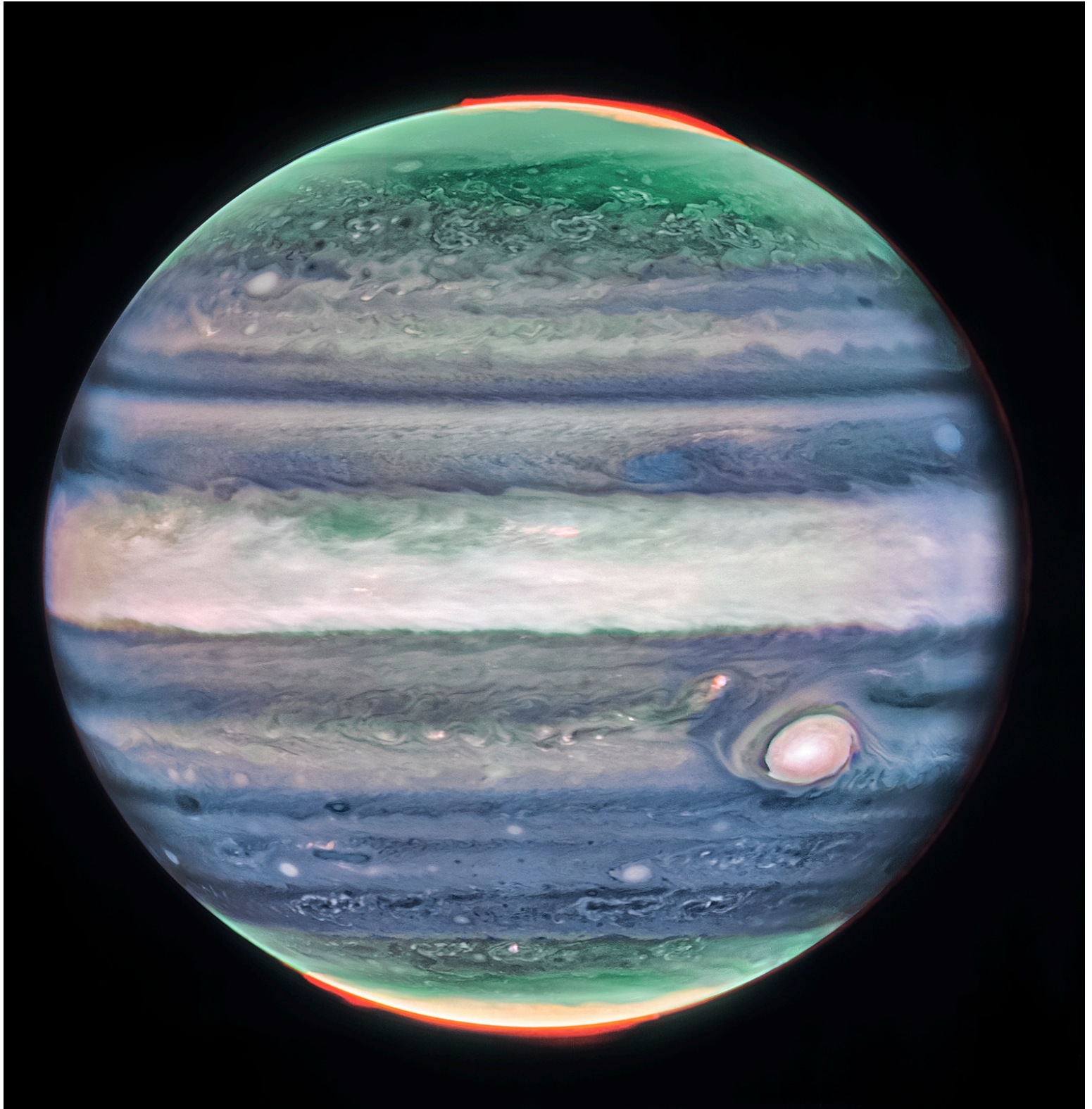


The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society



November 2023



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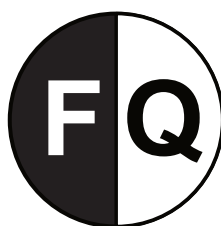
This image shows the “moonrise” of the satellite as it emerges from behind asteroid Dinkinesh as seen by the Lucy Long-Range Reconnaissance Imager (L’LORRI), one of the most detailed images returned by NASA’s Lucy spacecraft during its flyby of the asteroid binary. This image was taken at 12:55 p.m. EDT (1655 UTC) Nov. 1, 2023, within a minute of closest approach, from a range of approximately 270 miles (430 km). From this perspective, the satellite is behind the primary asteroid. The image has been sharpened and processed to enhance contrast. **Image Credits:** [NASA/Goddard/SwRI/Johns Hopkins APL/NOIRLab](#)

On the Cover: This image of Jupiter from NASA’s James Webb Space Telescope’s NIRCcam (Near-Infrared Camera) shows stunning details of the majestic planet in infrared light. In this image, brightness indicates high altitude. The numerous bright white "spots" and "streaks" are likely very high-altitude cloud tops of condensed convective storms. Auroras, appearing in red in this image, extend to higher altitudes above both the northern and southern poles of the planet. By contrast, dark ribbons north of the equatorial region have little cloud cover.

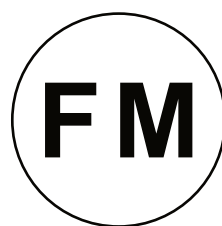
In Webb’s images of Jupiter from July 2022, researchers recently discovered a narrow jet stream traveling 320 miles per hour (515 kilometers per hour) sitting over Jupiter’s equator above the main cloud decks. **Image Credits:** [NASA](#), [ESA](#), [CSA](#), [STScI](#), [Ricardo Hueso \(UPV\)](#), [Imke de Pater \(UC Berkeley\)](#), [Thierry Fouchet \(Observatory of Paris\)](#), [Leigh Fletcher \(University of Leicester\)](#), [Michael H. Wong \(UC Berkeley\)](#), [Joseph DePasquale \(STScI\)](#)



Nov 13
Dec 12



Nov 20
Dec 19



Nov 27
Dec 26



Nov 5
Dec 4

Happy Birthday Christian Doppler by Robin Byrne

This month, we celebrate the life of a man whose discovery has come in handy in many different ways. Christian Andreas Doppler was born November 29, 1803 in Salzburg, Austria. Despite coming from a long line of stonemasons, because of being sickly most of his life, Christian pursued a different career path.

Christian started school in Salzburg, and then moved on to a secondary school in Linz. On the advice of one of his teachers, who felt Christian had a talent for mathematics, Doppler's parents sent him to the Vienna Polytechnic Institute in 1822, where he excelled. After graduating in 1825, Doppler attended the Salzburg Lyceum and then the University of Vienna to study mathematics, astronomy, and mechanics. He graduated in 1829.

Doppler's first job after graduation was as an assistant to one of the professors of mathematics at the University of Vienna, Professor A. Burg. During his four years as Burg's assistant, Doppler worked on his own research, and published four papers in the field of mathematics. At this point, Doppler was 30 years old, and felt he should have a more substantial job, so he left the university.



However, it turns out that finding a new position was not going to be easy. So, in the interim, Doppler worked as a bookkeeper in a factory that spun cotton. After 18 months of this dreary occupation, Doppler was afraid that there was no hope of finding a position, so he started to make plans to emigrate to the United States. Just as it looked like he was ready to go, a job offer as a math teacher at the Technical Secondary School in Prague arose. Starting in March of 1835, he took the job. However, he didn't really enjoy teaching high school level mathematics.

In 1836, Doppler married Mathilde Sturm. Over the next nine years, they would have five children: two daughters and three sons. Now that he had a family to support, for some extra money, Doppler began teaching a course on a part-time basis for the Prague Polytechnic Institute.

Despite his talents, Doppler was not well-regarded by his fellow mathematicians, which made his attempts to get better positions difficult. Bernard Bolzano, a well-regarded mathematician of the time, was one of the few who saw Doppler's potential. Bolzano wrote of Doppler, "Mr. Doppler has already demonstrated his very promising abilities to the scientific community through his numerous published works in mathematics and physics. The expectations raised by his hitherto published works would multiply when one enters into personal acquaintance with him. You are not only struck by how many highly interesting and fruitful ideas ... that so young a scientist is able to produce, but you also convince yourself with the greatest pleasure that this exceptional spiritual power combines with an amiable character ... and with that pure love of science and truth ..." Perhaps because of

the endorsement from Bolzano, in 1837, Doppler was hired by the Prague Polytechnic Institute as an Associate Professor of Mathematics. Four years later, he was promoted to Full Professor.

In 1842, Christian Doppler first wrote about the effect which now carries his name. In a paper titled "On the colored light of binary stars and some other stars in the heavens," he proposed that the frequency or wavelength of light is affected by both the motion of the object emitting the light and by the motion of the observer. He used the analogy of a ship traveling out to sea. As the ship meets the water waves approaching shore, the ship encounters the waves at a higher frequency than if stationary. Similarly, if the ship is moving toward the shore, then it will encounter the waves at a lower frequency. In the paper, he predicted that, "It is almost to be accepted with certainty that this will, in the not too distant future, offer astronomers a welcome means to determine the movements and distances of such stars which ... until this moment hardly presented the hope of such measurements and determinations."

Doppler knew that both sound and light travel as waves, so he tested his hypothesis using sound. Employing the skills of two trumpet players, one rode on a moving train, while the other remained stationary on the train platform. Both blew the same note. However, the trumpet on the train was heard as a higher pitch as the train approached, and a lower pitch as the train departed. Doppler, incorrectly, supposed that this same effect could also explain why stars appear different colors. Despite this idea being wrong, Doppler was correct about the motion changing the observed wavelength and frequency.

During this time, Doppler was still teaching at the Polytechnic Institute, but it was a grueling job. His duties included giving written and oral exams to hundreds of students at a time, and the students often complained that he was overly difficult and graded harshly. Doppler was reprimanded by the school's administration, and the students were allowed to retake their exams. Doppler felt this was unjust and demanded that the reprimand be withdrawn. In 1844, the reprimand was withdrawn, but by this time his poor health was in decline, and Doppler had to take a leave of absence for two years.

Doppler continued publishing papers over the years, with over 50 articles on mathematics, astronomy, and physics attributed to him during this time. After his return to the Polytechnic Institute, Doppler was not enthusiastic about continuing there considering his earlier harsh treatment, so he began looking for a new position. In 1847, he moved to the Academy of Mines and Forests in Banska Stiavnica, Hungary as Professor of Mathematics, Physics, and Mechanics.

Unfortunately, less than a year after moving to his new position, the Hungarian Revolution broke out. Surrounded by unrest and battles, Doppler sought refuge in Vienna in 1849. There, he was appointed the first director of the Institute of Physics at Vienna University.

Less than two years after moving to Vienna, Doppler's continuously declining health took a further turn for the worse. His lungs, long since damaged by the dust he inhaled as a child in his father's stonemasonry shop, began to fail. In November of 1852, Doppler went to Venice, in the hope that the climate there would help him to improve. Within a month, it was clear that he was not getting any better. His wife had, at first, remained in Vienna with their children, but his deterioration reached the point where she knew he wouldn't survive. She joined him in Venice, and was with him when he died on March 17, 1853.

Christian Doppler's legacy of the Doppler Shift continues to be a useful tool in so many ways. For astronomers, the ability to measure how fast distant objects in space move is remarkable, and

allows us to determine the masses of planets and stars, discover planets orbiting other stars, and determine the distance to galaxies in the far reaches of the universe. Meanwhile, here on Earth, the Doppler Effect is used by meteorologists to monitor the weather and better make predictions for impending tornadoes and other severe storms. And, perhaps unfortunately for some, police find it very useful in measuring how fast your car is traveling, so that they can more accurately determine how big your speeding fine should be.

While that last application may make some of you wince, for the most part, this phenomenon first proposed by Christian Doppler is an amazingly useful and versatile tool, that can be used by a wide range of professions. So when you are out gazing at galaxies through a telescope, and you read about how far away they are, odds are that the reason we know that distance is partly thanks to this month's honoree - Christian Doppler.

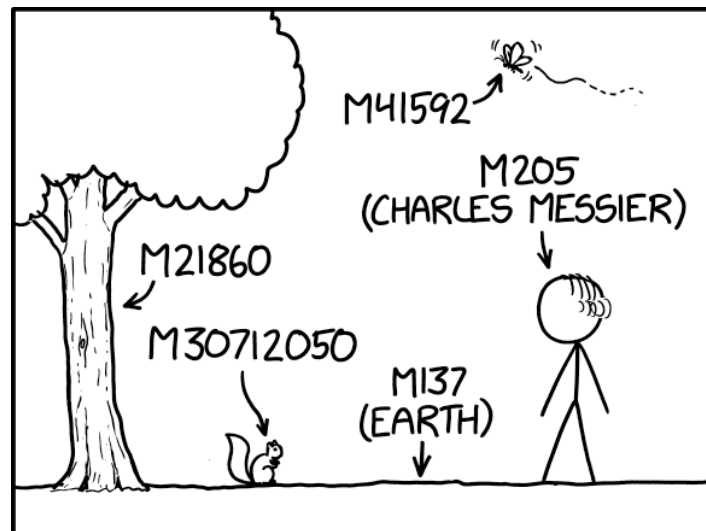
References:

[Christian Doppler - Wikipedia](#)

[Christian Andreas Doppler - MacTutor, Written by J J O'Connor and E F Robertson, April 1998](#)

[The Discovery of the Doppler Effect - European Space Agency, September 2019](#)

xkcd



PEOPLE USUALLY FOCUS ON THE FIRST 110, BUT THE MESSIER CATALOG ACTUALLY INCLUDES ALL OBJECTS.

Spy the Seventh Planet, Uranus By Vivian White

You might be familiar with Saturn as the solar system's ringed planet, with its enormous amount of dust and ice bits circling the giant planet. But Uranus, the next planet out from the Sun, hosts an impressive ring system as well. The seventh planet was the first discovered telescopically instead of with unaided eyes, and it was astronomer extraordinaire William Herschel who discovered Uranus March 13, 1781. Nearly two centuries passed before an infrared telescope aboard a military cargo aircraft revealed the planet had rings in 1977.

Since that discovery, multiple observatories have revealed more details of Uranus and its ring system. Most recently, the NASA-led JWST space observatory captured the planet and its rings in detail. This recent

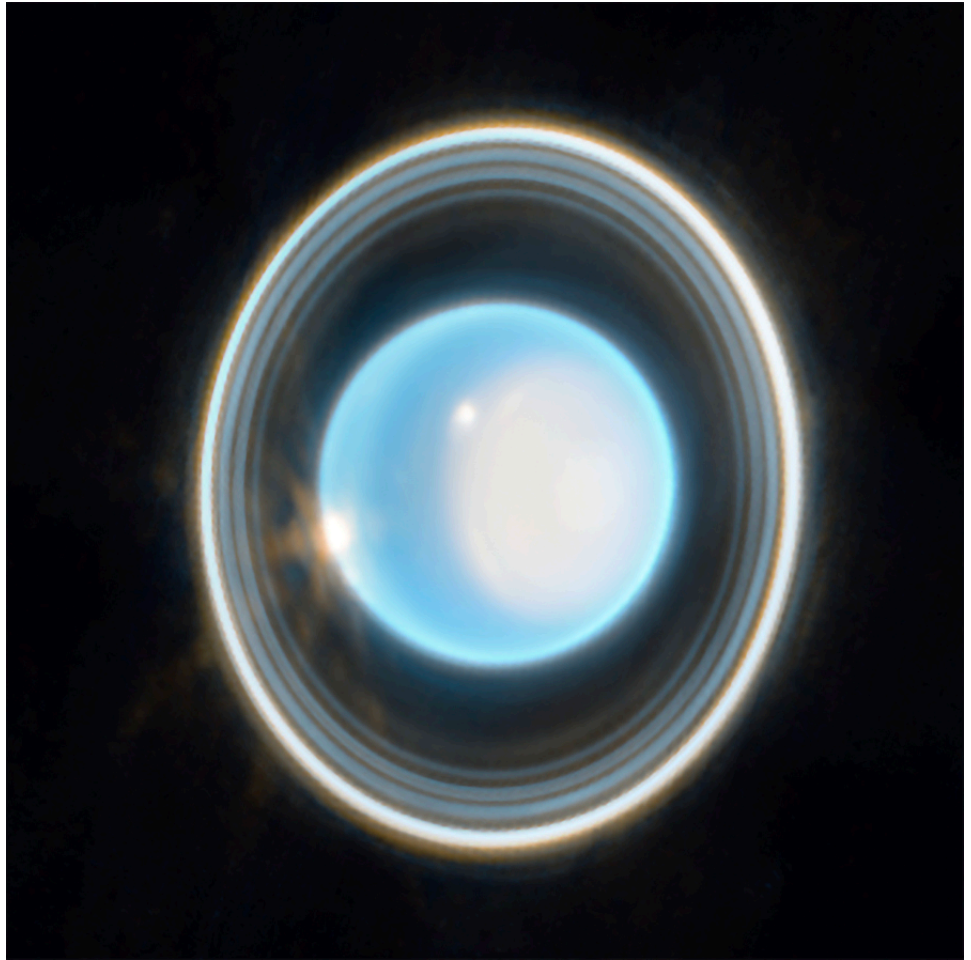


image combines just 12 minutes of exposure in two filters to reveal 11 of the planet's 13 rings. Even some of the planet's atmospheric features are visible in this image. Even with advanced imaging like that from JWST, much of Uranus remains a mystery, including why it orbits the Sun on its side. This is because only one spacecraft has ever visited this planet: NASA's Voyager 2, which flew by the distant planet in the mid-1980s.

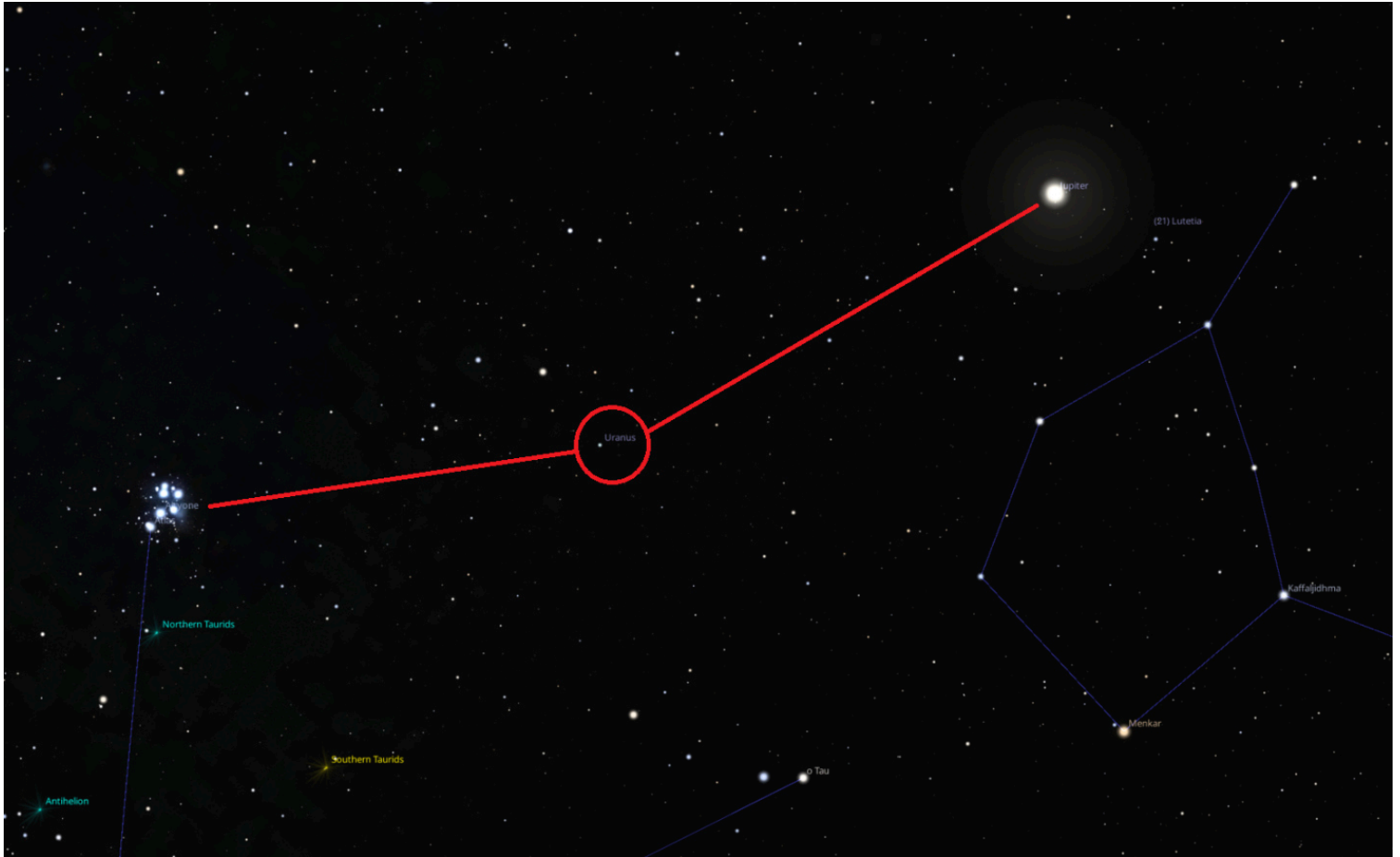
Planetary scientists are hoping to change that soon, though. Scientists recommended in a [report](#) released last year from the National Academies of Sciences, Engineering, and Medicine that Uranus be the focus on the next big planetary science spacecraft mission. Such a large-scale mission would gain insight into this icy giant planet and the similar solar system planet, Neptune.

If you want to catch a view of Uranus with your own eyes, now is prime time to view it. This ice giant planet lies perfectly positioned in mid-November, at so-called "opposition," when its position in its orbit places it on the other side of the Sun from Earth. That location means our star's light reflects off Uranus' icy atmosphere, and the planet appears as its brightest.

To find it, look overhead just after midnight on November 13. Uranus will lie about halfway between the brilliant planet Jupiter and the diffuse glow of the Pleiades star cluster (M45).

While Uranus may look like a bright blinking star in the night sky, its blue-green hue gives away its identity. Binoculars or a telescope will improve the view.

For more about this oddball planet, visit NASA's [Uranus](#) page.



ADDITIONAL LINKS:

<https://science.nasa.gov/uranus/facts/>

<https://www.nasa.gov/history/35-years-ago-voyager-2-explores-uranus/>

<https://www.nationalacademies.org/news/2022/04/report-identifies-priority-planetary-science-missions-planetary-defense-efforts-and-strategic-investments-for-the-next-decade>

<https://webbtelescope.org/contents/media/images/2023/117/01GWQD6PSGTBK7VQBZST09YYKW>

IMAGE CREDITS:

NASA, ESA, CSA, STScI; Image Processing: Joseph DePasquale (STScI), Stellarium

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!

Barnard-Seyfert Astronomical Society Minutes of a Regular Meeting of the Board of Directors Held on Wednesday, October 4, 2023

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held on October 4, 2023, online, Dr. Tom Beckermann presiding. Logged in were Tom Beckermann, Tony Drinkwine, Oz Gonzalez, Bud Hamblen, and Theo Wellington.

Membership report: We have 159 members on the Night Sky Network roster. Three new applications were pending.

Treasurer's Report: The Truist bank account has \$8,240.45.

Social Media: The Facebook page has 2,100 likes and 2,200 followers. "X" has 320 followers.

Solar glasses: Theo reported that 10,000 solar eclipse glasses have arrived. Members will get two pairs free and can buy additional pairs at \$1.00 each. Non-members can get them for \$2.00 each.

Star parties and outreach: Mill Ridge Park had about 100 visitors on 9/3/23. We had 4 telescopes on site. The telescope field was near some brightly lit buildings and recreation areas. A darker area may be available in the future. The construction company hasn't finished some of the work on park lands. Weather was cloudy for the Japanese Moon Festival. Ron Ladd has graciously offered to host observing on October 6 and 7. A private star party is scheduled for October 14 at Natchez Trace mile marker 435.3. A public star party is scheduled for October 21 at Bells Bend.

Meeting Programs: The Vanderbilt Rocket Team will make a presentation at the October 18 meeting. "All I Want for Christmas ..." is scheduled for November. A "NANOGrav" presentation is scheduled for December, as well as the annual potluck dinner. Further possibilities include the telescope workshop for January and a "What's Up" for February. Perhaps we can recruit the man who restored an ex-Air Force satellite tracking telescope.

We need to recruit new board members. Normally two at-large members rotate off each year. The vice-president position is open.

We will continue at the Girl Scouts for 2024, if available, and check out additional sites for 2025. Affordable meeting space seems to be scarce.

Should the club start a Discord channel? Plan to discuss this at the next members' meeting.

There being no further business, the meeting was adjourned at 8:30 PM.

Respectfully submitted,

Bud Hamblen
Secretary

Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held on Wednesday, October 18, 2023

The Barnard-Seyfert Astronomical Society met at the Girl Scouts Center and on-line via Zoom on Wednesday, October 18, 2023, at 7:30 PM, Tom Beckermann presiding.

The minutes for the September meeting were adopted without discussion.

Membership Report: The Night Sky Network membership roster shows 162 members.

Treasurer's Report: The Truist bank balance was \$8,240.45.

Star Parties and Outreach: Ron Ladd graciously hosted a star party at his property on September 22. About 12 members attended. We had several telescopes at Mill Ridge Park on September 23. About 100 guests attended. Upcoming star parties include a public event at the Bell's Bend Outdoor Center on October 21 from 7 to 9. Clear weather is forecast. A private star party is scheduled for November 11 at the Natchez Trace Mile Marker 432 (Water Valley Overlook). You need to bring your copy of the permit if you attend. The regular club meeting is on November 15. The scheduled presentation is "All I Want for Christmas ...". A public star party is on November 18 at the Edwin Warner Park Special Events Field.

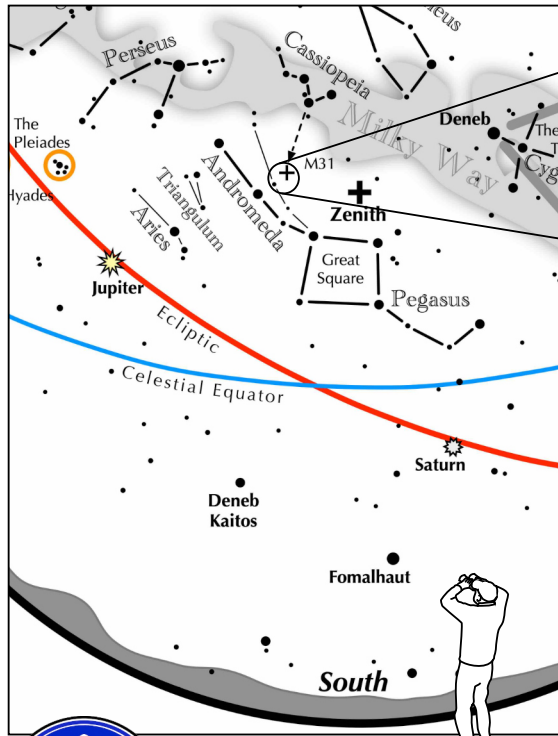
Andrew Noonan, Aziz Medhioub and Sebastian Nuñez, members of the Vanderbilt Aerospace Design Laboratory, made an exciting presentation on the VADL team's project for the NASA Student Launch Challenge. The URL for the Vanderbilt Aerospace Design Laboratory is <https://www.vadl.org/>. The URL for the NASA Student Launch Challenge is <https://www.nasa.gov/learning-resources/nasa-student-launch/>.

There being no further business, the meeting was adjourned at 9 PM.

Respectfully submitted,

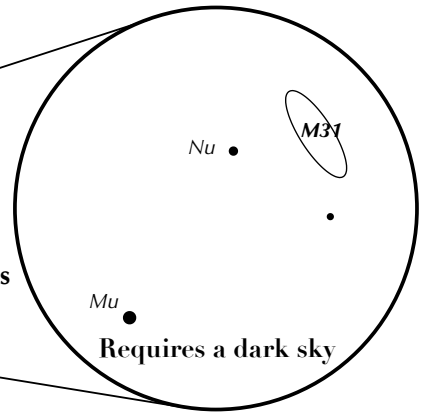
Bud Hamblen
Secretary

If you can observe only one celestial event this month, consider this one:



South
90 minutes after sunset

View
through
10x50 binoculars



Have you seen M31, the Andromeda Galaxy?

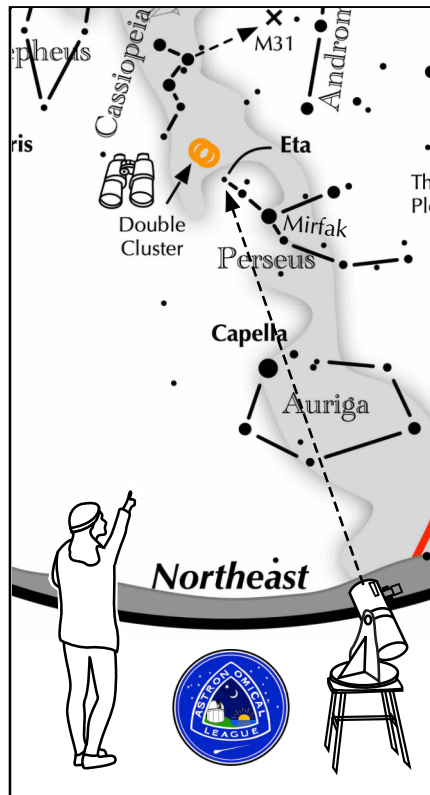
Look high in the south 90 minutes after sunset in November.

- Find the Great Square nearly at the zenith.
- Identify the line of four stars beginning at the northeast corner of the Great Square and extending northeast.
- Identify a second but dimmer line extending more northeasterly than the first line. These two lines represent Andromeda.
- Identify the third star on each line.
- A line passing through those two stars and extending northwest for the same length lands on M31.

OR ...

- Draw an arrow pointing southward through the three westernmost stars of Cassiopeia's "W."
- Extend that line for the same length as Cassiopeia is wide.
- It ends on M31.

ASTRONOMICAL LEAGUE Double Star Activity



Other Suns: Eta Persei

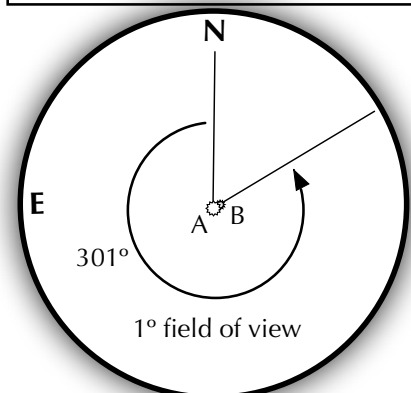
How to find Eta Persei on a November evening

Face northeast. Between bright Capella and the "W" of Cassiopeia, is the constellation Perseus. Eta Persei is not quite mid way between Mirfak, the brightest star in Perseus, and the eastern edge of the "W." It lies close to the Double Cluster.

Suggested magnification: 40x
Suggested aperture: >3 inches

Eta Persei

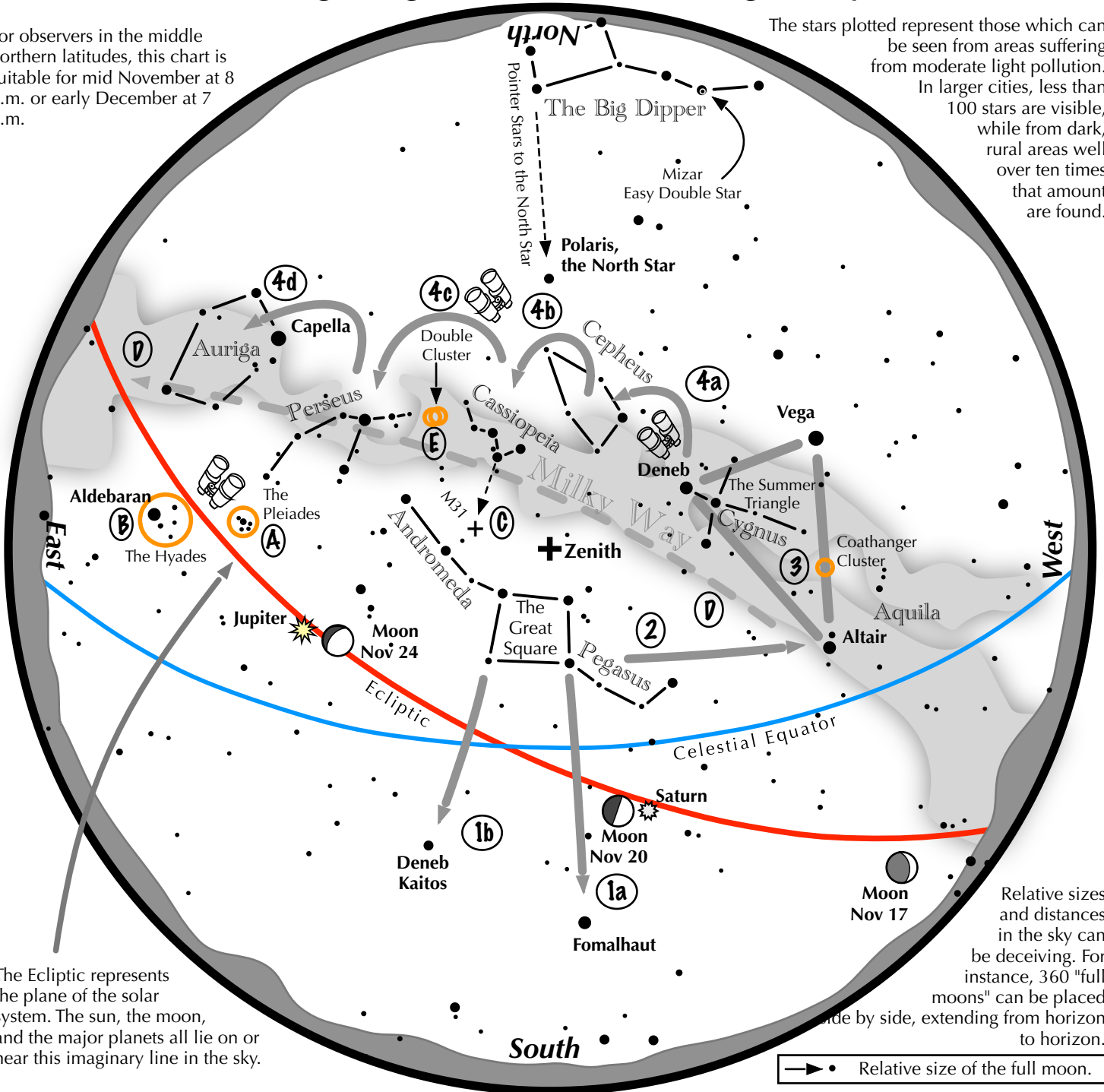
A-B separation: 28 sec
A magnitude: 3.8
B magnitude: 8.5
Position Angle: 301°
A & B colors:
yellow, blue



Navigating the November Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid November at 8 p.m. or early December at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the November night sky: Simply start with what you know or with what you can easily find.

- 1 Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brightest star in the south.
- 2 Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
- 3 Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
- 4 Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E:** The Double Cluster.





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.



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.