

The ECLIPSE

January
2015

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:
January 21, 2015, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic: *How to Use Your Telescope*

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From the President:

Happy 2015! I hope everyone will have fun with astronomical gear in the new year. All we need are clear nights.

If you or someone you know DID get some new gear and would like some help in getting started, our January meeting is for that exact purpose. You are welcome to bring a scope and get some help getting it set up, or just come and ask questions about the telescopes that are at the meeting. Maybe you have a telescope that's been in a closet for a while... get it out, and let's get it working so you can enjoy it out under the sky when we finally get some clear nights.

As extra incentive to get out your gear is Comet C/2014 Q2 Lovejoy! This comet is moving higher with each night in our sky on a line running from Lepus up past Orion. With luck it will be just naked eye visible once the Moon gets out of the way in January.

Save the dates March 20 - 22! Pickett State Park has invited us to come out for a spring star party/retreat/Messier marathon. The park will let us stay in the group camp bunkhouses. There is a meeting room / kitchen building available as well. We'll have more details about food, but there would be public viewing time in the early evening on Friday and Saturday, but the rest of the night would be ours under the darkest skies in Tennessee. We are inviting other groups from the area as well. This is a great opportunity to have some fun, help with outreach at Pickett, and enjoy some dark skies, weather permitting.



Officers

Theo Wellington
President

tmwellington@comcast.net

Joe Boyd
Vice-President

boydjoe@comcast.net

Bud Hamblen
Secretary

wrhamblen@comcast.net

Bob Norling
Treasurer

rdncpa@mindspring.com

(no one)
Ex-officio

Directors at Large

Gary Eaton

gary.eaton@lifeway.com

Jeffrey Horne

Jeffrey.Horne@gmail.com

Rob Mahurin

robert.s.mahurin@gmail.com

Kris McCall

planetmccall@gmail.com

Poppy Simmons

poppysmmns@gmail.com

Kathy Underwood

katy2222@comcast.net

Newsletter Editor
Drew Gilmore

eclipse@bsasnashville.com

Observing Highlights December and January

Open Clusters

M52, NGC457 (ET),
M103, NGC654, NGC663,
NGC884/869

(*Double Cluster*),

M34, M45, M36,
M37, M38, M35,
M41, M50, M47,
M46, M93

Variable Stars

Beta Persei (*Algol*),
Omicron Ceti (*Mira*),
R Leporis

(*Hind's Crimson Star*)

Globular Clusters

M79

Nebulae

NGC7293 (Helix),
M76 (Little Dumbell),
NGC1499 (California),

M1, M42 (Orion),
M43, M78

Galaxies

M31 (*Andromeda*),
M32, M110,

M33 (*Triangulum*),
M74, M77

Multiple Star Systems

Eta Cassiopeiae,
Gamma Arietis,

Gamma Andromedae,
Beta Orionis (*Rigel*),
Alpha Geminorum (*Castor*)

Upcoming Star Parties

Fri 1/9 7:30 - 9:30 pm	Bells Bend Outdoor Center
Sat 1/17	Private Star Party Natchez Trace Parkway mile marker 412 (Water Valley Overlook)
Sat 1/24	Shelby Bottoms Nature Center
Sat 2/7	Edwin Warner Park
Fri 2/20	Bowie Nature Park (Fairview)
Sat 2/21	Private Star Party Natchez Trace Parkway mile marker 433.5



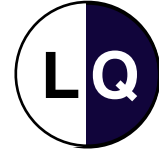
Jan 20
Feb 18



Jan 26
Feb 25



Jan 4
Feb 3



Jan 13
Feb 11

Happy Birthday Eris by Robin Byrne

This month we celebrate the anniversary of the discovery of a little object that caused a huge controversy. In October, 2003, a survey of the outer solar system was conducted at Palomar Observatory. In charge of the survey were Mike Brown from the California Institute of Technology, Chad Trujillo from the Gemini Observatory, and David Rabinowitz from Yale University. The team used an automated system that scanned images for motion of 1.5 arcseconds per hour or faster. However, when Sedna was discovered, it only moved 1.75 arcseconds per hour, which led the team to look for even slower moving objects. On January 5, 2005, using an even lower limit for motion, Eris was discovered. The discovery was officially announced the following July.

In September of that same year, using the adaptive optics on the Keck Telescopes, Eris and three other Trans Neptunian Objects were imaged. The image of Eris showed that it had a moon. Ultimately named Dysnomia, for the Greek goddess of lawlessness, it orbits Eris in a little under 16 days and is roughly 1/8 the size of Eris.

Estimating the diameter of Eris proved to be difficult. At a current distance of 97 Astronomical Units, the angular size of small bodies is below the resolution of most telescopes. Even for the Hubble Space Telescope, it would be right at its limit, so estimates are largely based on expected reflectivity. Combining that with the apparent brightness leads to an estimated size. The first estimated diameter was 2397 km, which is larger than Pluto at 2368 km. Earth, on the other hand, has a diameter of 12,742 km. Using the Spitzer Space

Telescope, the diameter was found to be closer to 2600 km, with both estimates within each other's margin of error. It wasn't until 2010, when Eris experienced an occultation, that a more accurate measurement could be made. This time, Eris came in at 2326 km, or just slightly smaller than Pluto, although even estimates of Pluto's size are approximate due to its atmosphere.

While the diameter is still in doubt, its mass is on much more solid ground. Because of being able to observe the orbital motion of Dysnomia around Eris, the mass can be determined. Eris was found to have a mass of 1.66×10^{22} kg, which is 27% larger than Pluto's mass. Combining this with the size estimates provides an approximate density of 2.52 g/cm^3 , which implies a much higher rock composition than that found in Pluto, which is thought to be roughly half rock and half ice.

The orbit of Eris is highly elongated and tilted. Its distance from the Sun ranges from 38 AU (closer than Pluto) to 98 AU (beyond the outer edge of the Kuiper Belt), which affects its surface temperature. At its closest to the Sun, it warms to -217°C , while at its most distant, it chills down to -243°C . The large orbit of Eris translates into an orbital period of 557 years for one trip around the Sun. Spectroscopic studies indicate the surface is covered with frozen methane, which is similar to Pluto. At its current distance, any atmosphere is frozen onto the surface, so there is speculation that as Eris returns to its closest approach of the Sun, the ice will sublimate into an atmosphere, potentially revealing a rocky surface.

From the President, continued from page 1

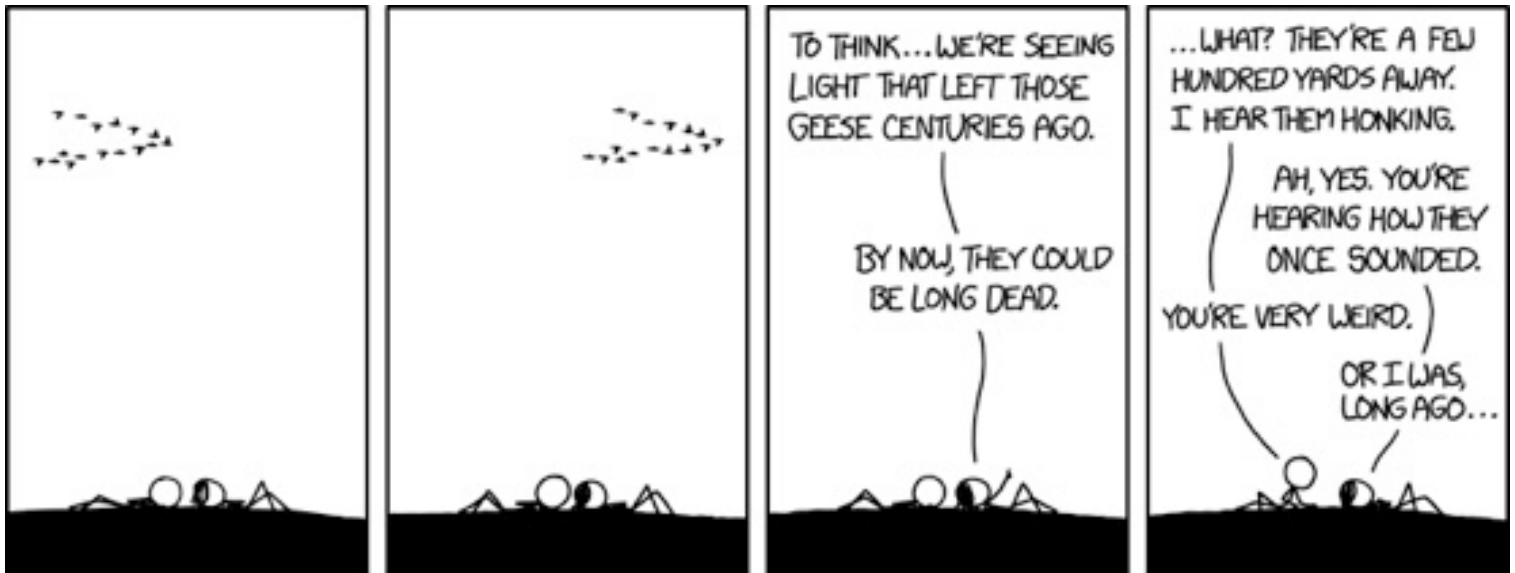
I would like to encourage new members who have portable telescopes to set them up for our public star parties. You will have a great time showing park visitors a view that most have never had. At Bells Bend on January 9 we will have the bright stars of winter... the Orion Nebula... the Pleiades... and maybe a comet as well. Easy targets that visitors always enjoy, and they really appreciate your time in bringing the telescopes out for them. The only other thing that you might consider bringing is a short stepladder for small children to reach the eyepiece. Don't want to bring a telescope? Help us pass out star charts to visitors, point out the easy winter constellations, share your enthusiasm about the night sky! Come on out on January 24th to Shelby Bottoms park, where we'll have the Moon as well.

Don't forget to keep up with the BSAS Facebook page ([facebook.com/bsasnashville](https://www.facebook.com/bsasnashville)), we post interesting space news as well as ephemeral events such as times of ISS passes and this month's shadow transits on Jupiter!

Clear skies,

Theo Wellington

XKCD



<http://xkcd.com/1440/>

There was not a quorum for the
BSAS board meeting December 2014.

Eris, continued from page 3

The discovery of Eris caused a great upheaval in the astronomical community. With a size, potentially, larger than Pluto, should Eris be called a planet? If not, then what is a planet? This conundrum ultimately led the International Astronomical Union to develop an official definition for a planet in 2006. The final decision was that a planet must orbit the Sun, be large enough to pull itself into a rounded shape, and massive enough to clear its orbit of similarly sized objects. That last criterium was the doom not only for Eris, but also for Pluto, since both objects share their orbits with the Kuiper Belt. A new category of Dwarf Planet was then created for objects like Pluto and Eris, which orbit the Sun, are gravitationally round, but which share their orbit with other objects. In addition to being called a dwarf planet, Eris can include among its titles: plutoid, Trans-Neptunian Object, and a Scattered Disk Object.

When it was first discovered, Eris only had a catalogue number for its name, 2003 UB313. After all of the turmoil created by the new definition for a planet, it seemed appropriate to name it after the goddess of strife and discord. According to Mike Brown, “[Eris} stirs up jealousy and envy to cause fighting and anger among men. At the wedding of Peleus and Thetis, all the gods were invited with the exception of Eris, and, enraged at her exclusion, she spitefully caused a quarrel among the goddesses that led to the Trojan War.”

Let’s hope that the still lingering controversy over the definition of a planet doesn’t lead to a full-out war in the astronomical community. Instead, may we rejoice in the spirit of discovery and appreciate that part of the scientific method involves modifying old ideas in the face of new evidence. Regardless of its title, Eris is a part of our Sun’s family, and that’s all that matters.

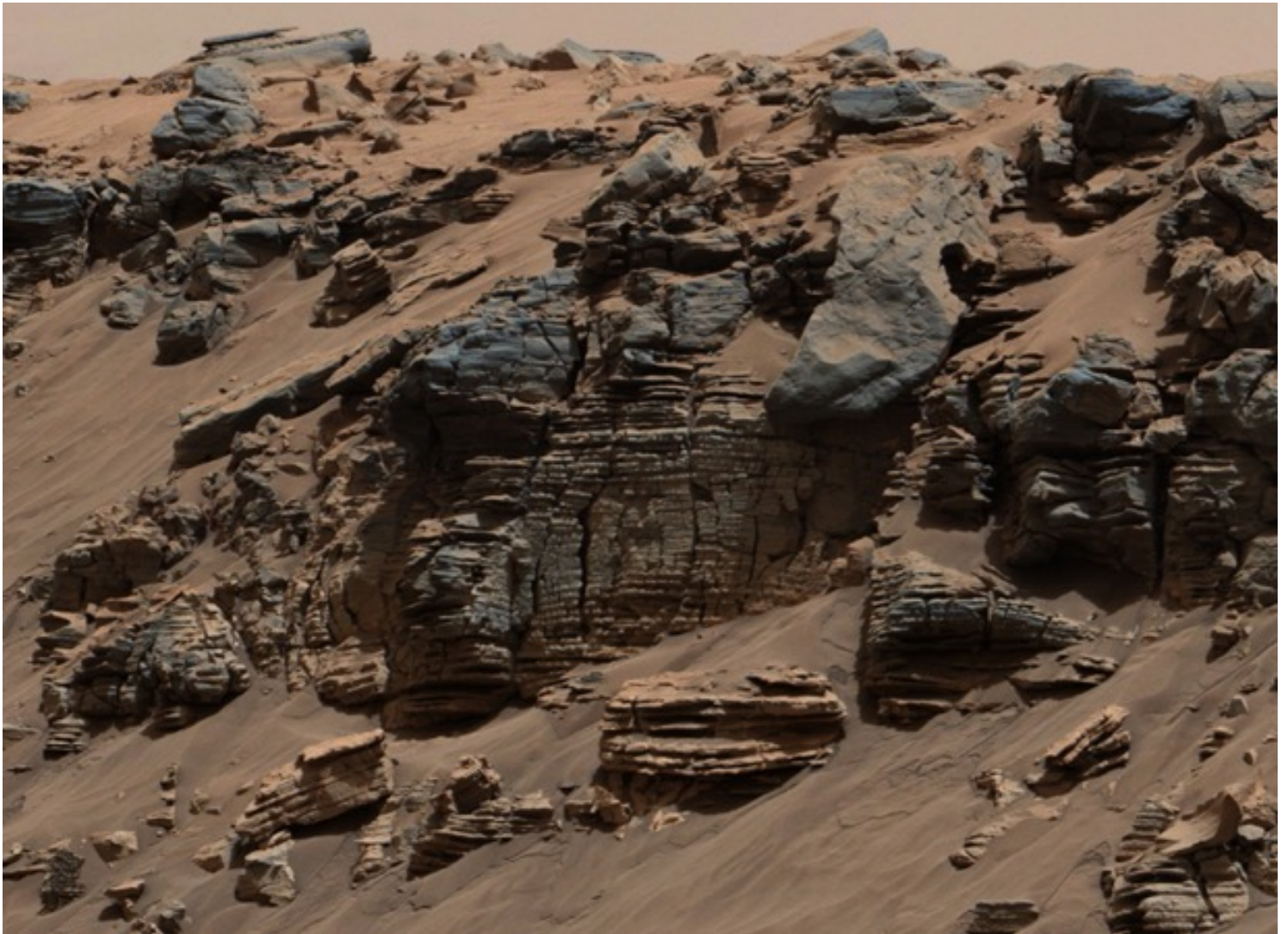
References:

Eris (dwarf planet) - Wikipedia
[en.wikipedia.org/wiki/Eris_\(dwarf_planet\)](http://en.wikipedia.org/wiki/Eris_(dwarf_planet))

Solar System Exploration: Planets: Dwarf Planets: Eris: Overview
solarsystem.nasa.gov/planets/profile.cfm?Object=Dwa_Eris

Eris, the largest dwarf planet by Marc Delehanty
Astronomy Today
www.astronomytoday.com/astronomy/eris.html

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This evenly layered rock photographed by the Mast Camera (Mastcam) on NASA's Curiosity Mars Rover shows a pattern typical of a lake-floor sedimentary deposit not far from where flowing water entered a lake. The scene combines multiple frames taken with Mastcam's right-eye camera on Aug. 7, 2014, during the 712th Martian day, or sol, of Curiosity's work on Mars. It shows an outcrop at the edge of "Hidden Valley," seen from the valley floor. This view spans about 5 feet (1.5 meters) across in the foreground.

www.jpl.nasa.gov/news/news.php?feature=4398



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

**Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, December 17, 2014**

The Barnard-Seyfert Astronomical Society held its monthly membership meeting at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, Tennessee, on Wednesday, December 17th, 2014. The Annual Holiday Potluck and Silent Auction began at 6:30 p.m., with much yummy food and fellowship enjoyed by all.

Theo Wellington called the meeting to order at 7:30 PM. Theo thanked everyone for bringing food, and welcomed visitors. Kris McCall announced the rules of the silent auction. Theo noted that anyone who ordered an Observers Handbook could pick it up from her at the Adventure Science Center, or at the next monthly meeting.

Theo announced that Pickett State Park has a hike and public Star Party planned for New Year's Eve. The park has no overhead street lights. They have a great observing field, and will provide food and lodging. They will also have a Star Party the 3rd weekend in March, the 20th - 22nd. There will be a new moon that weekend. Pickett State Park is working to be approved as a dark sky site.

The minutes of the November membership meeting as published in the December, 2014, issue of the Eclipse were approved. Treasurer Bob Norling was out of town, so there was no treasurer's report.

Upcoming star party dates include January 9th at Bells Bend. Theo noted the new COMET, Lovejoy 5, is exceeding expectations and is expected to be underneath Orion, coming up in January. Right now it is at 6, and may be brighter.

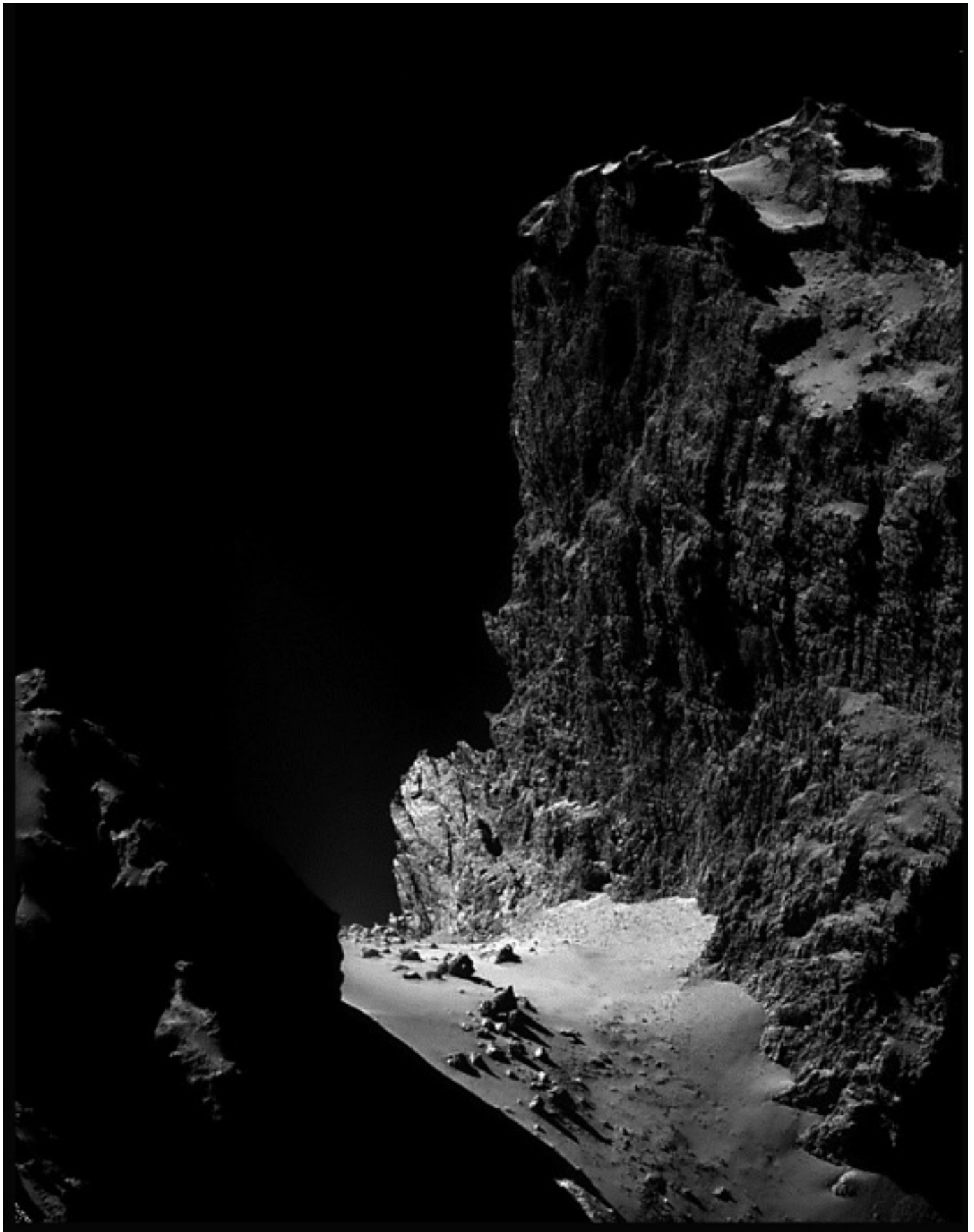
Theo presented nominations for three new board members: Gary Eaton, Rob Mahurin, and Kathy Underwood. Theo opened the floor for additional nominations. Spencer Buckner moved that the nominations be closed, and those three elected to the board. Terry Reeves seconded the motion, and the membership approved.

Theo introduced our speaker, Dr. Tracie Prater, Aerospace Engineer in the Materials and Processing Lab of NASA's Marshall Space Flight Center. Tracie spoke about the possibility of using 3D printers on space flights to produce needed parts for space ship repairs, while in orbit.

There being no further business the meeting was adjourned at 8:50 p.m., and the silent auction closed at 9:00.

Respectfully submitted,

Melissa Lanz, Substituting for Bud Hamblen, Secretary



The Cliffs of Comet Churyumov-Gerasimenko

Image Credit & [Licence \(CC BY-SA 3.0 IGO\)](#): [ESA](#), [Rosetta spacecraft](#), NAVCAM;
Additional Processing: [Stuart Atkinson](#)

Become a Member of BSAS!

Visit 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.

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. If you need more information, write to us at 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.