further business, the meeting was adjourned at 8:15.

Respectfully submitted,

Bud Hamblen
Secretary


In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold. The third color is a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4” x 22 1/4” and are available for $20 at our membership meetings, or $25 with shipping by ordering through bsasnashville.com. Frame not included.

Barnard-Seyfert Astronomical Society

Become a Member of BSAS! Visit bsasnashville.com to join online.

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

Annual dues:

Regular: $25
Family: $35
Senior/Senior family: $20
Student*: $15

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

## 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. If you need more information, write to us at info@bsasnashville.com.

## 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.