The ECLIPSE

February 2020

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:

Wednesday February 19, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic TBD

In this Issue:

Book Review: I am Marie Curie
Reviewed by Robin Byrne 3

Betelgeuse and the Crab Nebula: Stellar Death and Rebirth
by David Prosper 6

BSAS Board Minutes
January 8, 2020 8

Membership Meeting Minutes
January 15, 2019 9

Membership Information 11

BSAS
Barnard-Seyfert Astronomical Society
BSASNashville.com

From the President

I would like to start off by thanking everyone that showed up to help with our Telescope Workshop last month. We had a pretty good turn out of members and visitors that wanted help with their telescopes. I think we did a good job getting questions answered and helping get some more amateur astronomers out under the sky.

Next, let's talk about a new direction for BSAS. Last year, we were approached by the Adventure Science Center about forming a partnership that would be mutually beneficial to both organizations. After a lot of discussions and planning by the board, we have arranged to have our member meetings at the Adventure Science Center Sudekum Planetarium! Starting with our "What's Up?" presentation in March, we will move our meetings to the Planetarium. We used to have meetings there a few years back and it is exciting to get back to the ASC. If you have any questions about the change or the future, please talk to one of the board members and we will be happy to answer your questions.

Finally, let's keep those good thoughts coming for some clear skies!

Clear skies and have a great month!

Keith Rainey

BSAS
Barnard-Seyfert Astronomical Society

Officers

Keith Rainey
President
Keith.Rainey@gmail.com

Tom Beckermann
Vice President
tmbeckermann@gmail.com

Bud Hamblen
Secretary
wrhamblen@comcast.net

Theo Wellington
Treasurer
tmwellington@comcast.net

Gary Eaton
Ex-officio
gceaton@comcast.net

Directors at Large

Chip Crossman
chipcrossman@gmail.com

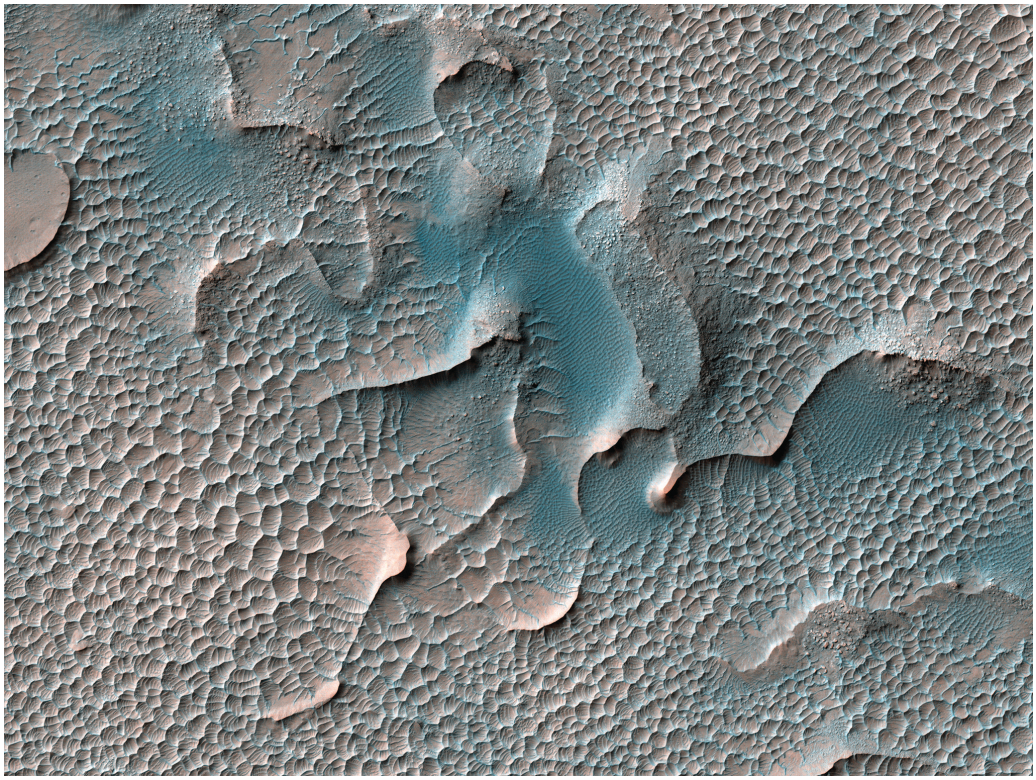
Thomas Gaudin
thomas.gaudin73@gmail.com

Drew Gilmore
eclipse@bsasnashville.com

K.C. Katalbas
hazeykc@gmail.com

Andy Reeves
reevesaf@gmail.com

Kathy Underwood
katy2222@comcast.net



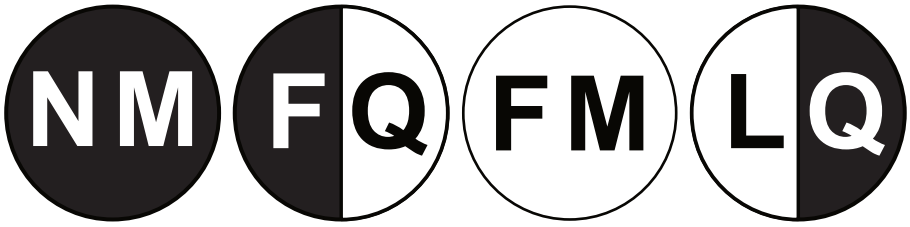
Sand dunes are found in many places on Mars. At most of these places the dunes are slowly moving, blown by the wind, just like on Earth. However, in this location in south Melas Chasma they appear to have turned to stone.

The large dunes are slowly being eroded and disappearing, replaced by smaller structures of scalloped sand.

Credit: NASA/JPL/UArizona

Upcoming Star Parties

Saturday February 22	BSAS Private Star Party Natchez Trace Parkway mile marker 412
Saturday February 29 7:00 to 9:00 pm	BSAS Public Star Party Edwin Warner Park
Friday March 6 7:30 to 9:30 pm	BSAS Public Star Party Bowie Nature Park (Fairview)



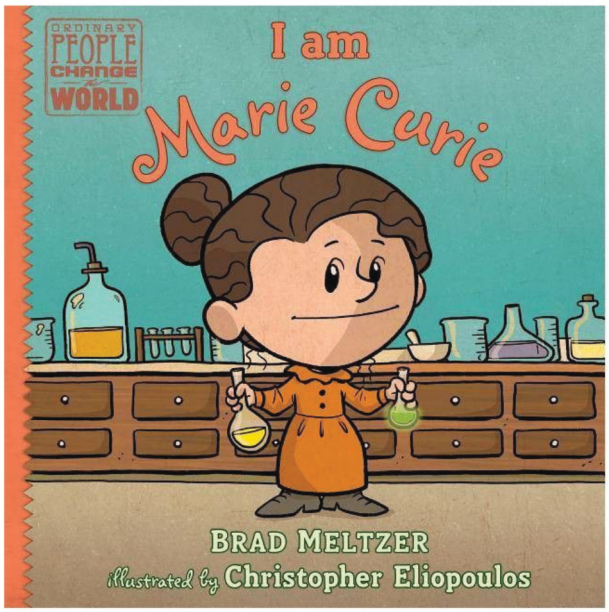
Feb 23
Mar 24

Feb 1
Mar 2

Feb 23
Mar 9

Feb 15
Mar 16

Book Review: I am Marie Curie
reviewed by Robin Byrne



"I am Marie Curie" by Brad Meltzer and illustrated by Christopher Eliopoulos, is a book targeted to children ages 5 - 8 years old. I bought it for my niece (shhhhh! don't tell her), but, of course, I wanted to read it first.

Having read biographies of Marie Curie before, there wasn't anything in the book I hadn't known about. However, the writing style was engaging enough to entertain not only this adult, but any child, as well. We learn about the major events in Marie's life. It begins with her childhood and interest in her father's scientific instruments. Meltzer discusses the expectations for women during the late 19th century, and how Marie wasn't allowed to study science or attend college in Poland, due to the limits placed on women at that time. The book talks about how supportive Marie's father was, and how he encouraged all of his children to be interested in learning, even his daughters, and the illegal "Flying School" that Marie attended with other women interested in furthering their eduction. We then see Marie finally able to attend the Sorbonne and become a chemist, and the hardships she endured to achieve her dream. We meet her husband and daughter, too. Then the book tells of Marie's two Nobel Prizes, the mobile x-ray unit she developed during World War I, and her legacy to this day.

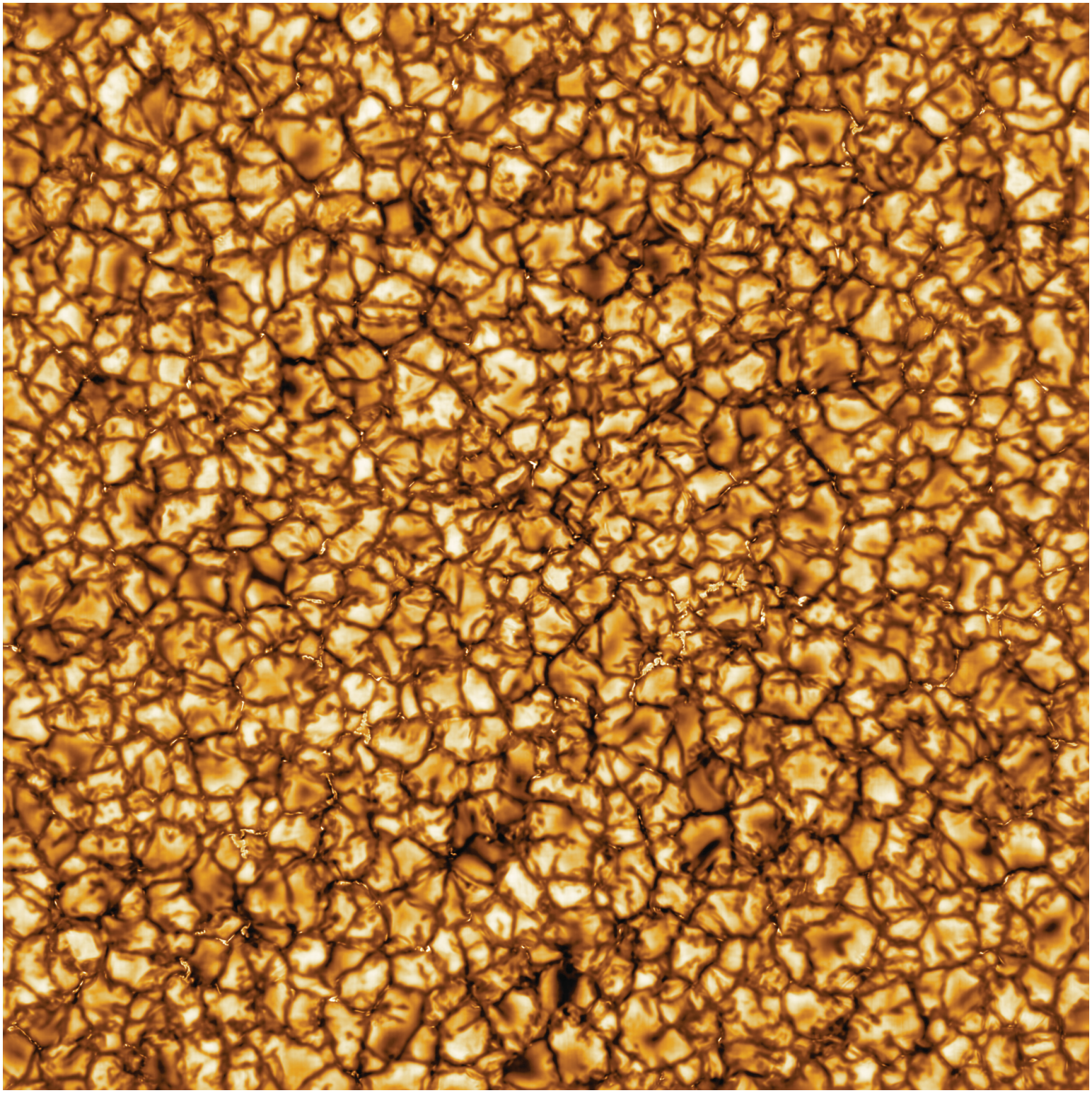
The illustrations by Eliopoulos are very cute, though I wished that Marie wasn't drawn as a child throughout the story, when other women and men were shown at appropriate ages. My guess is that he wanted her depiction to be consistent throughout the book, but I found it misleading, implying that Marie did all of these things as a child. What did help to compensate were actual pictures of Marie Curie at the end of the book, showing her at different ages and working in her laboratory.

"I am Marie Curie" is part of a series of books meant to motivate young children, called Ordinary People Change the World. Others highlighted in the series include: Walt Disney, Neil Armstrong, and Billie Jean King, among many more. I found the book to be very inspiring, and at several points in the book, the author intentionally has other people, saying of Marie, "She's such an inspiration!" She really is.

I truly enjoyed "I am Marie Curie," and it would be a good addition to any child's library, though a good number of adults may want it as part of their library, too.

References:

I am Marie Curie by Brad Meltzer; Illustrations by Christopher Eliopoulos; Dial Books for Young Readers, Penguin Random House, 2019.



The Daniel K. Inouye Solar Telescope has produced the highest resolution image of the Sun's surface ever taken. In this picture taken at 789nm, we can see features as small as 30km (18 miles) in size for the first time ever. The image shows a pattern of turbulent, "boiling" gas that covers the entire sun. The cell-like structures – each about the size of Texas – are the signature of violent motions that transport heat from the inside of the sun to its surface. Hot solar material (plasma) rises in the bright centers of "cells," cools off and then sinks below the surface in dark lanes in a process known as convection. In these dark lanes we can also see the tiny, bright markers of magnetic fields. This image covers an area 36,500 × 36,500 km (22,600 × 22,600 miles or 51 × 51 arcseconds). Credit: NSO/NSF/AURA

The Tarantula Nebula, seen in this image by the Spitzer Space Telescope, was one of the first targets studied by the infrared observatory after its launch in 2003, and the telescope has revisited it many times since. Now that Spitzer is set to be retired on Jan. 30, 2020, scientists have generated a new view of the nebula from Spitzer data.

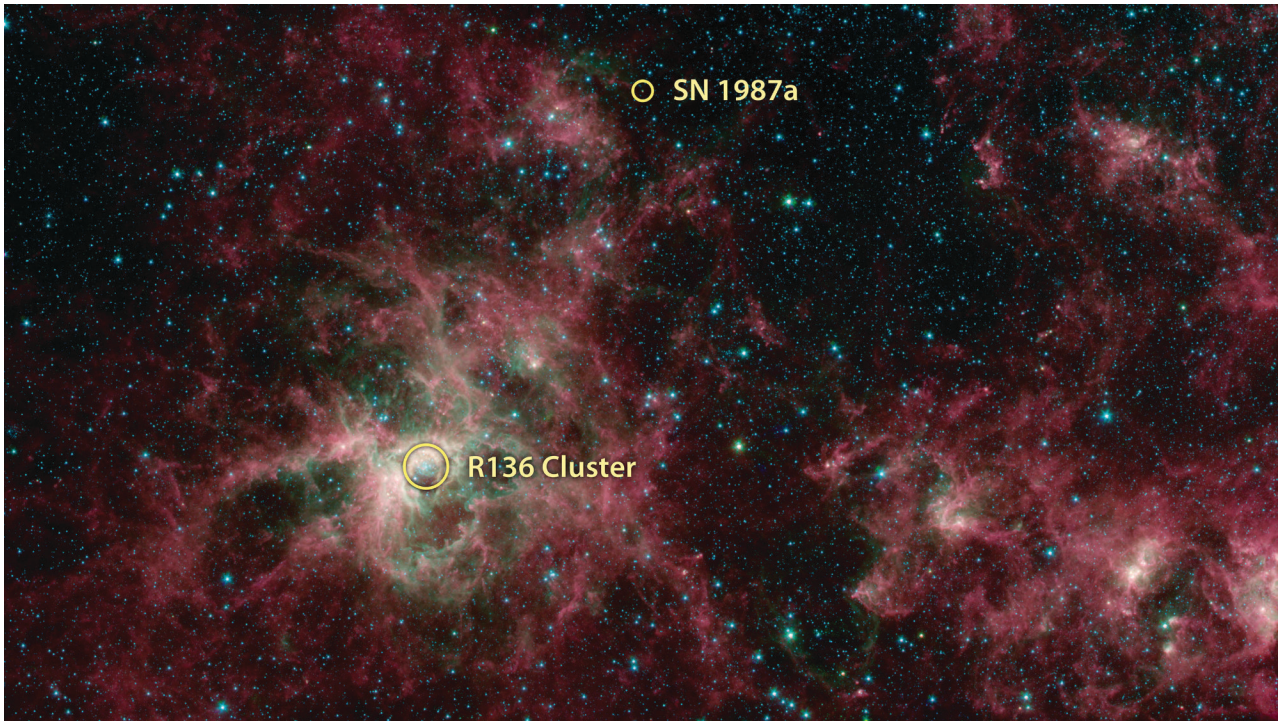
This high-resolution image (below) combines data from multiple Spitzer observations, most recently in February and September 2019.

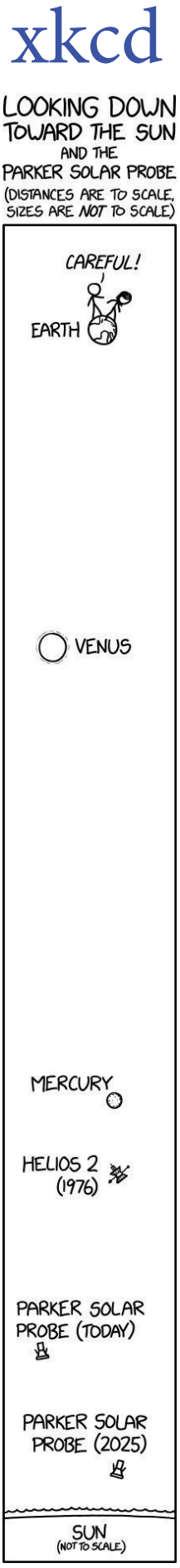
Located in the Large Magellanic Cloud - a dwarf galaxy gravitationally bound to our Milky Way galaxy - the Tarantula Nebula is a hotbed of star formation. In the case of the Large Magellanic Cloud, such studies have helped scientists learn about rates of star formation in galaxies other than the Milky Way.

The nebula also hosts R136, a "starburst" region, where massive stars form in extremely close proximity and at a rate far higher than in the rest of the galaxy. Within R136, in an area less than 1 light-year across (about 6 trillion miles, or 9 trillion kilometers), there are more than 40 massive stars, each containing at least 50 times the mass of our Sun. By contrast, there are no stars at all within 1 light-year of our Sun. Similar starburst regions have been found in other galaxies, containing dozens of massive stars - a higher number of massive stars than what is typically found in the rest of their host galaxies. How these starburst regions arise remains a mystery.

On the outskirts of the Tarantula Nebula, you can also find one of astronomy's most-studied stars that has exploded in a supernova. Dubbed 1987A because it was the first supernova spotted in 1987, the exploded star burned with the power of 100 million Suns for months. The shockwave from that event continues to move outward into space, encountering material ejected from the star during its dramatic death.

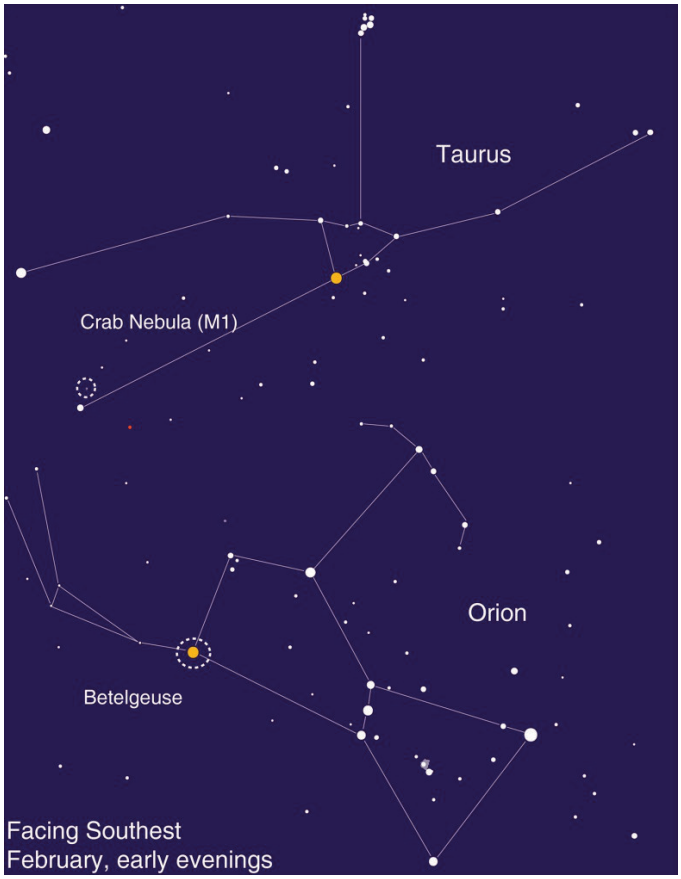
Credit: NASA/JPL-Caltech





Betelgeuse and the Crab Nebula: Stellar Death and Rebirth
by David Prosper

What happens when a star dies? Stargazers are paying close attention to the red giant star Betelgeuse since it recently dimmed in brightness, causing speculation that it may soon end in a brilliant supernova. While it likely won't explode quite yet, we can preview its fate by observing the nearby Crab Nebula.



Spot Betelgeuse and the Crab Nebula after sunset! A telescope is needed to spot the ghostly Crab.

Betelgeuse, despite its recent dimming, is still easy to find as the red-hued shoulder star of Orion. A known variable star, Betelgeuse usually competes for the position of the brightest star in Orion with brilliant blue-white Rigel, but recently its brightness has faded to below that of nearby Aldebaran, in Taurus. Betelgeuse is a young star, estimated to be a few million years old, but due to its giant size it leads a fast and furious life. This massive star, known as a supergiant, exhausted the hydrogen fuel in its core and began to fuse helium instead, which caused the outer layers of the star to cool and swell dramatically in size. Betelgeuse is one of the only stars for which we have any kind of detailed surface observations due to its huge size – somewhere between the diameter of the orbits of Mars and Jupiter - and relatively close distance of about 642 light-years. Betelgeuse is also a "runaway star," with its remarkable speed possibly triggered by merging with a smaller companion star. If that is the case, Betelgeuse may actually have millions of years left! So, Betelgeuse may not explode soon after all; or it might explode tomorrow! We have much more to learn about this intriguing star.

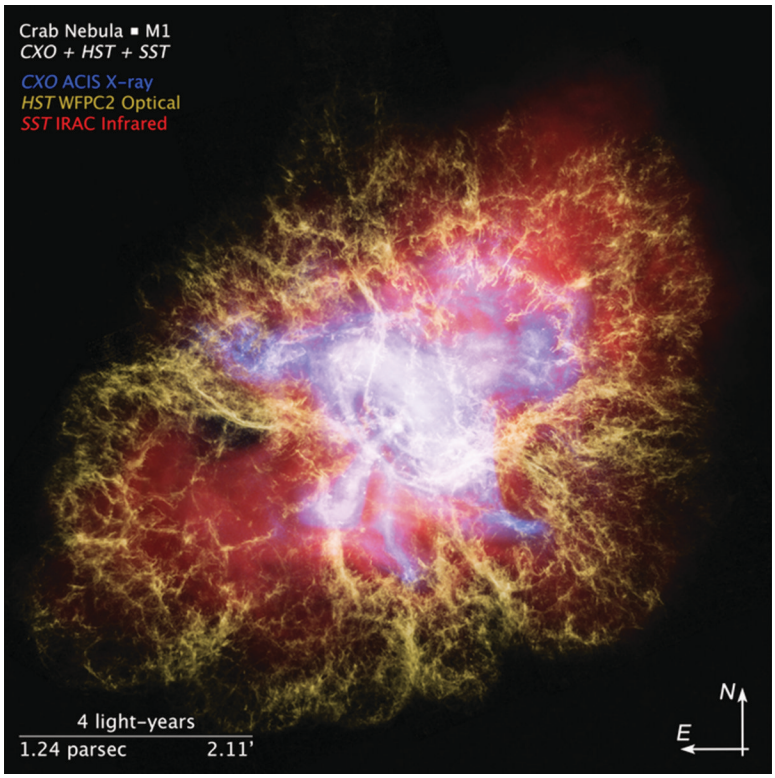
The Crab Nebula (M1) is relatively close to Betelgeuse in the sky, in the nearby constellation of Taurus. Its ghostly, spidery gas clouds result from a massive explosion; a supernova observed by astronomers in 1054! A backyard telescope allows you to see some details, but only advanced telescopes reveal the rapidly spinning neutron star found in its center: the last stellar remnant from that cataclysmic event. These gas clouds were created during the giant star's violent demise and expand ever outward to enrich the universe with heavy elements like silicon, iron, and nickel. These element-rich clouds are like a cosmic fertilizer, making rocky planets like our own Earth possible. Supernova also send out powerful shock waves that help trigger star formation. In fact, if it wasn't for a long-ago supernova, our solar system - along with all of us - wouldn't exist! You can learn much more about the Crab Nebula and its neutron star in a new video from NASA's Universe of Learning, created from observations by the Great Observatories of Hubble, Chandra, and Spitzer: bit.ly/CrabNebulaVisual.

Continued on page 7

Betelgeuse and the Crab Nebula, continued

Our last three articles covered the life cycle of stars from observing two neighboring constellations: Orion and Taurus! Our stargazing took us to the ”baby stars” found in the stellar nursery of the Orion Nebula, onwards to the teenage stars of the Pleiades and young adult stars of the Hyades, and ended with dying Betelgeuse and the stellar corpse of the Crab Nebula. Want to know more about the life cycle of stars? Explore stellar evolution with “The Lives of Stars” activity and handout: bit.ly/starlifeanddeath.

Check out NASA’s most up to date observations of supernova and their remains at nasa.gov.



This image of the Crab Nebula combines X-ray observations from Chandra, optical observations from Hubble, and infrared observations from Spitzer to reveal intricate detail. Notice how the violent energy radiates out from the rapidly spinning neutron star in the center of the nebula (also known as a pulsar) and heats up the surrounding gas. More about this incredible “pulsar wind nebula” can be found at bit.ly/Crab3D Credit: NASA, ESA, F. Summers, J. Olmsted, L. Hustak, J. DePasquale and G. Bacon (STScI), N. Wolk (CfA), and R. Hurt (Caltech/IPAC)

This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more! You can catch up on all of NASA’s current and future missions at nasa.gov. With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

Next Membership Meeting:

Wednesday February 19, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic TBD

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, January 8, 2020

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held January 8, 2020, at the Girl Scouts Center, 4522 Granny White Pike, Nashville, TN 37204. Present were Tom Beckermann, Chip Crossman, Gary Eaton, Thomas Gaudin, Bud Hamblen, KC Katalbas, Keith Rainey, Andy Reeves, Kat Underwood and Theo Wellington. A quorum being present, Keith called the meeting to order at 7:30 PM and asked for a motion to adopt the minutes as printed in the January issue of the Eclipse, which was adopted by unanimous voice vote. Theo reported that there was $10,988.01 in the bank account ($5,586.94 general and $5,401.07 equipment), and $432.08 in the PayPal account. Poster sales totaled 28. 16 RASC Observer's Handbook and 10 Deep Space calendars were ordered. Two sets remain to be picked up. The silent auction brought in $1,128. Keith reported that there were 140 members.

January's membership meeting will be the telescope workshop. February's meeting will be Greg Neaveill's presentation on his briefcase telescope. March's meeting will be the Messier Marathon edition of "What's Up" at the Adventure Science Center.

The December 7 star party at Shelby Bottoms Nature Center had about 70 guests. The January 4 star party at Bells Bend Outdoor Center was clouded out and about 6 guests showed up for the talk.

Upcoming star parties include a January 25 private star party at Natchez Trace Mile Marker 435.3, and a February 1 public star party at Shelby Bottoms Nature Center.

The Bowie Nature Park star party has not yet been confirmed. The star party at Long Hunter State Park on August 22 could be moved to the new Mill Ridge Park near 12924 Old Hickory Blvd, Antioch, TN.

Discussion of loaner scopes included the need for pictures of the equipment on the web site to show what is available.

Other discussion included new star party gear (signs, red filters for flashlights, planispheres, etc.) and possible access to the telescopes at the Boy Scout Latimer Reservation or MBA's observatory at Long Mountain, near McMinnville, TN.

There being no further business the meeting was adjourned at 8:45 PM.

Respectfully submitted,

Bud Hamblen
Secretary

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Wednesday, January 15, 2019

The Barnard-Seyfert Astronomical Society held its annual monthly meeting at the Girl Scout Center, Nashville, Tennessee, on Wednesday, January 15, 2020. Twenty-six members and guests signed in. Tom Beckermann called the to order at 7:30 PM. Tom asked for a motion to approve the minutes of the December 18, 2019, meeting as printed in the January issue of the Eclipse and the minutes were approved by a unanimous voice vote. Theo Wellington reported that there was $10,522.91 in the bank account. Tom reported that there were 140 members.

Tom announced a private star party at Natchez Trace Mile Marker 435.3 on January 25, 2020, and a public star party at Shelby Bottoms Nature Center on Saturday, February 4, 2020, from 6:30 to 8:30 PM.

After the announcements, the members and guests formed working groups to assist with telescopes. At least 11 guests with telescopes attended.

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

Respectfully submitted,

Bud Hamblen

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.