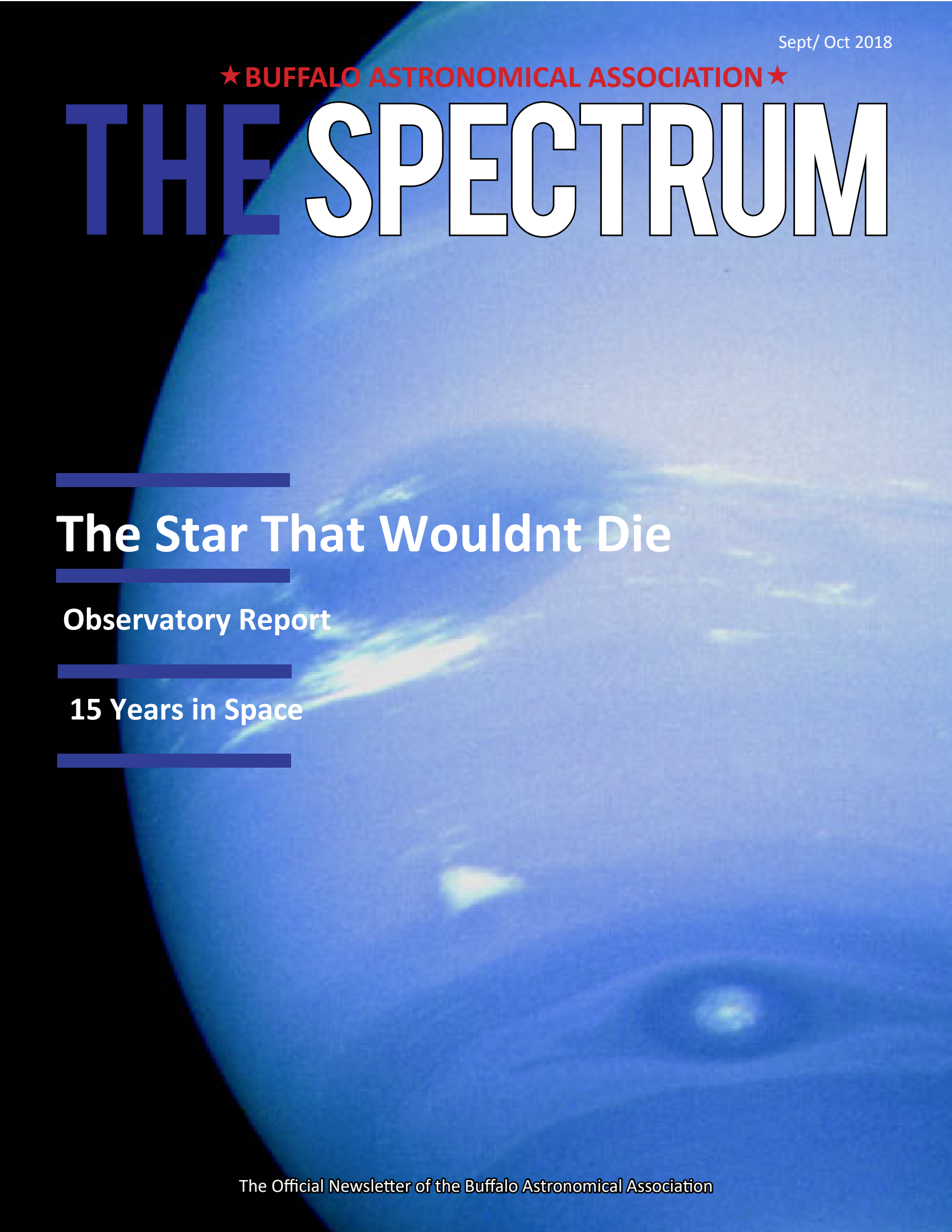
Sept/ Oct 2018

★BUFFALO ASTRONOMICAL ASSOCIATION★

THE SPECTRUM



The Star That Wouldnt Die

Observatory Report

15 Years in Space

The Official Newsletter of the Buffalo Astronomical Association

TABLE OF CONTENTS

ABOUT THE COVER: Neptune will be at closest approach in September .

Voyager Image courtesy of NASA.

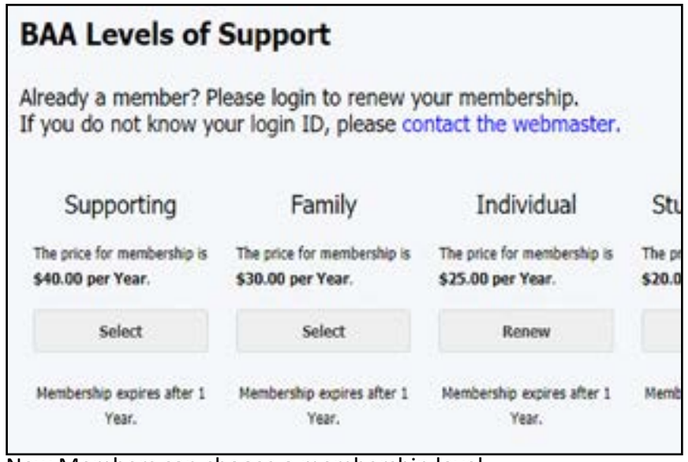
Renew your BAA membership in 3 easy steps

Visit http://www.buffaloastronomy.com

Non-members can sign up by clicking on “Join the BAA”
Current members can renew by clicking on “Membership renewal”(you will be asked to login)

#1

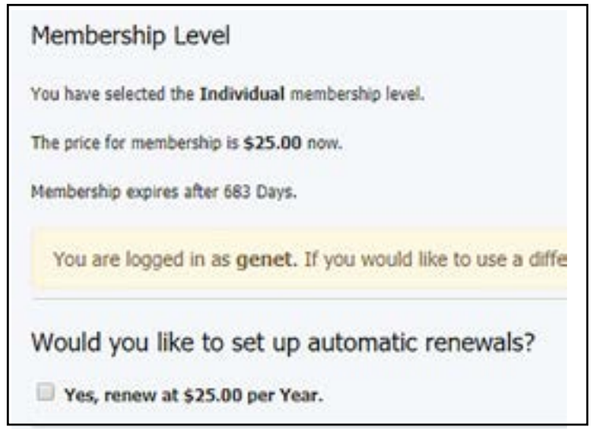
#2



New Members can choose a membership level

existing members can choose to renew current level or choose a new level.

#3



PayPal Check out
The safer, easier way to pay

Confirm your Membership Level and checkout using Paypal where you can pay with a Credit card/Debit Card or your Paypal balance

FIND US ONLINE

Find us on Facebook

Follow Us On twitter

Help Support The BAA by choosing the BAA as your charitable donation within Amazon. Every little bit helps!

amazonsmile You Shop. Amazon Gives.

Instagram

Online at
www.buffaloastronomy.com

CALENDAR

Sept 7/8/9	Black Forest Star Party Weekend!
Sep 8	Wilson Star Search
Sep 14	7:30pm BAA Meeting at Buffalo State
Sept 21	"Astronomy at the Pointe
Oct 6	Public Night Beaver Meadow Observatory- last one of the season
Oct 12	7:30pm BAA Meeting at Buffalo State
Oct 13	Wilson Star Search- last one of the season
Nov 9	BAA Meeting at Buffalo State 7:30pm
Dec 14	BAA Meeting at Buffalo State 7:30pm-Holiday Party!!

SEND CALENDAR EVENTS TO
Mike Humphrey thespectrum@buffaloastronomy.com
FOR THE LATEST INFORMATION ON CLUB EVENTS,

visit http://www.buffaloastronomy.com/events

MEMBERSHIP APPLICATION

You can join (or renew) at the organization web site, http://www.buffaloastronomy.com.

Click the 'Membership' Tab. To Join by mail Send funds to address shown along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of The BAA.

BAA MEETINGS

All meetings are held at the Buffalo State College classroom building. For directions to the location and more information see the last page.

GENERAL MEETING
7:30 P.M. room C122
Classroom Building

STELLAR NURSERY MEETING (Kids under 10)
7:00 P.M. room C122
Classroom Building

"TUESDAY" NIGHT IMAGERS MEETING
AS POSTED by Dan Marcus
via E-mail @ BMO

GENERAL MEMBERSHIP MEETING

The Buffalo Astronomical Association holds its regular monthly General Membership Meeting on the second Friday of each month.

BOARD OF DIRECTORS MEETING

The Board of Directors Meeting is held on dates and at locations scheduled by the board. Information provided to The Spectrum will be published. The meetings are open to all members of the Club in good standing. Attendance is encouraged.

BAA Directory

CLUB OFFICERS

PRESIDENT
Mike Humphrey
VICE PRESIDENT
Dennis Bartkowiak
SECRETARY
Neal Ginsberg
TREASURER
DaRand Land

AT-LARGE-DIRECTORS
Noah Erhart
Ernie Jacobs
Steve Smith
Taylor Cramer

COLLEGE OF FELLOWS
Rowland Rupp

BMS RESEARCH ASSOCIATE
Alan Friedman

OBSERVATORY DIRECTORS
Dan Marcus
Gene Timothy

SPECTRUM EDITOR
Mike Humprey

WEBMASTER
Gene Timothy

AD-HOC OUTREACH COMMITTEE
Jim Lehman
Tom Heyer

MEMBERSHIP CHAIR
Dennis Bartkowiak

CHECK THE WEBSITE

BUFFALOASTRONOMY.COM

The BAA website not only has news and information about our association, but also a variety of features to manage your membership and connect with other club members. Current members can post photos, trade gear, pay dues, manage discount magazine subscriptions, swap stories in the forum, and more. Questions about the site? Need a hand to get your account set up? Contact webmaster@buffaloastronomy.com

BAA Marketing Materials

The BAA has ordered new marketing materials to represent the association while at public Outreach events. We have a new table cloth with logo as well as 2 new banners for display at the Observatory during Public Nights, Wilson Star Search and at Wile-son Pointe Star parties

BAA T-Shirts

Show your support for the BAA

The BAA has a new logo and with it we have new T-Shirts available for Purchase. each T-Shirt is $10 and can be prepaid and ordered by seeing either Dennis bartKowiak or Gene Timothy.

OBSERVATORY REPORT

The latest Observatory news:

All seems to be running properly for now at the Observatory. We had to cancel a couple of "Tues Night at the Obs" since I ran out of spare time due to an overabundance of club outreach activities. Not complaining as we had some REALLY FUN big events, and a couple of massively successful public nights at Beaver Meadow!

Observatory Privileges:

For those new to the club who want to use the Observatory we ask that you help out for 2 public nights, one Observatory Clean up/fix up day, and show that you are able to use the scopes you want privileges on. If you want to obtain imaging privileges with the clubs cameras, you will need to visit us on a "Tues Night", to learn how to use the clubs cameras. Keep in mind that the Sun is starting to set earlier, it makes it easier to get several hours of imaging in and be home by 10pm especially as it gets nearer to the winter equinox.

On another note: We will be posting a closing sign out sheet.

It seems We are having some issues with members abusing their observatory privileges and not following rules.
An observatory user seems to forget to sign in and then leaves a food mess and things not properly put away at the Obs. Last person to leave the Observatory will have to check off the closing list and make sure all is secured. We will be changing the observatory combination again this fall as we have adopted a yearly "reboot" of access to the observatory. If this continues to be a problem we will be changing the combination AGAIN and take measures to find the culprit who will lose privileges for a year. Please Remember that Leaving food out (includes garbage and recyclables) attracts ANTS, and RODENTS. We do NOT want them in the Obs. So please help out when you visit and make sure the place is clean of food stuffs and the garbage and recyclables are emptied (ants love pop cans). Giving the place an occasional vacuuming never hurts as well.

Loaner Scopes:

The Observatory has several loaner scopes you can check out for 4 weeks at a time. We have a Celestron 8" on a tracking German Equatorial Mount and a 6" Dobson. If you wish to borrow one of these scope's, see Gene Timothy or Dan Marcus on a "Tues" night.

Tuesday Night at the Observatory:

As you can see the fun never stops at the Observatory! Well the weather and seeing has been most uncooperative this summer along with a few missed "Tue Nights" so we have not had much luck with the planets. On top of that Mars developed a major planet wide dust storm that obliterated most of Mar's surface features. ;,-(Tues Nights will be back in full swing this fall when things quiet down after the Black Forest Star Party. I have out of town relatives visiting all of Aug and most of Sep so my spare time for "Tues Nights" will be limited. If you want notifications as to when we are having "Tues Night" you can send me your email at DMa3141551@msn.com

Astronomy Adventures:

Do you want to chase and Asteroid occultation, Grazing Lunar Occultation, Clear dark skies to image? I'm always up for an adventure, so give me a call. I will also be posting to the Tues group as well as on our web site any ISS transits of the Sun or Moon.

See you at the Observatory!

Daniel Marcus
Gene Timothy

September 14

Project Gemini: Unsung Hero of Neil Armstrong's One Small Step

Think of Project Mercury and what comes to mind? Alan Shepard, the first American in space, and John Glenn, the first to orbit the earth. Probably The Right Stuff. How about the Apollo program? Apollo 11, of course. Neil Armstrong. "One small step for a man…" Apollo 13. "Houston, we've had a problem." But how about Project Gemini, the U.S. space program between Mercury and Apollo? When did it take place? Who flew on Gemini and what did it accomplish?

Well Neil Armstrong flew on it, and demonstrated the first docking of two spacecraft in orbit during Gemini 8. In fact ten of the twelve men that eventually walked on the moon during Apollo flew Gemini first, and the other two were Gemini backup crew. Even though its first launch was only three years after John Glenn's five hour orbital flight in Friendship 7, Project Gemini demonstrated technologies and techniques critical to the Apollo program and was key to President Kennedy's pledge, "…before this decade is out, of landing a man on the moon and returning him safely to the earth." Mercury made it to space and back. Gemini operated there.

Please join us Friday, September 14 when Walter Gordon, local aerospace historian and chairman of the AIAA Niagara Frontier Section, discusses this too little remembered yet extremely important and accomplished part of the U.S. space program, including Western New York's significant contributions.

October 3

Dark Matter as a Superuid

Rance Solomon

The existence of dark matter (DM) in some form agrees very well with cosmological observations but has dificulty reproducing galactic scale observations.
On the other hand, MOND (MOdied Newtonian Dynamics) supersedes DM by proposing a modication to gravity at low accelerations, making suspiciously accurate predictions on galactic scale phenomena but failing at cosmological scale.

The two approaches, dark matter and MOND, excel in two mutually exclusive regions. So in a hybrid approach we attempt to merge the two models by considering a fluid dark matter which condenses inside galaxies through a super fluid transition. The phononic interactions inside the super fluid region could mediate MOND like dynamics. This hybrid approach with MOND as an emergent phenomenon of dark matter would allow cosmological scale dark matter dominance with galactic scale MOND dominance. In this talk we will discuss some of the good and some of the bad of this approach.

Astronomers Uncover New Clues to the Star that Wouldn't Die

What happens when a star behaves like it exploded, but it's still there?

About 170 years ago, astronomers witnessed a major outburst by Eta Carinae, one of the brightest known stars in the Milky Way galaxy. The blast unleashed almost as much energy as a standard supernova explosion. Yet Eta Carinae survived. An explanation for the eruption has eluded astrophysicists. They can't take a time machine back to the mid-1800s to observe the outburst with modern technology.
However, astronomers can use nature's own "time machine," courtesy of the fact that light travels at a finite speed through space. Rather than heading straight toward Earth, some of the light from the outburst rebounded or "echoed" off of interstellar dust, and is just now arriving at Earth. This effect is called a light echo. The light is behaving like a postcard that got lost in the mail and is only arriving 170 years later.

By performing modern astronomical forensics of the delayed light with ground-based telescopes, astronomers uncovered a surprise.

The new measurements of the 1840s eruption reveal material expanding with record-breaking speeds up to 20 times faster than astronomers expected.The observed velocities are more like the fastest material ejected by the blast wave in a supernova explosion, rather than the relatively slow and gentle winds expected from massive stars before they die.

Based on this data, researchers suggest that the eruption may have been triggered by a prolonged stellar brawl among three rowdy sibling stars, which destroyed one star and left the other two in a binary system. This tussle may have culminated with a violent explosion when Eta Carinae devoured one of its two companions, rocketing more than 10 times the mass of our Sun into space. The ejected mass created gigantic bipolar lobes resembling the dumbbell shape seen in present-day images.

The results are reported in a pair of papers by a team led by Nathan Smith of the University of Arizona in Tucson, Arizona, and Armin Rest of the Space Telescope Science Institute in Baltimore, Maryland.

The light echoes were detected in visible-light images obtained since 2003 with moderate-sized telescopes at the Cerro Tololo Inter-American Observatory in Chile. Using larger Magellan telescopes at the Carnegie Institution for Science's Las Campanas Observatory and the Gemini South Observatory, both also located in Chile, the team then used spectroscopy to dissect the light, allowing them to measure theejecta's expansion speeds. They clocked material zipping along at more than 20 million miles per hour (fast enough to travel from Earth to Pluto in a few days).
The observations offer new clues to the mystery surrounding the titanic convulsion that, at the time, made Eta Carinae the second-brightest nighttime star seen in the sky from Earth between 1837 and 1858. The data hint at how it may have come to be the most luminous and massive star in the Milky Way galaxy.

"We see these really high velocities in a star that seems to have had a powerful explosion, but somehow the star survived," Smith explained. "The easiest way to do this is with a shock wave that exits the star and accelerates material to very high speeds."

Massive stars normally meet their final demise in shock-driven events when their cores collapse to make a neutron star or black hole. Astronomers see this phenomenon in supernova explosions where the star is obliterated. So how do you have a star explode with a shock-driven event, but it isn't enough to completely blow itself apart? Some violent event must have dumped just the right amount of energy onto the star, causing it to eject its outer layers. But the energy wasn't enough to completely annihilate the star.

One possibility for just such an event is a merger between two stars, but it has been hard to find a scenario that could work and match all the data on Eta Carinae.

The researchers suggest that the most straightforward way to explain a wide range of observed facts surrounding the eruption is with an interaction of three stars, where the objects exchange mass.

If that's the case, then the present-day remnant binary system must have started out as a triple system. The reason why we suggest that members of a crazy triple system interact with each other is because this is the best explanation for how the present-day companion quickly lost its outer layers before its more massive sibling," Smith said.

In the team's proposed scenario, two hefty stars are orbiting closely and a third companion is orbiting farther away. When the most massive of the close binary stars nears the end of its life, it begins to expand and dumps most of its material onto its slightly smaller sibling.

The sibling has now bulked up to about 100 times the mass of our Sun and is extremely bright. The donor star, now only about 30 solar masses, has been stripped of its hydrogen layers, exposing its hot helium core.

Hot helium core stars are known to represent an advanced stage of evolution in the lives of massive stars. is now a much less massive star than the one it is orbiting.

"From stellar evolution, there's a pretty firm understanding that more massive stars live their lives more quickly and less massive stars have longer lifetimes," Rest explained. "So the hot companion star seems to be further along in its evolution, even though itThat doesn't make sense without a transfer of mass."

The mass transfer alters the gravitational balance of the system, and the helium-core star moves farther away from its monster sibling. The star travels so far away that it gravitationally interacts with the outermost third star, kicking it inward. After making a few close passes, the star merges with its heavyweight partner, producing an outflow of material.

In the merger's initial stages, the ejecta is dense and expanding relatively slowly as the two stars spiral closer and closer. Later, an explosive event occurs when the two inner stars finally join together, blasting off material moving 100 times faster. This material eventually catches up with the slow ejecta and rams into it like a snowplow, heating the material and making it glow.

This glowing material is the light source of the main historical eruption seen by astronomers a century and a half ago.

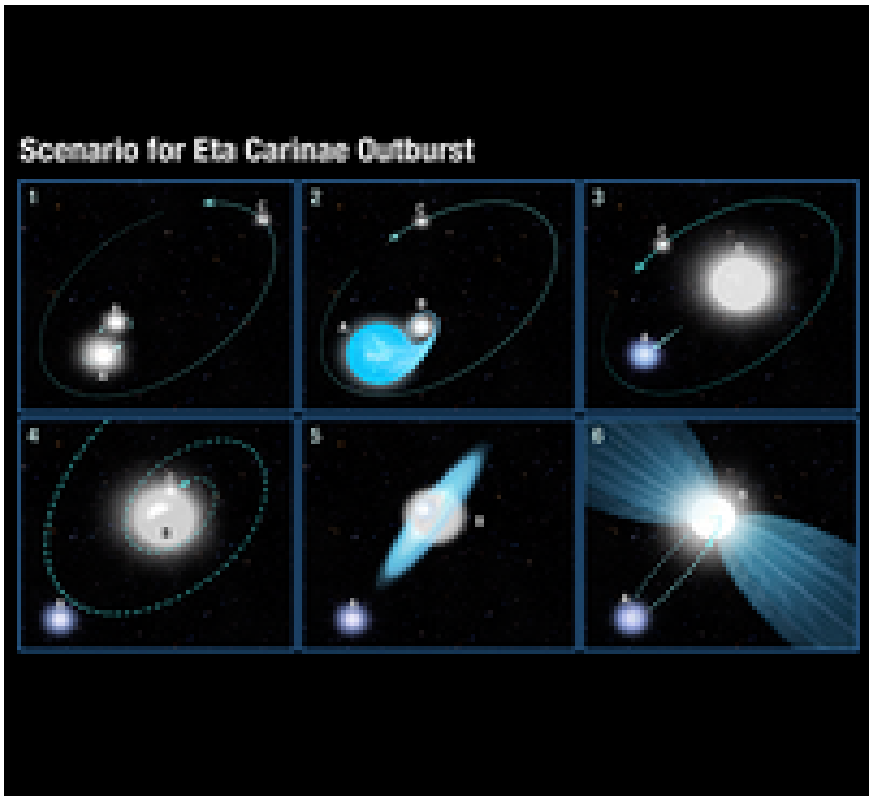
Meanwhile, the smaller helium-core star settles into an elliptical orbit, passing through the giant star's outer layers every 5.5 years. This interaction generates X-ray emitting shock waves.

A better understanding of the physics of Eta Carinae's eruption may help to shed light on the complicated interactions of binary and multiple stars, which are critical for understanding the evolution and death of massive stars.

The Eta Carinae system resides 7,500 light-years away inside the Carina nebula, a vast star-forming region seen in the southern sky.

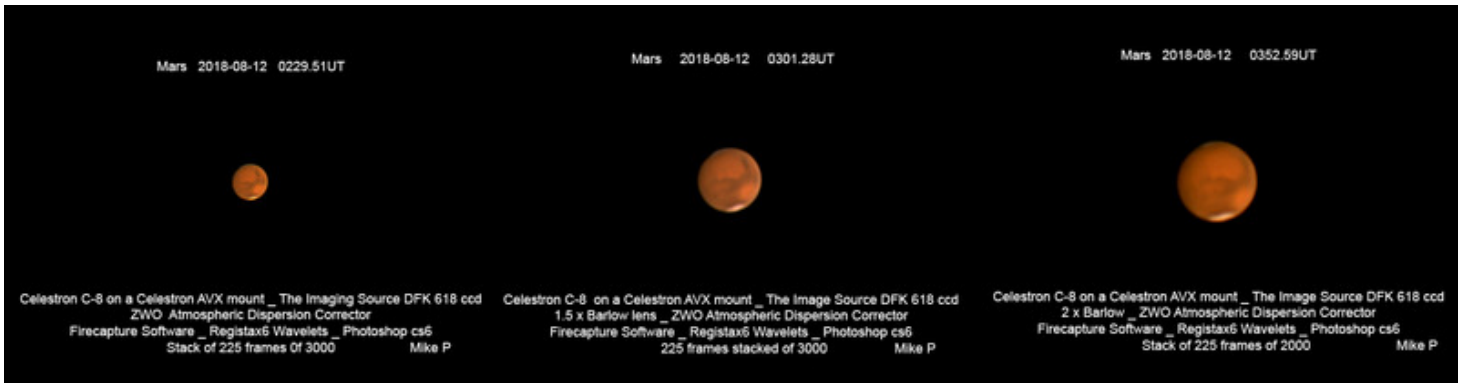
Credits

Illustration: NASA, ESA, and A. Feild (STScI)
Science: NSF and AURA

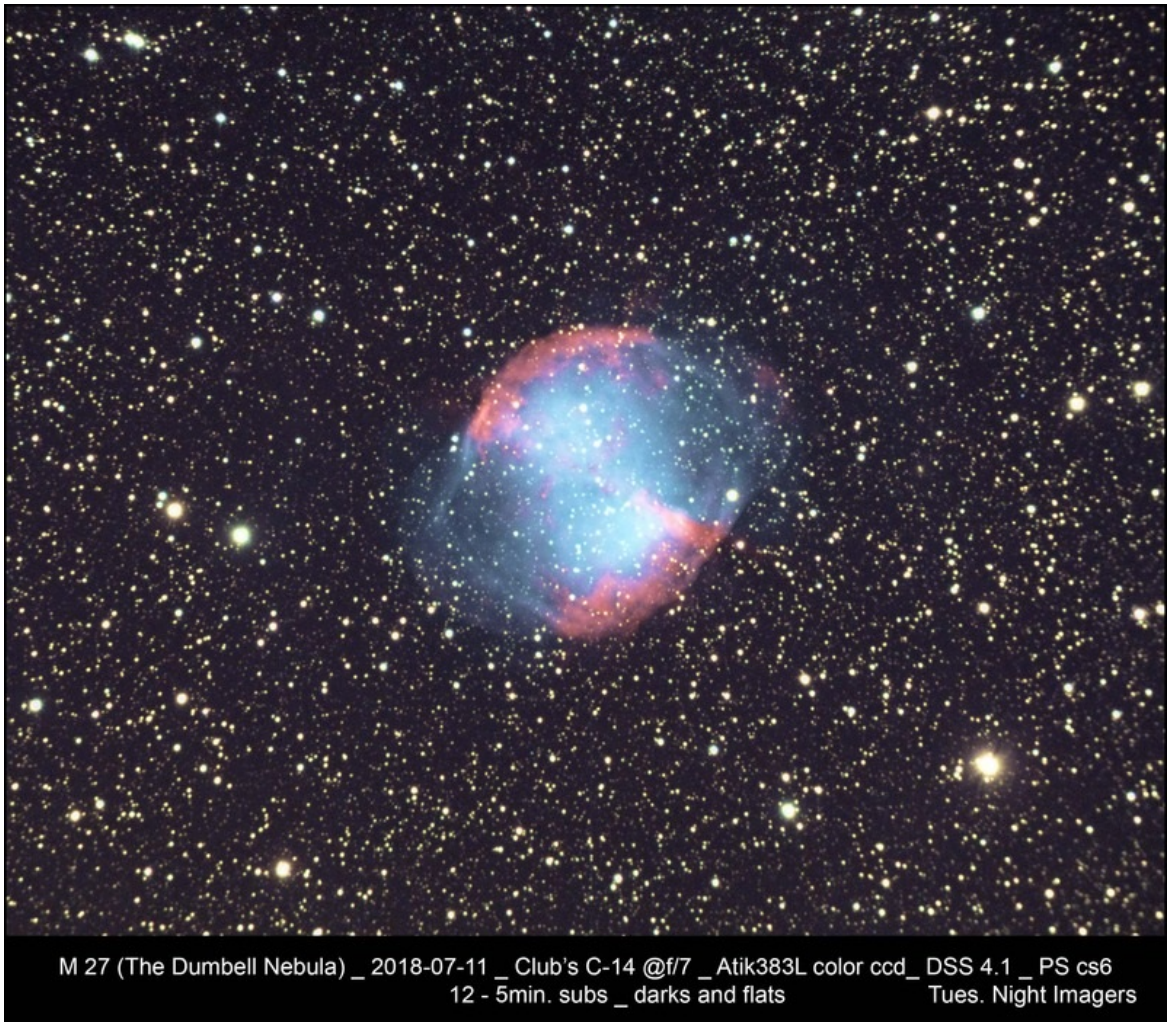


The team published its findings in papers titled Exceptionally Fast Ejecta Seen in Light Echoes of Eta Carinae's Great Eruption and Light Echoes From the Plateau in Eta Carinae's Great Eruption Reveal a Two-Stage Shock-Powered Event, which appear online Aug. 2 in The Monthly Notices of the Royal Astronomical Society

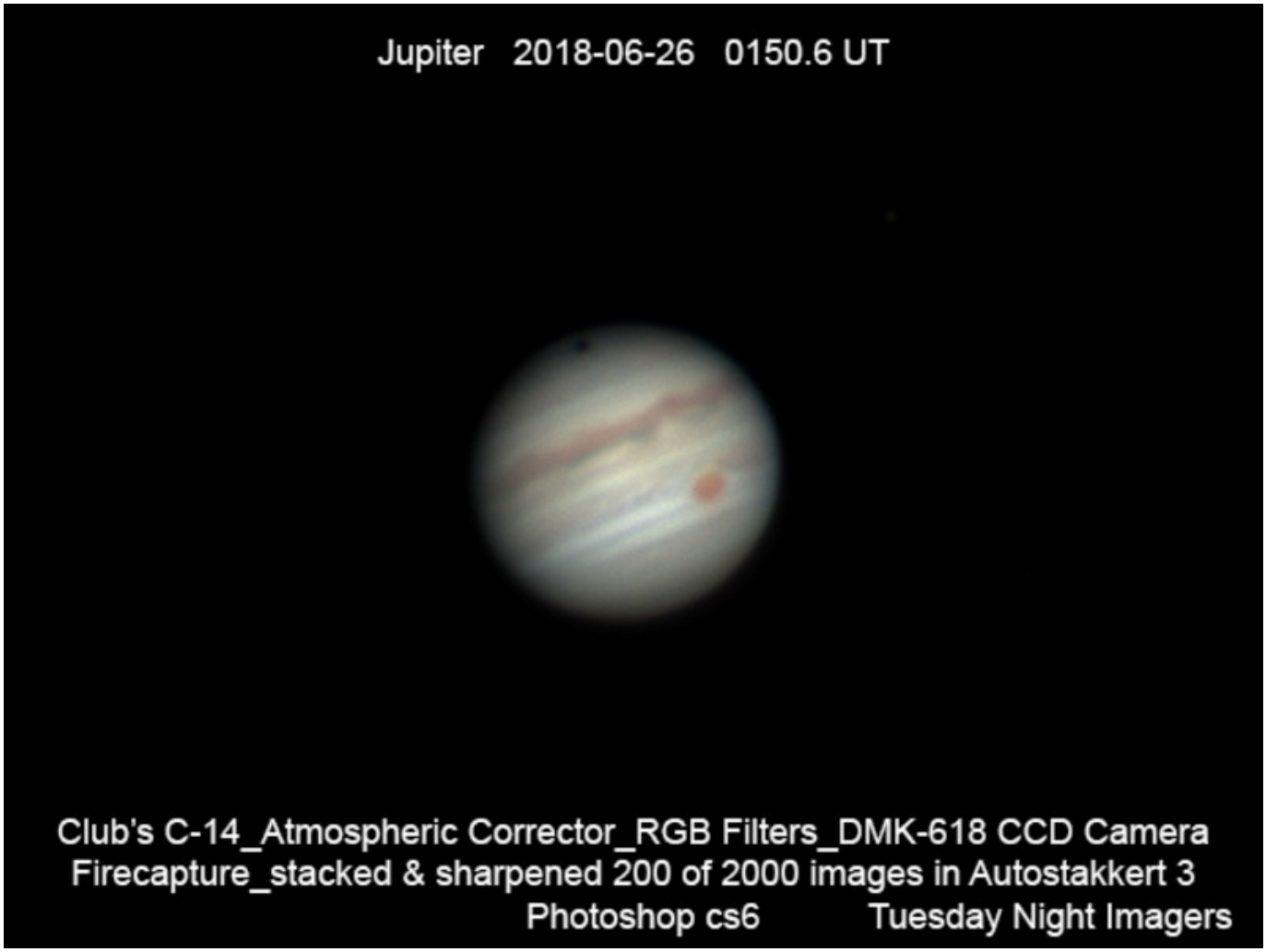
The Hubble Space Telescope is a project of international cooperation between NASA and ESA (European Space Agency). NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore, Maryland, conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy in Washington, D.C.



Mike Plotar



Mike Israel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Club's C-14_Atmospheric Corrector_RGB Filters_DMK-618 CCD Camera
Firecapture_stacked & sharpened 200 of 2000 images in Autostakkert 3
Photoshop cs6 Tuesday Night Imagers

Mike Plotar

15 Years in Space for NASA's Spitzer Space Telescope

Initially scheduled for a minimum 2.5-year primary mission, NASA's Spitzer Space Telescope has gone far beyond its expected lifetime -- and is still going strong after 15 years. Launched into a solar orbit on Aug. 25, 2003, Spitzer was the final of NASA's four Great Observatories to reach space. The space telescope has illuminated some of the oldest galaxies in the universe, revealed a new ring around Saturn, and peered through shrouds of dust to study newborn stars and black holes. Spitzer assisted in the discovery of planets beyond our solar system, including the detection of seven Earth-size planets orbiting the star TRAPPIST-1, among other accomplishments.

"In its 15 years of operations, Spitzer has opened our eyes to new ways of viewing the universe," said Paul Hertz, director of the Astrophysics Division at NASA Headquarters in Washington. "Spitzer's discoveries extend from our own planetary backyard, to planets around other stars, to the far reaches of the universe. And by working in collaboration with NASA's other Great Observatories, Spitzer has helped scientists gain a more complete picture of many cosmic phenomena."

A view into the past

Spitzer detects infrared light -- most often heat radiation emitted by warm objects. On Earth, infrared light is used in a variety of applications, including night-vision instruments.

With its infrared vision and high sensitivity, Spitzer has contributed to the study of some of the most distant galaxies in the known universe. The light from some of those galaxies traveled for 13.4 billion years to reach Earth. As a result, scientists see these galaxies as they were less than 400 million years after the birth of the universe.

Among this population of ancient galaxies was a surprise for scientists: "big baby" galaxies that were much larger and more mature than scientists thought early-forming galaxies could be. Large, modern galaxies are thought to have formed through the gradual merger of smaller galaxies. But the "big baby" galaxies showed that massive collections of stars came together very early in the universe's history. Studies of these very distant galaxies relied on data from both Spitzer and the Hubble Space Telescope, another one of NASA's Great Observatories. Each of the four Great Observatories collects light in a different wavelength range.

By combining their observations of various objects and regions, scientists can gain a more complete picture of the universe.

"The Great Observatories program was really a brilliant concept," said Michael Werner, Spitzer project scientist at NASA's Jet Propulsion Laboratory in Pasadena, California. "The idea of getting multispectral images or data on astrophysical phenomenon is very compelling, because most heavenly bodies produce radiation across the spectrum. An average galaxy like our own Milky Way, for example, radiates as much infrared light as visible wavelength light. Each part of the spectrum provides new information."

New worlds

In recent years, scientists have utilized Spitzer to study exoplanets, or planets orbiting stars other than our Sun, although this was not something the telescope's designers anticipated.

With Spitzer's help, researchers have studied planets with surfaces as hot as stars, others thought to be frozen solid, and many in between.

Spitzer has studied some of the nearest known exoplanets to Earth, and some of the most distant exoplanets ever discovered.

Spitzer also played a key role in one of the most significant exoplanet discoveries in history: the detection of seven, roughly Earth-size planets orbiting a single star. The TRAPPIST-1 planetary system was unlike any alien solar system ever discovered, with three of its seven planets located in the "habitable zone," where the temperature might be right for liquid water to exist on the planets' surfaces. Their discovery was an enticing step in the search for life elsewhere in the universe.

"The study of extrasolar planets was still in its infancy when Spitzer launched, but in recent years, often more than half of Spitzer's observation time is used for studies of exoplanets or searches for exoplanets," said Lisa Storrie-Lombardi, Spitzer's project manager at JPL. "Spitzer is very good at characterizing exoplanets, even though it wasn't designed to do that."

Some other major discoveries made using the Spitzer space telescope include:

-- The largest known ring around Saturn, a wispy, fine structure with 300 times the diameter of Saturn.

-- First exoplanet weather map of temperature variations over the surface of a gas exoplanet. Results suggested the presence of fierce winds.

-- Asteroid and planetary smashups. Spitzer has found evidence for several rocky collisions in other solar systems, including one thought to involve two large asteroids.

-- Recipe for "comet soup." Spitzer observed the aftermath of the collision between NASA's Deep Impact spacecraft and comet Tempel 1, finding that cometary material in our own solar system resembles that around nearby stars.

-- The hidden lairs of newborn stars. Spitzer's infrared images have provided unprecedented views into the hidden cradles where young stars grow up, revolutionizing our understanding of stellar birth.

-- Buckyballs in space. Buckyballs are soccer-ball-shaped carbon molecules discovered in laboratory research with multiple technological applications on Earth..

-- Massive clusters of galaxies. Spitzer has identified many more distant galaxy clusters than were previously known.

-- One of the most extensive maps of the Milky Way galaxyever compiled, including the most accurate map of the large bar of stars in the galaxy's center, created using Spitzer data from the Galactic Legacy Mid-Plane Survey Extraordinaire project, or GLIMPSE.

An extended journey

Spitzer has logged over 106,000 hours of observation time. Thousands of scientists around the world have utilized Spitzer data in their studies, and Spitzer data is cited in more than 8,000 published papers.

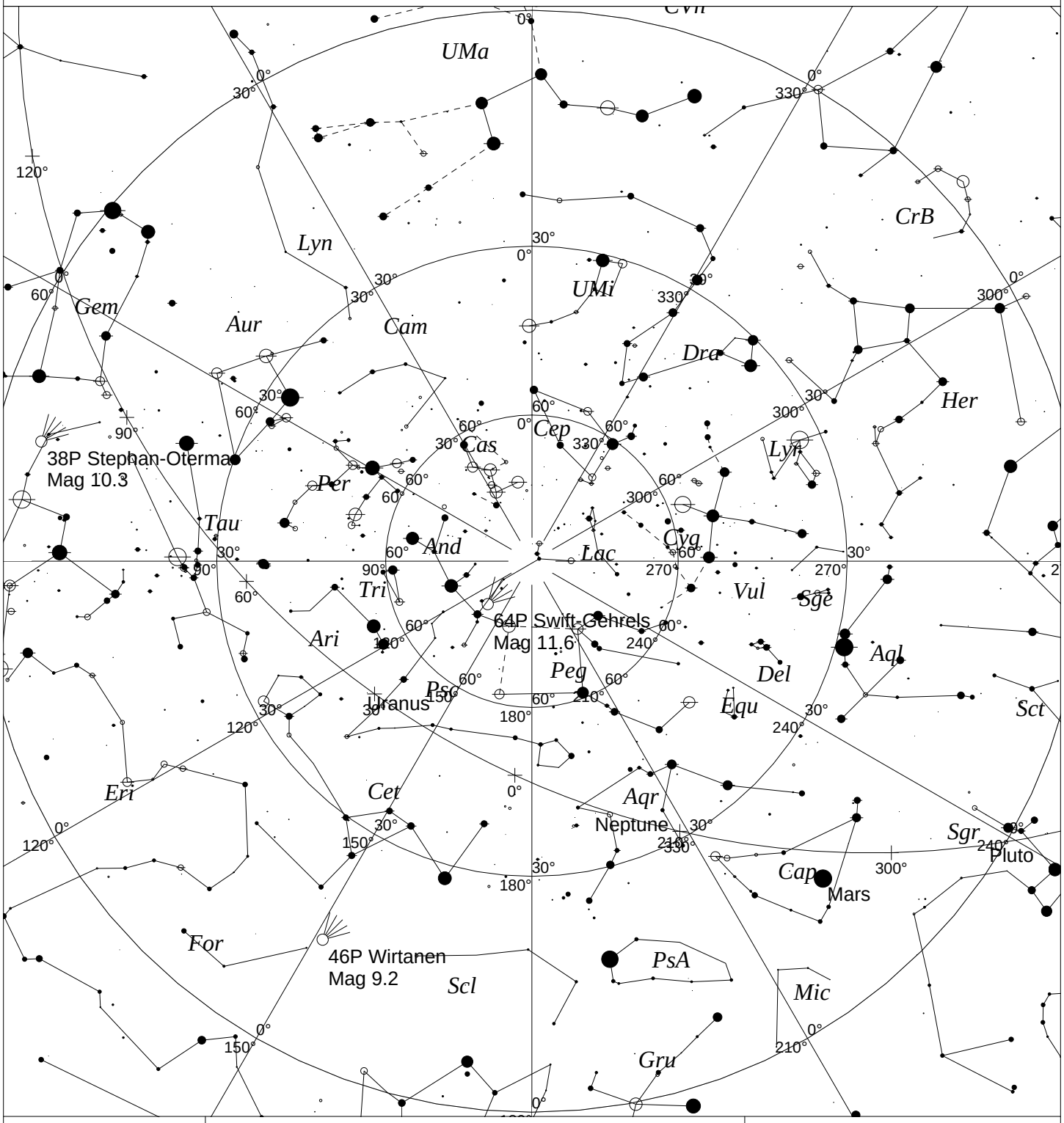
Spitzer's primary mission ended up lasting 5.5 years, during which time the spacecraft operated in a "cold phase," with a supply of liquid helium cooling three onboard instruments to just above absolute zero. The cooling system reduced excess heat from the instruments themselves that could contaminate their observations. This gave Spitzer very high sensitivity for "cold" objects.

In July 2009, after Spitzer's helium supply ran out, the spacecraft entered a so-called "warm phase." Spitzer's main instrument, called the Infrared Array Camera (IRAC), has four cameras, two of which continue to operate in the warm phase with the same sensitivity they maintained during the cold phase.
Spitzer orbits the Sun in an Earth-trailing orbit (meaning it literally trails behind Earth as the planet orbits the Sun) and has continued to fall farther and farther behind Earth during its lifetime. This now poses a challenge for the spacecraft, because while it is downloading data to Earth, its solar panels do not directly face the Sun. As a result, Spitzer must use battery power during data downloads. The batteries are then recharged between downloads.
"Spitzer is farther away from Earth than we ever thought it would be while still operating," said Sean Carey, manager of the Spitzer Science Center at Caltech in Pasadena, California. "This has posed some real challenges to the engineering team, and they've been extremely creative and resourceful to keep Spitzer operating far beyond its expected lifetime."

In 2016, Spitzer entered an extended mission dubbed "Spitzer Beyond." The spacecraft is currently scheduled to continue operations into November 2019, more than 10 years after entering its warm phase.
In celebration of Spitzer's 15 years in space, NASA has released two new multimedia products: The NASA Selfies app for iOS and Android, and the Exoplanet Excursions VR Experience for Oculus and Vive, as well as a 360-video version for smartphones. Spitzer's incredible discoveries and amazing images are at the center of these new products.

JPL manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at Caltech in Pasadena, California. Spacecraft operations are based at Lockheed Martin Space Systems Company, Littleton, Colorado. Data are archived at the Infrared Science Archive housed at the IPAC at Caltech. Caltech manages JPL for NASA. Article and image courtesy JPL and NASA

Oct 6, 2018 23:00:00 Beaver Meadow



STARS

<1	3.5
1.5	4
2	4.5
2.5	>5
3	

SYMBOLS

Multiple star	Dark nebula	Radio source
Variable star	Globular cluster	X-ray source
Comet	Open cluster	Other object
Galaxy	Planetary nebula	
Bright nebula	Quasar	

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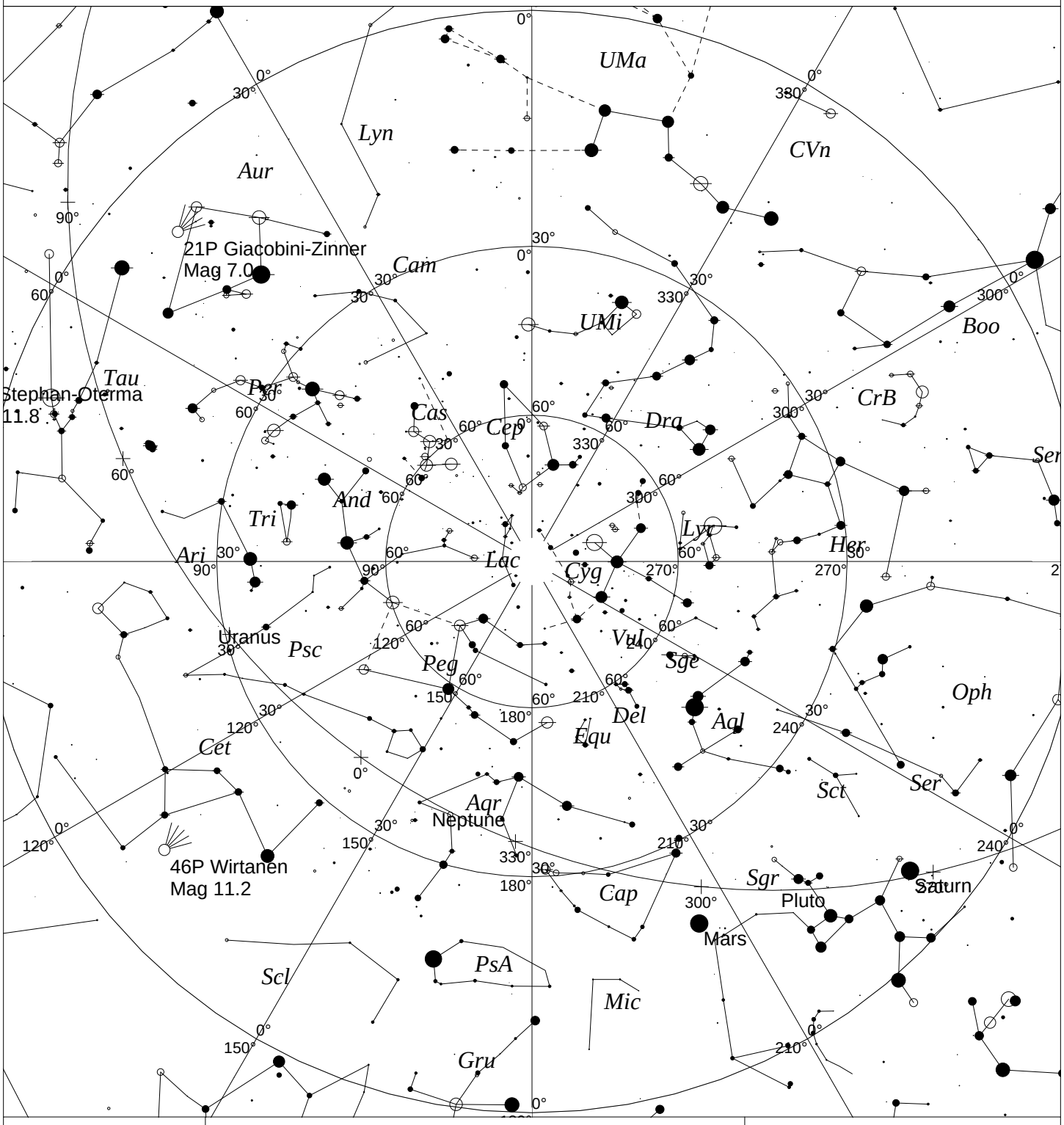
Sept 8, 2018 23:00:00 Wilson Star Search



STARS

<1	3.5
1.5	4
2	4.5
2.5	>5
3	

SYMBOLS

Multiple star	Dark nebula	Radio source
Variable star	Globular cluster	X-ray source
Comet	Open cluster	Other object
Galaxy	Planetary nebula	
Bright nebula	Quasar	

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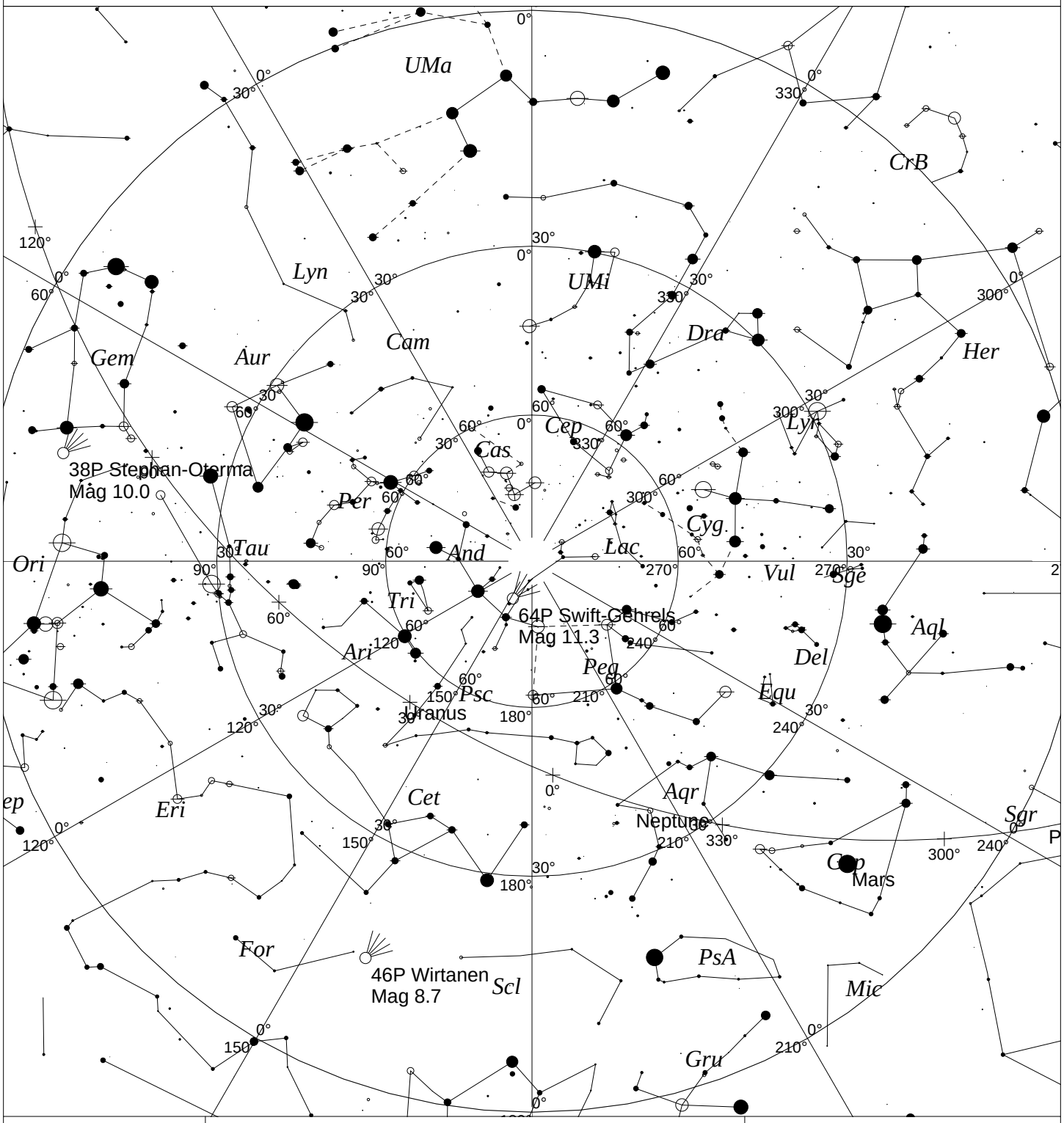

STARS			SYMBOLS		
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1.5	4		Variable star	Globular cluster	X-ray source
2	4.5		Comet	Open cluster	Other object
2.5	>5		Galaxy	Planetary nebula	
3			Bright nebula	Quasar	

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THE BUFFALO ASTRONOMICAL ASSOCIATION

(BAA) welcomes you to our organization.

The BAA is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers, and imagers.
The benefits of membership are:

- Access to our Dark Sky observing site in North Java -- a great place to observe the universe!
- A telescope loaner program -- borrow a BAA telescope and try observing for yourself!
- A monthly kids meeting, site orientation meeting, and general meeting with speakers of interest. Access to meeting videos on the BAA web site. - Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties)
- Meet other amateurs and share experiences, learn techniques, and swap stories.

The BAA is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.