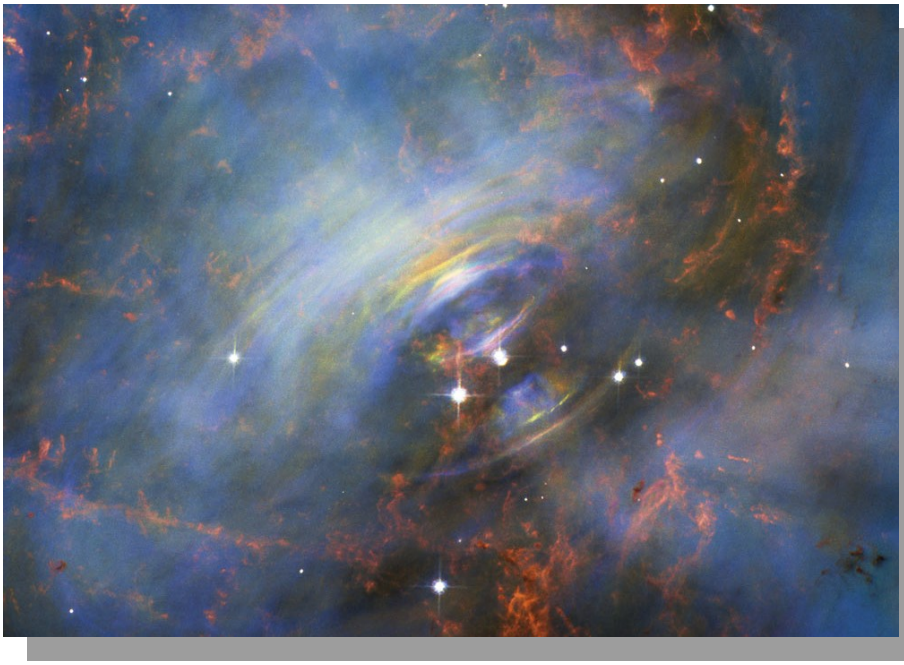
Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 25, No. 7 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *July 2017*

In This Issue

The Beating Heart of the Crab Nebula



See page 9 for details. *Image credit: NASA / ESA*

Membership Renewals Due

07/2017	Hockenberry/Miller Hunsinger Johnston
08/2017	Buki Knabb & Family Lurcott, L. Tiedemann
09/2017	Armored Lurcott, E. Proko

July 2017 Dates

1st • The Moon, Jupiter and Spica form a triangle in the southwest

6th • The Moon is near Saturn

9th • Full Moon, the Full Buck Moon or the Birds Shed Feathers Moon, 12:06 a.m. EDT

16h • Last Quarter Moon, 3:25 p.m. EDT

23rd • New Moon, 5:45 a.m. EDT

30th • First Quarter Moon, 11:23 a.m. EDT

30th • The Southern Delta Aquariid meteor shower peaks before dawn

CCAS Upcoming Nights Out

CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

☼ **Friday, July 14, 2017** - Friday Night Lights with the Natural Lands Trust - this is a fund raiser for the Natural Lands Trust where music is provided. Last year 600 people attended and it will be bigger this year! Several local astronomy clubs set up telescopes during the event. If you want to help with this event let me know so I can tell the organizers. You must bring a telescope or mounted astronomical binoculars to this event if you want to attend.

☼ **Saturday, August 12, 2017** - Hickory Run State Park and Perseid meteor shower.

Summer 2017 Society Events

July 2017

5th • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

13th-14th • The von Kármán Lecture Series: Five Years of Exploring Gale Crater with the Curiosity Mars Rover, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

14th • Friday Night Lights with the Natural Lands Trust - this is a fund raiser for the Natural Lands Trust where music is provided. Several local astronomy clubs are setting up telescopes for the concert goers to view the night sky during the event. If you are not a member of CCAS you must purchase tickets from the Natural Lands Trust at https://natlands.org/event/fridaynightlights2017/. CCAS members who want to assist with the astronomy portion of this event must bring a telescope or mounted astronomical binoculars to qualify for free admission. Members must contact Don Knabb by June 9th.

20th • Open call for articles and photographs for the August 2017 edition of Observations.

21st • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

26th • Deadline for newsletter submissions for the August 2017 edition of Observations.

August 2017

2nd • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

12th • Hickory Run State Park and Perseid meteor shower.

18th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

20th • Open call for articles and photographs for the September 2017 edition of Observations.

24th-25th • The von Kármán Lecture Series: 40 Years in Space: Voyager's Remarkable Journey Continues, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltec

26th • Deadline for newsletter submissions for the September 2017 edition of Observations.

Minutes from the May 9, 2017, CCAS Meeting

by Ann Miller, CCAS Secretary

- On May 9, 2017, Roger Taylor welcomed 34 guests and members to the last meeting of the 2016-2017 schedule of CCAS.
- Roger thanked all who participated in the "Astronomy Day Miracle" at Nottingham Park Star Party.
- Our upcoming events are:
  - Anson Nixon Park Star Party in Kennett Square, PA on May 13
  - A rescheduled star party at Bucktoe Preserve on May 20
  - Friday Night Lights Star Party at ChesLen Preserve on July 14
- Don Knabb introduced our first guest of the evening, Science Fiction author, Jack McDevitt.
  - Jack has authored 22 novels and counting including the Priscilla Hutchins series.
  - Jack shared that he first became interested in Science Fiction when his father took him to Flash Gordon and Buck Rodgers movies at the Bell Theater in South Philly in the 1940's.
  - He published his first story in Twilight Zone Magazine in 1981.
  - Jack answered our questions about writing science fiction stories.
  - Jack shared copies of his novel "Starhawk" with our club and was gracious enough to sign them for us.
  - He left us with these concluding remarks that "most of us underestimate what we are capable of doing."
  - We also would like to thank Jack's son, Chris, for accompanying him to Pennsylvania from Georgia.
- David Hockenberry introduced our second speaker of the evening, Dr. Edward Guinan, Professor of Astronomy and Astrophysics at Villanova University.
  - Dr. Guinan presented "Proxima b: The Alien Next Door-Is Anyone Home?"
  - For further information on exoplanet census, go to http://phl.upr.edu/projects/habitable-exoplanets-catalog and Kepler.nasa.gov.
  - The website for Living with a Red Dwarf is www.astronomy.villanova.edu/lward.
- Pete Kellerman announced that he will be attending the Cherry Springs Star Party on June 22-25, 2017. Please contact him if anyone else from our club is attending.
- Planetary Society handouts and eclipse glasses were available again for our members.

September 2017 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on September 12, 2017, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Our guest speaker is Gordon Richards, Ph.D., from Drexel University, who will present "The LSST and Upcoming Discoveries."

Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

As for future meetings, we are looking for presenters for our Fall 2017 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Jupiter Has Two New Moons—And Five Lost Ones Have Been Found

By Nicole Kiefert, Courtesy of Astronomy Magazine

A montage of images taken by Voyager of Jupiter and four of its moons: Io, Europa, Ganymede, and Callisto. Image Credit: NASA/JPL

As if the gas giant wasn't impressive enough, Jupiter's already long list of moons has just grown by two.

While on the hunt for Planet X, DTM staff scientist Scott Sheppard, along with David Tholen from the University of Hawaii and Chadwick Trujillo from Northern Arizona University, decided to point their telescopes toward Jupiter. From there, the team could study Jupiter in the foreground while continuing their search for Planet X in the background.

While making those observations, they discovered many "lost" moons in addition to two new, mile-wide moons they're calling S/2016 J 1 and S/2017 J 1. The new moons lie about 13 million miles (21 million kilometers) and 15 million miles (24 million kilometers) from Jupiter.

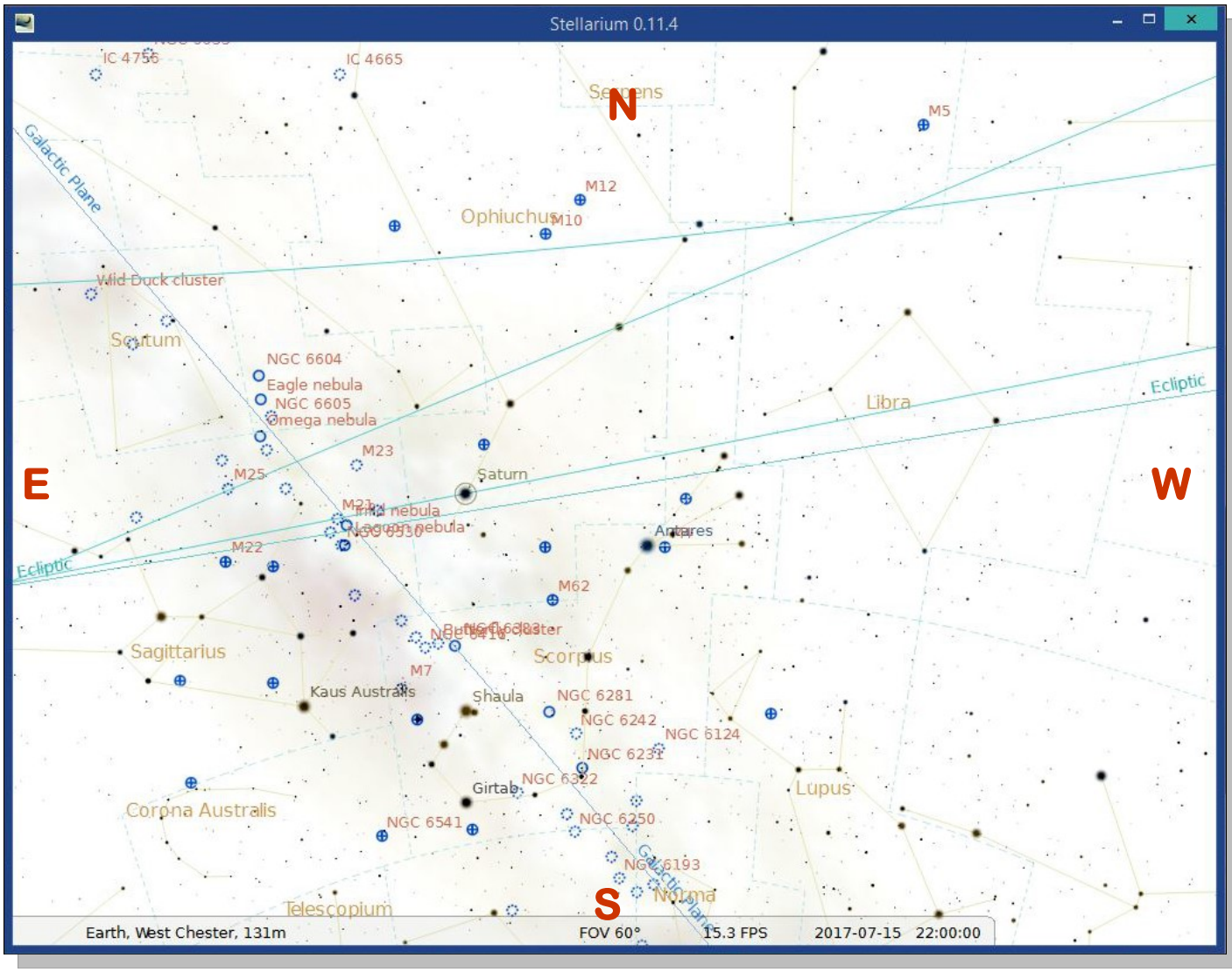
Several of the moons Sheppard's team found qualify as lost moons - despite their discovery back in 2003, there was not enough information to define their exact orbits, so astronomers lost track of them as they circled Jupiter. Some moons have been found since that time, but at the beginning of 2016, 14 were still considered lost.

(Continued on page 9)

The Sky Over Chester County

July 15, 2017 at 10:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
7/01/2017	5:03 a.m. EDT	5:35 a.m. EDT	8:33 p.m. EDT	9:05 p.m. EDT	14h 57m 16s
7/15/2017	5:12 a.m. EDT	5:44 a.m. EDT	8:28 p.m. EDT	8:59 p.m. EDT	14h 43m 17s
7/31/2017	5:28 a.m. EDT	5:58 a.m. EDT	8:15 p.m. EDT	8:45 p.m. EDT	14h 16m 27s

Moon Phases					
			Full Moon	7/09/2017	12:06 a.m. EDT
Last Quarter	7/16/2017	3:25 p.m. EDT	New Moon	7/23/2017	5:45 a.m. EDT
First Quarter	7/30/2017	11:23 a.m. EDT			

July 2017 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1	**The Moon, Jupiter and Spica form a triangle in the southwest**
2	**The Lunar Straight Wall (Rupes Recta) is visible**
6	**The Moon is near Saturn**
9	**Full Moon, the Full Buck Moon or the Birds Shed Feathers Moon, 12:06 a.m. EDT**
16	**Last Quarter Moon, 3:25 p.m. EDT**
23	**New Moon, 5:45 a.m. EDT**
28	**The Moon is near Jupiter**
30	**First Quarter Moon, 11:23 a.m. EDT**
30	**The Southern Delta Aquariid meteor shower peaks before dawn**
31	**The Lunar Straight Wall (Rupes Recta) is visible**

The best sights this month: Jupiter and Saturn lead the show during July, and with the southern constellations hitting center stage be sure to seek out the vast collection of Messier objects in that area of the sky. Warm nights, fireflies, star clusters, nebula and planets – it doesn't get much better!

Mercury: The best day to see Mercury during July is the 19th when it is about 8 degrees above the horizon a half hour after sunset. Then on the 25th it is about 1 degree from the first magnitude star Regulus in the constellation Leo the Lion.

Venus: The "morning star" continues to shine like brightly in the pre-dawn glow.

Mars: Mars passes behind the Sun on July 27th so it is not visible this month.

Jupiter: Jupiter continues to light up the southwest sky and is visible well before darkness falls. Watch the dance of the four Galilean moons as they change from hour to hour, night to night. Then bump up the power and look for the Great Red Spot!

Saturn: Saturn was at opposition in mid-June so it is now in excellent position for evening viewing. And look at those rings! They look substantial but are really extremely thin. If we made a model of the rings using a DVD disk, we would need to make the disk two miles in diameter to maintain the correct thickness to diameter ratio!

Uranus and Neptune: The distant gas giants can only be seen just before morning twilight during July.

The Moon: Full Moon is on July 9th. Native Americans called this the Full Buck Moon because July is normally the month when the new antlers of buck deer push out of their foreheads with coatings of velvety fur. It was also often called the Full Thunder Moon, since thunderstorms are most frequent during this time of year. This Full Moon has also been called the Full Hay Moon. Native Canadians called this the Birds Shed Feathers Moon.

Constellations: I love the warm July nights! Settle back in a lounge chair on a clear July night and enjoy the wonderful stars of summer! In the west is bright Arcturus in Boötes with the beautiful Corona Borealis, the Northern Crown, just to its east. Then we pass through Hercules to the Summer Triangle with the Milky Way filling the spaces within the triangle. Lean back with a pair of binoculars and gaze into the triangle and you will see hundreds of stars!

Messier/deep sky: While the southern constellations of summer, Sagittarius and Scorpius, are visible don't miss the chance to gaze into the heart of the Milky Way. M4, a globular cluster near red Antares in Scorpius is a nice sight in binoculars or a telescope. Two of my favorite open clusters are low in the south: M6 and M7. These are easy to find if you use the tail of Scorpius as a guide. Then head north to find M22, a nice globular cluster, and continue north to find the Swan Nebula, M17. Open clusters, a globular cluster and a nebula all in one area of the sky, and that is just scratching the surface of the southern summer sky!

Comets: Comet Johnson (C/2015 V2) is visible during the evening observing hours during July. The comet should reach magnitude 6 or 7 if predictions

(Continued on page 10)

The Shape of the Solar System

by Marcus Woo

When Stamatios (Tom) Krimigis was selected for the Voyager mission in 1971, he became the team's youngest principal investigator of an instrument, responsible for the Low Energy Charged Particles (LECP) instrument. It would measure the ions coursing around and between the planets, as well as those beyond. Little did he know, though, that more than 40 years later, both Voyager 1 and 2 still would be speeding through space, continuing to literally reshape our view of the solar system.

The solar system is enclosed in a vast bubble, carved out by the solar wind blowing against the gas of the interstellar medium. For more than half a century, scientists thought that as the sun moved through the galaxy, the interstellar medium would push back on the heliosphere, elongating the bubble and giving it a pointy, comet-like tail similar to the magnetospheres—bubbles formed by magnetic fields—surrounding Earth and most of the other planets

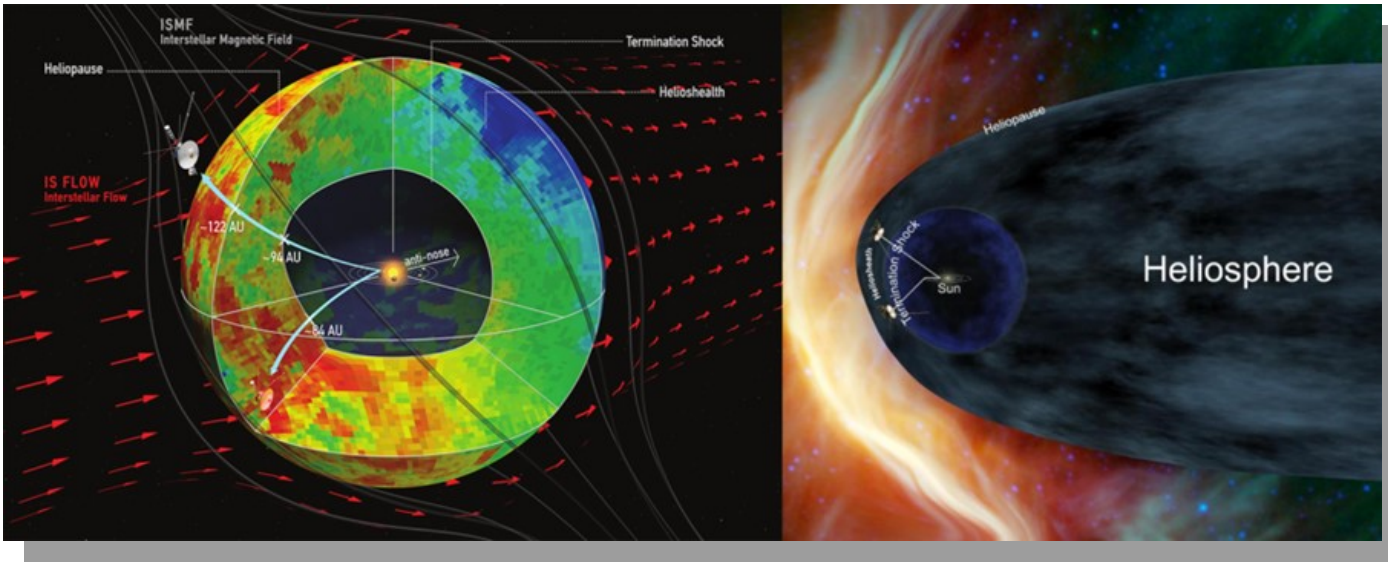
"We in the heliophysics community have lived with this picture for 55 years," said Krimigis, of The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. "And we did that because we didn't have any data. It was all theory."

But now, he and his colleagues have the data. New measurements from Voyager and the Cassini spacecraft suggest that the bubble isn't pointy after all. It's spherical.

Their analysis relies on measuring high-speed particles from the heliosphere boundary. There, the heated ions from the solar wind can strike neutral atoms coming from the interstellar medium and snatch away an electron. Those ions become neutral atoms, and ricochet back toward the sun and the planets, uninhibited by the interplanetary magnetic field.

Voyager is now at the edge of the heliosphere, where its LECP instrument can detect those solar-wind ions. The researchers found that the number of measured ions rise and fall with increased and decreased solar ac-

(Continued on page 7)



Caption: New data from NASA's Cassini and Voyager show that the heliosphere — the bubble of the sun's magnetic influence that surrounds the solar system — may be much more compact and rounded than previously thought. The image on the left shows a compact model of the heliosphere, supported by this latest data, while the image on the right shows an alternate model with an extended tail. The main difference is the new model's lack of a trailing, comet-like tail on one side of the heliosphere. This tail is shown in the old model in light blue. Image credits: Dialynas, et al. (left); NASA (right)

Space Place (Cont'd)

(Continued from page 6)

tivity, matching the 11-year solar cycle, showing that the particles are indeed originating from the sun.

Meanwhile, Cassini, which launched 20 years after Voyager in 1997, has been measuring those neutral atoms bouncing back, using another instrument led by Krimigis, the Magnetosphere Imaging Instrument (MIMI). Between 2003 and 2014, the number of measured atoms soared and dropped in the same way as the ions, revealing that the latter begat the former. The neutral atoms must therefore come from the edge of the heliosphere.

If the heliosphere were comet-shaped, atoms from the tail would take longer to arrive at MIMI than those from the head. But the measurements from MIMI, which can detect incoming atoms from all directions, were the same everywhere. This suggests the distance to the heliosphere is the same every which way. The heliosphere, then, must be round, upending most scientists' prior assumptions.

It's a discovery more than four decades in the making. As Cassini ends its mission this year, the Voyager spacecraft will continue blazing through interstellar space, their remarkable longevity having been essential for revealing the heliosphere's shape.

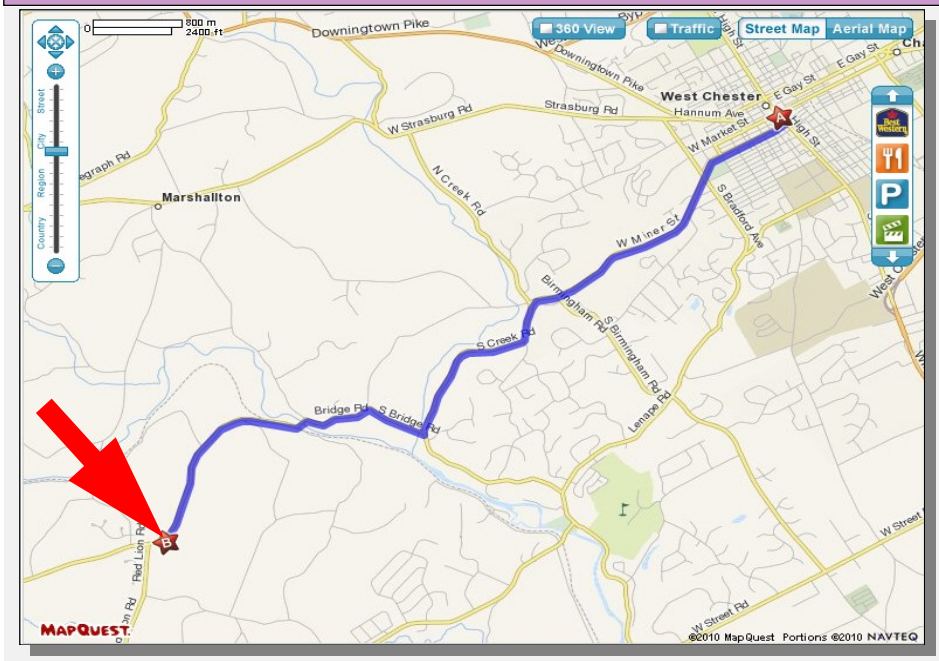
"Without them," Krimigis says, "we wouldn't be able to do any of this."

To teach kids about the Voyager mission, visit the NASA Space Place: https://spaceplace.nasa.gov/voyager-to-planets

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!

CCAS Directions



Brandywine Red Clay Alliance
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

Through The Eyepiece: Messier 7, Ptolemy's Cluster

by Don Knabb, CCAS Treasurer & Observing Chair

Image Credit: Stellarium.org

During the summer months I find myself irresistibly drawn to the southern sky. This part of the sky is visible to us for only a few months, and it is full of incredible objects to gaze upon. One of these objects is the open cluster Messier 7.

Messier 7 or M7, also designated NGC 6475 and sometimes known as Ptolemy's Cluster, is an open cluster of stars in the constellation of Scorpius. From a dark sky site, the cluster is easily detectable with binoculars, close to the "stinger" of Scorpius.

M7 has been known since antiquity. This great open star cluster is most often credited to Ptolemy, who listed it in his 'Almagest' as Object Number 567 in 130 AD. From his notes he describes it as "A nebulous cluster following the sting of Scorpius." Italian astronomer Giovanni Batista Hodierna observed it before 1654 and counted 30 stars in it. In 1764, French astronomer Charles Messier catalogued the cluster as the seventh member in his list of comet-like objects. English astronomer John Herschel described it as "coarsely scattered clusters of stars".

Telescopic observations of the cluster reveal about 80 stars within a field of view of 1.3° across. One of the easiest ways to find "Ptolemy's Cluster" is to recognize the two familiar constellation asterisms of Scorpius and Sagittarius. The bright star that represents the 'stinger' on the tail of the Scorpion is Lambda. Aim your binoculars three finger widths east (left). Under dark skies it will show as a conspicuous patch in the sky, but do not confuse it with its dimmer, northwestern neighbor, M6, The Butterfly Cluster. In binoculars, Messier 7's stars will appear of varied brightness with no particular pattern and will occupy about 1/3 the field of view in average binoculars.

M7 is easily seen in the finder scope of a telescope. Or, use lowest magnification when ob-

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Eyepiece (Cont'd)

(Continued from page 8)

serving with any telescope because of Messier 7′s large apparent size. Because it is so bright, this open cluster is a great object on a moonlit night and larger telescopes can fully resolve its members.

This bright collection of about 80 mixed magnitude stars is estimated to be about 800-1000 light years away from Earth. Moving along through space in an area spanning about 18-25 light years across, this group of stars were all born about the same time some 220 million years ago.

Information credits:

Dickinson, Terence 2006. *Nightwatch: a practical guide to viewing the universe.* Buffalo, NY. Firefly Books
http://www.universetoday.com/31228/messier-7/
http://en.wikipedia.org/wiki/Messier_7
http://www.eso.org/public/images/eso1406a/

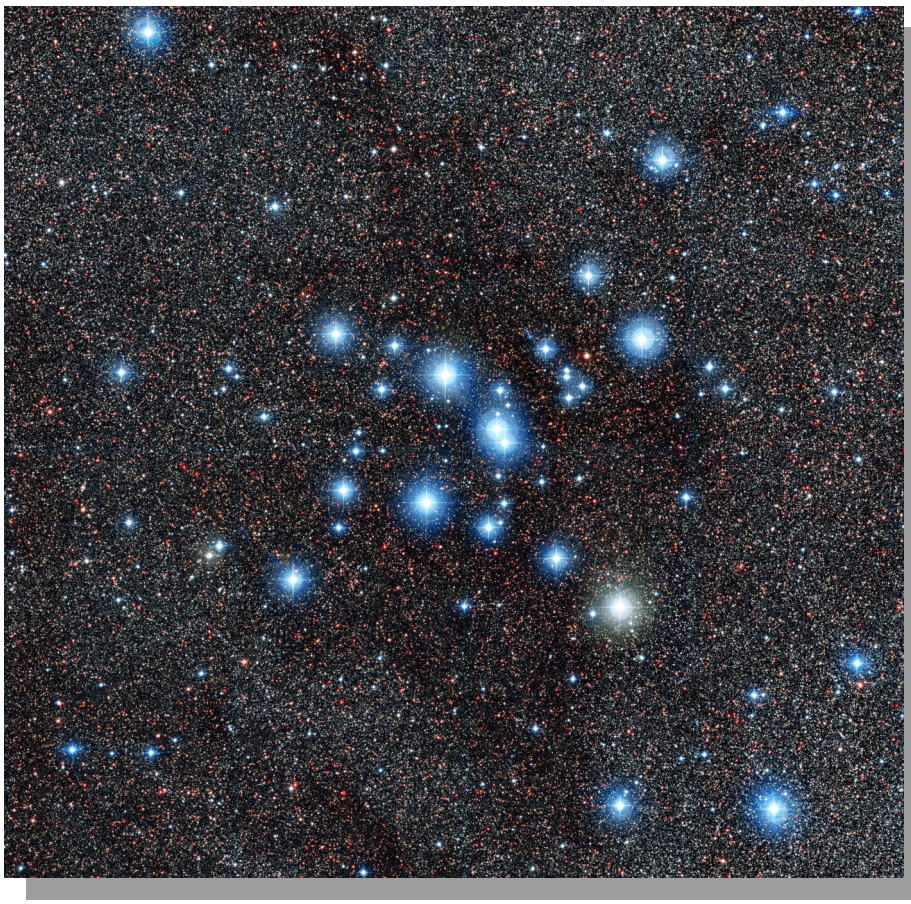


Image credit: ESO (European Southern Observatory) licensed under a Creative Commons Attribution 4.0 International License

Jupiter (Cont'd)

(Continued from page 3)

While observing, Sheppard and his team added their data from 2016-2017 to data from 2003 and found five of those lost moons. They will continue observing for another year to see if they can identify the rest of the lost moons; they may find more new moons, too.

In the meantime, after checking their 2016-2017 data against images taken in 2003, the team confirmed that S/2016 J 1 and S/2017 J 1 are previously undiscovered moons, bringing the number of Jupiter's moons up to 69.

On the Cover: Beating Heart of the Crab Nebula

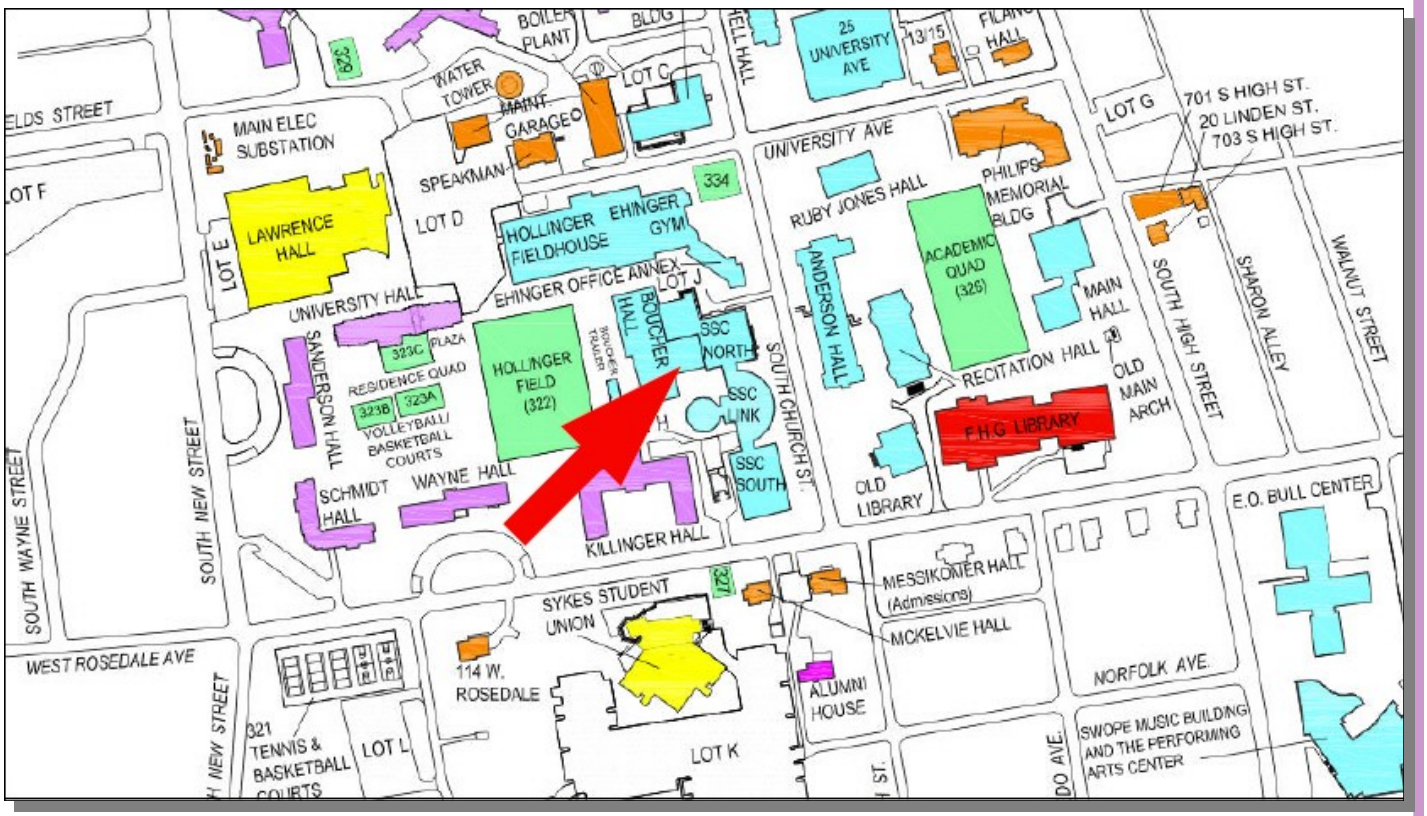
by Steve Cariddi , The Year in Space

Peering deep into the core of the Crab Nebula, this close-up image reveals the beating heart of one of the most historic and intensively studied remnants of a supernova, an exploding star. The inner region sends out clock-like pulses of radiation and tsunamis of charged particles embedded in magnetic fields. The neutron star at the very center of the Crab Nebula has about the same mass as the Sun but compressed into an incredibly dense sphere that is only a few miles across. Spinning thirty times a second, the neutron star shoots out detectable beams of energy that make it look like it's pulsating. This NASA Hubble Space Telescope snapshot is centered on the region around the neutron star (the rightmost of the two bright stars near the center of this image).

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).



Minutes (Cont'd)

(Continued from page 5)

hold true. A sky map is in the July issue of Astronomy Magazine or use your favorite astronomy app to find this visitor from the depths of the solar system.

Meteor showers: The Delta Aquariid meteor shower peaks the night of July 29/30. We won't have an impressive shower, but one might see 25 fast meteors per hour from a dark site. This meteor shower has a broad peak, so you can look a day or two before or after the peak and still see meteors.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

June 2017 Financial Summary

Beginning Balance	$1,337
Deposits	$90
Disbursements	$89
Ending Balance	$1,338

New Member Welcome!

Welcome new CCAS members Linda Harris from Malvern, PA, and Jack McDevitt from Brunswick, GA. We're glad you decided to rejoin us under the stars! Clear skies to you!

Membership Renewals

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

Don Knabb
988 Meadowview Lane
West Chester PA 19382

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

CCAS Information Directory

Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $30.00 for one year. Send to:

International Dark-Sky Association
3225 North First Avenue
Tucson, AZ 85719

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

For more information, including links to helpful information sheets, visit the IDA web site at:

http://www.darksky.org

Dark-Sky Website for PA

PENNSYLVANIA OUTDOOR LIGHTING COUNCIL

The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

http://www.POLCouncil.org

Find out about Lyme Disease!

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

http://www.LymePA.org

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

Starry Night Lights

Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Park City, Utah.

Phone: **877-604-7377**
Fax: **877-313-2889**

http://www.starrynightlights.com

★ ★ ★ ★ ★

LIGHTHOUSE OUTDOOR LIGHTING

Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. Lighthouse's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Phone: **484-291-1084**

https://www.lighthouse-lights.com/landscape-lighting-design/pa-west-chester/

Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided only as a service to our members and the general public.

Skies UNLIMITED

Skies Unlimited is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, Stellarvue, Takahashi, Vixen, Losmandy and more.

Skies Unlimited
Suburbia Shopping Center
52 Glocker Way
Pottstown, PA 19465

Phone: **610-327-3500** or **888-947-2673**
Fax: **610-327-3553**

http://www.skiesunlimited.net

★ ★ ★ ★ ★

Spectrum Scientifics
Quality Science Products for All Ages

Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

4403 Main Street
Philadelphia, PA 19127

Phone: **215-667-8309**
Fax: **215-965-1524**

Hours:
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM to 5PM

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings, and on the CCAS website. Barb's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us**

Or mail the contribution, typed or handwritten, to:

John Hepler
21103 Striper Run
Rock Hall, MD 21661

CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

CCAS Website

John Hepler is the Society's Webmaster. You can check out our Website at:
http://www.ccas.us

John welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work—no copyrighted material! Give your contributions to John Hepler at (410) 639-4329 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President:	Roger Taylor 610-430-7768
Vice President:	Liz Smith 610-842-1719
ALCor, Observing, and Treasurer:	Don Knabb 610-436-5702
Secretary:	Ann Miller 610-558-4248
Librarian:	Barb Knabb 610-436-5702
Program:	Dave Hockenberry 610-558-4248
Education:	Kathy Buczynski 610-436-0821
Webmaster and Newsletter:	John Hepler 410-639-4329
Public Relations:	Deb Goldader 610-304-5303

CCAS Membership Information

The present membership rates are as follows:

REGULAR MEMBER……$25/year
SENIOR MEMBER…….$10/year
STUDENT MEMBER……..$ 5/year
JUNIOR MEMBER……..$ 5/year
FAMILY MEMBER…….$35/year

Membership Renewals

Check the Membership Renewals on the front of each issue of *Observations* to see if it is time to renew. If you need to renew, you can mail your check, made out to "Chester County Astronomical Society," to:

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

Phone: **610-436-5702**
e-mail: **treasurer@ccas.us**

*Sky & Tele*scope Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$32.95,** much less than the newsstand price of $66.00, and also cheaper than individual subscriptions ($42.95)! Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

To **start** a **new** subscription, make **sure** you make out the check to the **Chester County Astronomical Society**, note that it's for *Sky & Telescope*, and mail it to Don Knabb.

To **renew** your "club subscription" contact Sky Publishing directly. Their phone number and address are in the magazine and on their renewal reminders. If you have **any** questions call Don first at 610-436-5702.

Astronomy Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of $42.95 (or $60.00 for two years). If you want to participate in this special Society discount offer, **contact our Treasurer Don Knabb.**