The ECLIPSE

September 2017

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:
September 20, 2017, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic:
The Citizen CATE Experiment
Plus, Your Eclipse Experiences!

In this Issue:

Barnard-Seyfert Astronomical Society
bsasnashville.com

From the President

Greetings,

"Amazing", "awe-inspiring", "incredible". These are just a few of the descriptions I've heard from BSAS members after witnessing the total eclipse of August 21, 2017. More than one person said they had some concern leading up to the event, wondering if it would live up to all of the hype, but that yes, indeed it did. If you took photos of the eclipse and would like to share those with BSAS members, please send them ASAP to eclipse@bsasnashville.com and we will include them in our September member meeting eclipse presentation. The deadline was originally 9/1 but we will extend that a few days if needed.

Personally speaking, the eclipse was an emotional and moving experience for me. That was true in part because the final moments leading up to totality held some drama. A fairly large cloud was blocking our view about fifteen minutes before totality. Just a few minutes later, it had begun moving away and we anticipated soon having a great view. But, with just about three minutes left before totality, the cloud stalled and my group of family and friends realized that the sun may indeed be blocked during totality. My son Daniel looked to the west and noticed the sun was shining brightly on a field about 400-500 feet away. Off we raced on foot as quickly as we could. Fortunately, even before reaching the spot, the cloud moved away, opening up a perfectly clear view for all to see.

"Amazing", "awe-inspiring" and "incredible" could also be used to describe the tireless effort of BSAS members who helped our community and visitors understand, appreciate and safely view the eclipse. Special presentations were supported by BSAS at

continued on page 5

BSAS
Barnard-Seyfert Astronomical Society

Officers

Gary Eaton
President
gceaton@comcast.net

Keith Rainey
Vice President
Keith.Rainey@gmail.com

Tom Guss
Treasurer
t_guss@bellsouth.net

Bud Hamblen
Secretary
wrhamblen@comcast.net

Theo Wellington
Ex-officio
tmwellington@comcast.net

Directors at Large

Mike Benson
ocentaurus@aol.com

Spencer Buckner
BucknerS@apsu.edu

Drew Gilmore
eclipse@bsasnashville.com

Rob Mahurin
robert.s.mahurin@gmail.com

Todd Nannie
toddn_us@yahoo.com

Kathy Underwood
katy2222@comcast.net

Observing Highlights September and October

Open Clusters
M6 *(Butterfly)*, M7, M23,
M21, M18, M25, M26,
M11 *(Wild Duck)*,
M29, M73, M39, M52

Galaxies
M101/M102, NGC 6822 *(Barnard's)*

Globular Clusters
M5, M80, M4, M107, M13, M12,
M10, M62, M19, M92, M9, M14,
M28, M69, M22, M70, M54, M56,
M55, M71, M75, M72, M15, M2, M30

Multiple Star Systems
Epsilon Bootis *(Izar or Pulcherrima)*
Mu Bootis *(Alkalurops)*,
Beta Scorpii *(Acrab)*,
Alpha Herculis *(Rasalgethi)*,
Epsilon Lyrae *(Double Double)*,
Beta Cygni *(Albireo)*

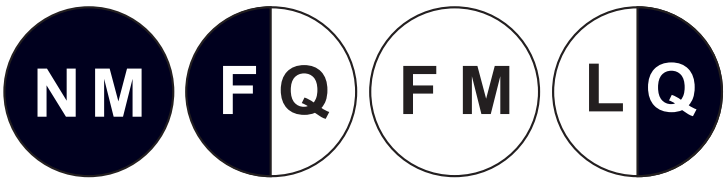
Variable Stars
Mu Cephei
(Herschel's Garnet Star)

Nebulae
NGC6302 *(Bug)*,
NGC6309 *(Box)*,
NGC6543 *(Cat's Eye)*,
M20 *(Trifid)*, M8 *(Lagoon)*,
M16 *(Eagle)*, M17 *(Swan)*,
M57 *(Ring)*,
NGC6818 *(Little Gem)*,
NGC6826 *(Blinking Planetary)*,
M27 *(Dumbbell)*,
NGC6888 *(Crescent)*,
NGC6905 *(Blue Flash)*,
NGC6960/6974/6979/
6992/6995 *(Veil)*,
NGC7000 *(North America)*,
NGC7009 *(Saturn)*,
IC 5146 *(Cocoon)*,
NGC7293 *(Helix)*,
NGC7635 *(Bubble)*,
NGC7662 *(Blue Snowball)*

Other
Barnard's Star
M24 *(Small Sagittarius Star Cloud)*
Cr 399 *(Coat Hanger)*

Upcoming Star Parties

Saturday 9/16	Private Star Party Natchez Trace Parkway mile marker 435.3
Friday 9/30 7:30 pm to 9:30 pm	Public Star Party Edwin Warner Park
Friday 10/20 7:00 pm to 9:00 pm	Public Star Party Bowie Nature Park (Fairview)
Saturday 10/21	Private Star Party Natchez Trace Parkway mile marker 412 (Water Valley Overlook)



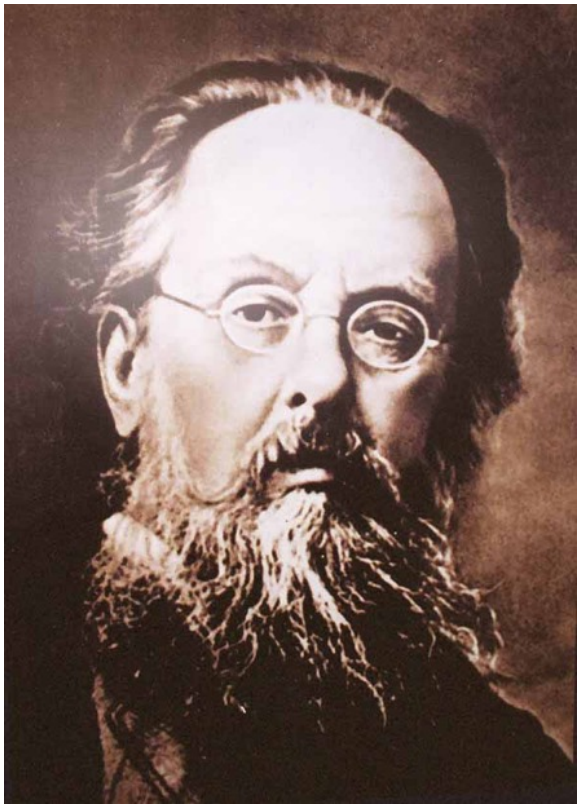
Sep 20
Oct 19

Sep 27
Oct 2

Sep 6
Oct 5

Sep 13
Oct 12

Happy Birthday Konstantin Tsiolkovsky
by Robin Byrne



This month we celebrate the life of a self-taught rocket man who laid the foundation for how we venture into space. Konstantin Eduardovich Tsiolkovsky was born September 17, 1857 in Izhevskoye, Russia, although, because Russia had not yet adopted the Gregorian Calendar, he thought of his birthday as September 5. His father, Eduard, was originally from Poland and was deported to Russia in 1849, where he worked as a forester. Konstantin's mother, Maria, came from Russian nobility. Konstantin was their 5th child, and they would go on to have a total of 18 children.

Stories vary about how Konstantin lost most of his hearing. According to one source, which quotes what Tsiolkovsky himself wrote, says that when he was 10 years old, after going tobogganing, he fell ill from a bad cold to the point of delirium and near death. When he recovered, his hearing was mostly gone. Other sources say it was scarlet fever. No matter which, his hearing loss had a profound affect on his life and subsequent events. By the time he was 14, his teachers gave up on trying to teach him because of his inability to hear. So, instead, Konstantin turned to teaching himself through books. This was when his interest in math and physics began.

In 1873, at the age of 16, his father sent young Konstantin to Moscow to study further than the resources in his town would provide. There he made use of the Chertkovskaya Library to teach himself math, physics, mechanics and chemistry. While in Moscow, Tsiolkovsky encountered two sources of inspiration. First were the writings of Jules Verne. Second was meeting Nikolai Fyodorov, a philosopher who worked in the library and was a proponent of the idea that advances in science would lead to humans becoming immortal and needing to travel in space to find a place to live. Both turned Konstantin's head to the stars. After reading Verne's "From the Earth to the Moon," Tsiolkovsky calculated that the method used in the book for going into space (a cannon) would produce accelerations so large that it would kill the passengers. Meanwhile, the

continued on next page

Konstantin Tsiolkovsky, continued

little money his father could send was barely keeping Konstantin fed, especially after he spent most of it on books and equipment for doing experiments.

Worrying about his starving son, Konstantin's father insisted he return home in 1876. Here he built his own centrifuge to test how various objects respond to increasing forces of gravity. He used chickens as his test subjects. Tsiolkovsky then took an exam to become a teacher, which he passed, leading to his first teaching job in Borovsk, near Moscow, in the Kaluga region. Here he taught courses in mathematics. The town itself was very much a tough, rural, backward area, with a reputation for drunken fights and people believing in witchcraft. In his spare time, Tsiolkovsky tried his hand at writing science fiction like Jules Verne. However, he was more concerned about making the science accurate and got his stories bogged down in the mathematics, so he moved on to writing actual science papers, instead. In 1880, Tsiolkovsky met and married Varvara Sokolova.

Tsiolkovsky's first scientific paper was written in 1881, titled "Theory of Gases." In the paper, he proposed a kinetic theory of gases. He submitted it to the Russian Physico-Chemical Society (RPCS). They wrote back to inform him that he was 25 years too late in his discovery. One of many drawbacks of living in an isolated area, he was completely unaware of the discoveries of others. Konstantin's second submission, " The Mechanics of Animal Organism" was better received, and he was admitted as a member of the RCPS. In 1883, his next paper concerned the problems of living in a weightless environment. It included a sketch of a spaceship with people floating in spacesuits, a cannon to be used as the propulsion, plus gyroscopes for orientation.

For the next couple of years, Tsiolkovsky focused on air travel in machines made of metal. His first venture was looking at dirigibles made of metal, and he even made a model of one. Then he looked at building airplanes out of metal. Once again, he was ahead of his time, with airplanes similar to his design being built within the next 18 years. In 1895, Tsiolkovsky published "Dreams of Earth and Sky," which was about living in space and included characters that mined asteroids and had orbital greenhouses.

In 1897, Tsiolkovsky, in his house, built the first wind tunnel in Russia. This allowed him to study the motions of rockets even better. He used the wind tunnel to study the drag coefficients of a variety of shapes, including spheres, cylinders, and cones. His results were used by others in the field of aerodynamics. It was during this time that he came up with the equation describing how a rocket's speed changes based on how

continued on next page

Konstantin Tsiolkovsky, continued

fast the exhaust leaves and the initial and final mass of the rocket ($\delta V = v_e * \ln(M_0/M_1)$). This equation is still used today in the field of aerospace engineering. Unfortunately, between the magazine in which he published closing down, and the fact that he was a mere schoolteacher living in a rural town, no one outside of Russia knew about his work. In the 1920's, both Oberth, in Germany, and Goddard, in the United States, ultimately came to the same conclusions as Tsiolkovsky. Today, all three men are considered the "fathers of rocketry."

"Exploration of Outer Space by Means of Rocket Devices" was published in 1903. This article, and two others Tsiolkovsky wrote in the following years, are considered the basis for spaceflight. He determined the speed necessary for a rocket to launch into Earth orbit, and also the speed necessary to leave Earth orbit to explore other planetary objects. He also calculated the flight time to other objects. He was the first to propose the use of a multistage rocket. He was the first to propose the use of fuel comprised of liquid oxygen and liquid hydrogen, which is even more notable considering that hydrogen had only been successfully liquified 5 years earlier. Sadly, once again his ideas didn't get much circulation in Russia, let alone in other countries.

While Tsiolkovsky was laying the groundworks for his legacy in the scientific community, sadly, his personal life suffered multiple tragedies. In 1902, his son, Ignaty, committed suicide while at college. In 1908, many of Tsiolkovsky's papers were lost in a flood. Then, in 1922, his daughter, Lyubov, was arrested for her participation in activities

continued on next page

Next BSAS meeting
September 20 2017, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

***Topic**: Your Eclipse Experiences!*
Let's talk about the total solar eclipse!
Send your eclipse photos to eclipse@bsasnashville.com,
and we'll share at the meeting. We will also hear an update on
the Citizen CATE Experiment and other science stories about the eclipse.

Konstantin Tsiolkovsky, continued

leading up to the Russian revolution.

The lack of public recognition of his work led Tsiolkovsky to abandon his efforts in aeronautics. Instead, after the start of Work War I, he worked on ways to end poverty. After the Russian Revolution, support for science and technology increased, and Tsiolkovsky was seen as an excellent symbol of those areas. The Soviet government made Tsiolkovsky a member of the Socialist Academy in 1918.

Tsiolkovsky continued teaching high school math until his retirement in 1920. It was not until then that he started to receive honors for his pioneering work, even being given financial backing from the government to continue in his studies. This was also the time when Tsiolkovsky came to be known by the next generation of rocket engineers. Valentin Glushko, who would become the developer of the rocket propulsion systems used by the Soviet Union, at the age of 15, began a correspondence with Tsiolkovsky which laid the theoretical foundation for the practical work for which Glushko would later be known.

Retirement was not the end of Tsiolkovsky's work. He continued to explore various aspects of rocket travel. Tsiolkovsky went back to his early influences, with the idea of humanity ultimately needing to colonize space to survive. Much of his work related to the questions of how to live and survive in space. Tsiolkovsky worked out how to maneuver a spacecraft using graphite rudders and how to cool parts of the rocket using the existing propellants. He had the idea of using plants to provide oxygen and food for the people onboard, and pressurized spacesuits for working outside of the spacecraft. Solar power would be used to provide energy for orbital colonies, as well as settlements on asteroids, other planets, and, ultimately, around other star systems.

In the 1930's, as his health began to decline, Tsiolkovsky found himself being interviewed and written about even more. His name was just starting to be known. Not long after undergoing an operation for stomach cancer, Konstantin Tsiolkovsky died September 19, 1935 in Kaluga, Russia. He was laid to rest in the center of a city park, where the monument calls Tsiolkovsky "the great Russian scientist."

Tsiolkovsky's legacy ranged far and wide. Werner von Braun, the German rocket designer behind Germany's V2 and America's Saturn V rockets, had one of Tsiolkovsky's books, in which he had written many notes in the margins. Sergey Korolev, Russia's

continued on next page

Konstantin Tsiolkovsky, continued

chief rocket designer for their space program, studied Tsiolkovsky's work as a child and was inspired by it. Tsiolkovsky's name has been commemorated in many diverse ways, from a crater on the Moon to a spacecraft in "Star Trek: The Next Generation." His greatest legacy, though, is the desire to travel in space. Tsiolkovsky said, "The Earth is the cradle of mankind, but mankind cannot stay in the cradle forever."

References:

Konstantin Tsiolkovsky - Wikipedia

Konstantin E. Tsiolkovsky - NASA

Konstantin Tsiolkovsky: Russian Father of Rocketry by Nola Taylor Redd, space.com

Konstantin Tsiolkovsky - Russian Space Web

Canon Rebel XT
75-300 Canon lens
- *Meghan Keohane*

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, August 2, 2017.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held August 2, 2017, in the classroom at Glendale United Methodist Church, 900 Glendale Lane, Nashville, TN 37204. Present were Mike Benson, Spencer Buckner, Gary Eaton, Drew Gilmore, Bud Hamblen and Keith Rainey. A quorum being present, the meeting was called to order at 7:30 PM. The club has $1,859.24 in the checking account and $1,870.38 in the savings account. There are 122 members.

The eclipse program for the August 16 meeting was discussed. Spencer Buckner's presentation will include the history of eclipses, Billy Teets' presentation will include data on this eclipse, and Theo Wellington's presentation will include safely observing eclipses.

The Nissan star party was discussed. As an incentive to encourage members to participate, offering an one-year extension to members who brought a telescope to the event was discussed. Spencer made the motion, Bud Hamblen seconded, and the motion was carried by unanimous voice vote.

Resolution 2017-08-02. Resolved to encourage participation in the Nissan star party on August 20, 2017, offer a one-year extension to members who bring a telescope to the event.

Spencer noted that he was scheduled to do a live stand-up interview with Channel 2 News at 6:40 AM on August 3.

There being no further business, Gary asked for a motion to adjourn. Keith so moved, Spencer seconded, and the meeting was adjourned at 8:20 PM.

Respectfully submitted,

Bud Hamblen
Secretary

Contribute to *The Eclipse*!
eclipse@bsasnashville.com!

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, August 16, 2017.

The Barnard-Seyfert Astronomical Society held its monthly meeting at the Adventure Science Center, Nashville, Tennessee, on Wednesday, August 16, 2017. About 75 people attended.

Following a special presentation of the planetarium program at 6:00 PM, the club meeting was called to order at 7:00 PM by Gary Eaton. Gary announced upcoming star parties, and asked for adoption of the minutes for the July meeting, which were adopted by voice vote. The heart of the meeting was a discussion of the coming solar eclipse. Dr. Spencer Buckner, Austin Peay University, discussed the history of past solar eclipses; Dr. Billy Teets, Vanderbilt University, discussed some of the science behind solar eclipses; and Mrs. Theo Wellington discussed how to safely observe the solar eclipse. A question and answer period followed the panel discussion.

There being no further business the meeting was adjourned at 9:00 PM.

Respectfully submitted,

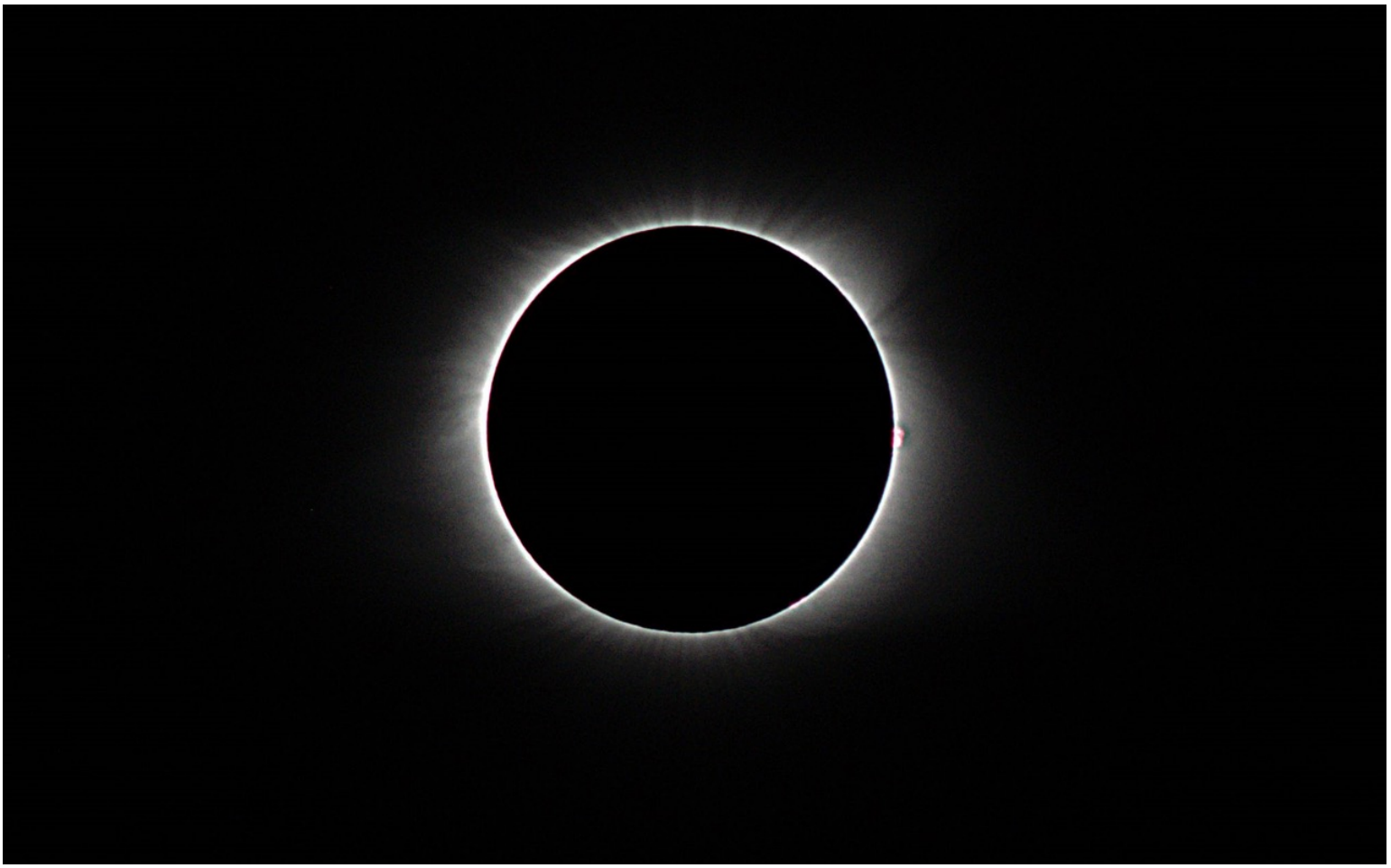
Bud Hamblen

Secretary

From the President, continued

the Parthenon and Warner Park. Numerous library talks were given. Groups of school-age children and teachers, boy-scouts, civic groups and hundreds of others heard from BSAS representatives. I suppose every BSAS member talked to family members, friends, neighbors or co-workers about the eclipse, adding greatly to the experience. Many positive comments were made about the eclipse presentations and panel discussion at the Adventure Science Center. The ASC weekend eclipse celebration and the NISSAN star party and eclipse presentation went smoothly. Thanks to all who passed along solar glasses, promoted events or participated in opportunities along the way. BSAS truly provided a great service to Nashville and surrounding communities and we can be proud of that.

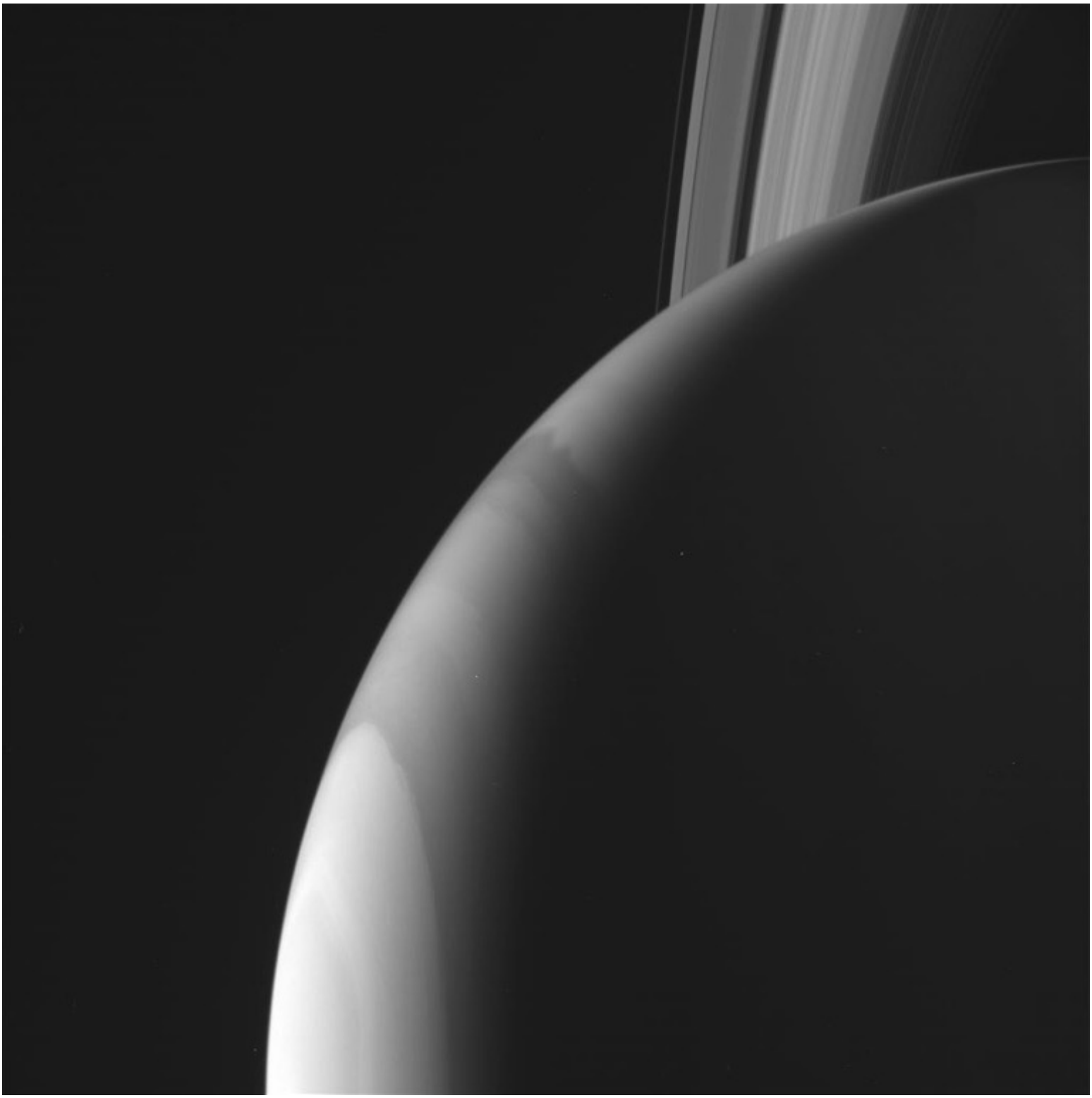
Gary Eaton



Inner solar corona: Nikon D7000 f/5.6 300mm from Crossville TN - *Bud Hamblen*

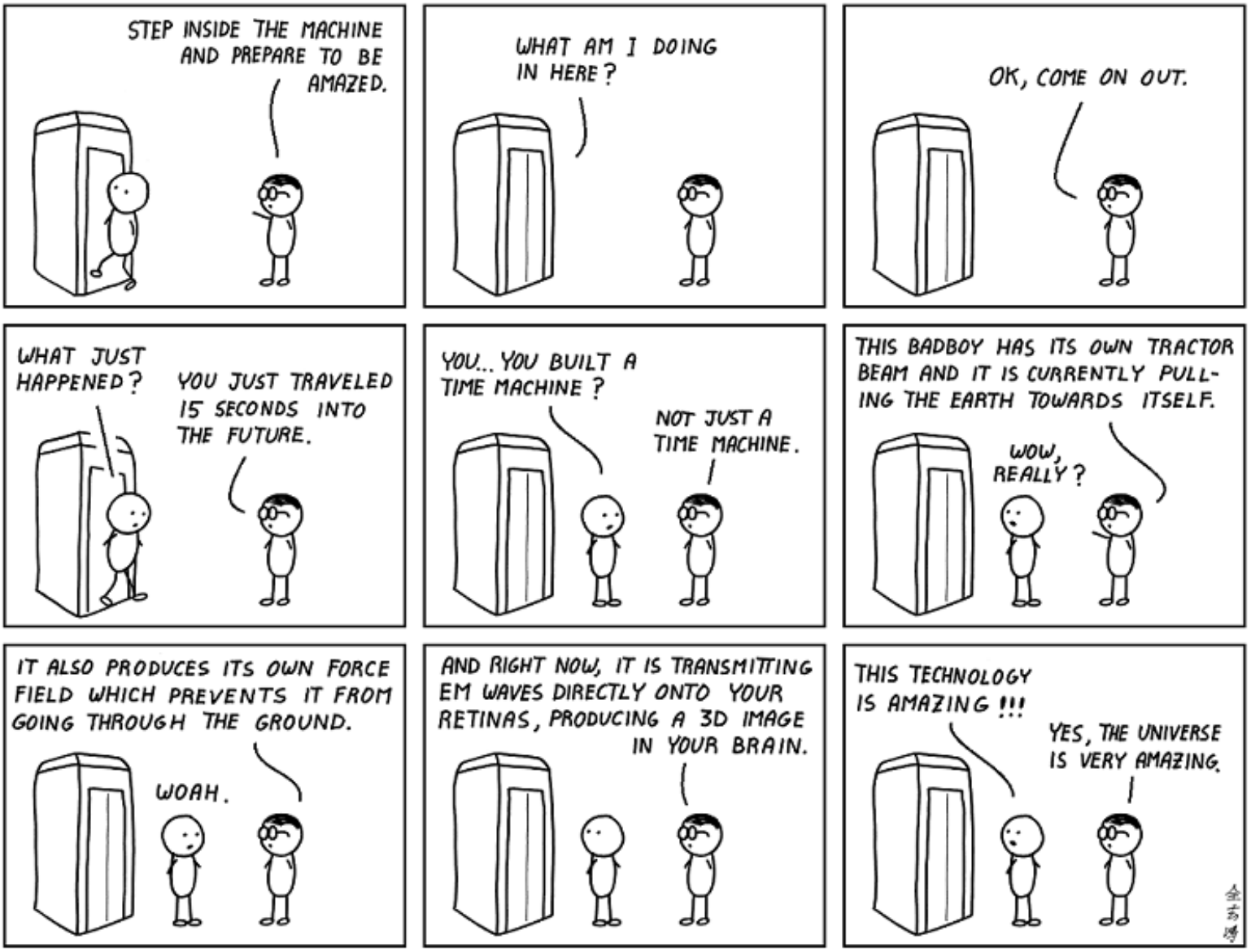
Celestron 8SE
Nikon D5600
from Cross Plains, TN
- *Jim Bardsley*

David Reagan



Raw Image: Cassini's camera was pointing toward Saturn, and the image was taken using the MT2 and CL2 filters. This image has not been validated or calibrated. A validated/calibrated image will be archived with the NASA Planetary Data System. Taken August 31, 2017. Image Credit: NASA/JPL-Caltech/Space Science Institute

abstruse goose



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.