



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 23, No. 4

Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009

April 2015

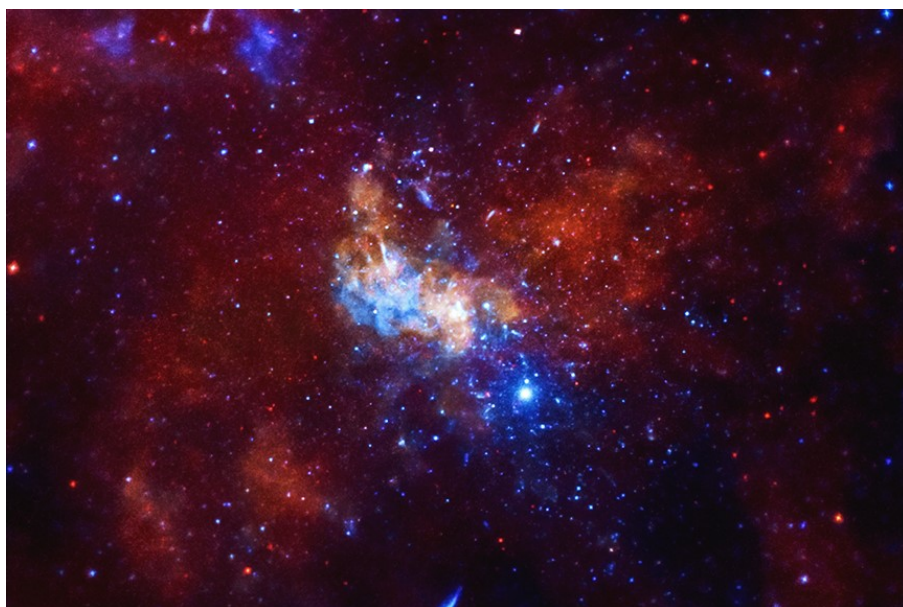
In This Issue

CCAS Winter/Spring 2015 Events	2
Minutes from the March 2015 Meeting	2
April 2015 Meeting	3
Sagittarius A* Imaging	3
The Sky Over Chester County: April 2015	4
April 2015 Observing Highlights	5
Looking Up: Mizar & Alcor ...	6
NASA Space Place	8
CCAS Directions: Brandywine Valley Association	9
Membership Renewals	10
New Member Welcome	10
CCAS Directions: WCU Map	10
Treasurer's Report	10
CCAS Information Directory	11-12

Membership Renewals Due

04/2015	Armored Imburgia Miller Richter
05/2015	Cunningham Fletcher O'Hara
06/2015	Hebding Mazziotta & Calobrisi

Sagittarius A*: Chandra Images Supermassive Black Hole



NASA X-ray Telescopes Find Black Hole May Be a Neutrino Factory. See pg. 3.

Important April 2015 Dates

- 4th** • Full Moon, 8:07 a.m.
- 4th** • Total Lunar Eclipse: Totality not Visible in Chester County.
- 11th** • Last Quarter Moon, 11:46 p.m.
- 18th** • New Moon, 2:58 p.m.
- 22nd** • Lyrid Meteor Shower Peaks.
- 25th** • First Quarter Moon, 7:56 p.m.



CCAS Upcoming Nights Out

CCAS has several "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.

- ☼ **Saturday, April 18, 2015.** CCAS special observing session at Nottingham County Park.
- ☼ **Saturday, May 23, 2015.** Cheslin multi-club star party in Coatesville, PA, with Chesmont, CCAS, DVAA, and BucksMont participating.
- ☼ **Saturday, June 6, 2015.** CCAS special observing session at Anson Nixon Park in Kennett Square, PA.

Spring 2015 Society Events

April 2015

1st • 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.

3rd • West Chester University Planetarium Live Show: "Walking on the Moon," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

14th • CCAS monthly meeting in Room 112, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. Guest speaker is Paul Halpern, "Einstein's Dice and Schrodinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory."

18th • CCAS special observing session at Nottingham County Park.

20th • Open call for articles and photographs for the May 2015 edition of [Observations](#).

23rd-24th • The von Kármán Lecture Series: [Robots to the Rescue! JPL's RoboSimian and Surrogate Robots are here to Help](#), at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

26th • Deadline for newsletter submissions for the May 2015 edition of [Observations](#).

May 2015

1st • West Chester University Planetarium Live Show: "Pluto Demoted," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

6th • 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.

9th • CCAS special observing session at Hoopes Park in West Chester, PA.

14th • CCAS monthly meeting in Room 112, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. CCAS Member Speaker: John Conrad, NASA Solar System Ambassador, "NEOs – and Other Dangers from Space."

21st-22nd • The von Kármán Lecture Series: [The Search for Planets, Habitability, and Life in Our Galaxy](#), at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the June 2015 edition of [Observations](#).

20th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA. The observing session starts at sunset.

23rd • Cheslen multi-club star party in Coatesville, PA, with Chesmont, CCAS, DVAA, and BucksMont participating.

26th • Deadline for newsletter submissions for the June 2015 edition of [Observations](#).

Minutes from March 2015 Meeting

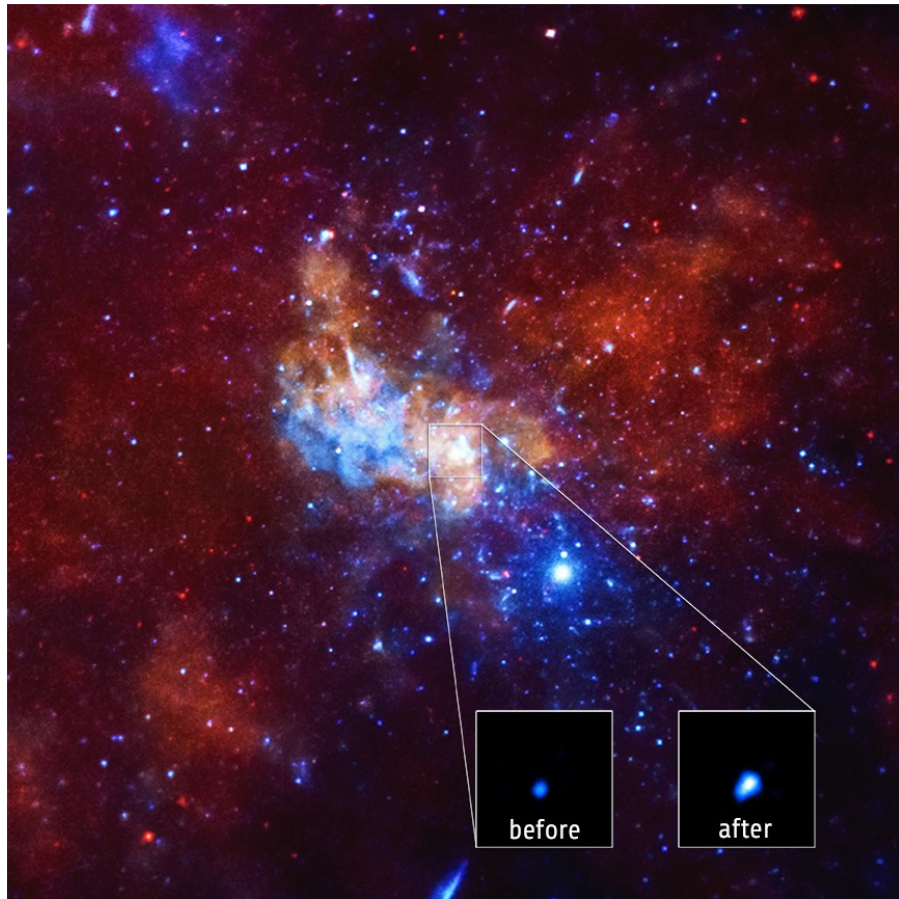
by Ann Miller, CCAS Secretary

- Dave Hockenberry, CCAS program chair, welcomed 17 members and guests to our yearly Members Night on March 10, 2015.
- Dave reminded members that Professor Paul Halpern will return to CCAS for our April meeting to present the release of his latest book, "Einstein's Dice and Schrodinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory."
- May's meeting will be presented by our own, John Conrad, NASA ambassador.
- David thanked our newsletter editor and webmaster, John Hepler for all of the hard work he has contributed to our club even at a distance over the last few years. He was presented with a CCAS sweatshirt and tee-shirt.
- Don Knabb presented Stellarium for the monthly night sky. He also announced upcoming star parties:
 - Bucktoe Preserve-March 21 which has now been rescheduled to April 25 due to weather
 - April 18-Nottingham Park in Nottingham, PA
 - May 9-Hoopes Park in West Chester, PA
 - Memorial Day weekend May 23-Cheslen multi-club star party in Coatesville, PA, with Chesmont, CCAS, DVAA, and BucksMont participating.
 - June 6-Anson Nixon Park in Kennett Square, PA
- Don Knabb led off the member presentations with Enhancements that he has made to his Orion "Go To" Dobsonian telescope.
- Pete Kellerman taught a night school class in astronomy for the last 20 years. He shared his experience on how to teach students to observe with the telescope that they have. Time to revisit that 60mm Tasco.
- Ed Lurcott, CCAS founder, shared how he got his start in astronomy.
 - His father, a machinist, was asked to make improvement on a 4" refractor.
 - In 1940 he saw Cunningham's comet as a 12 year old and was hooked. Ed shared photos of the 10" telescope that his father built and Ed later upgraded with a stepper motor and computer.
 - In 1986, Ed took an astronomy course at WCU. The professor from the course invited Ed to the lab class for the astronomy course and he became an Adjunct Professor at WCU.
 - Ed shared photos of the faculty and staff including himself from that era. Ed also built his own hair line micrometer to

(Continued on page 9)

Sagittarius A*: NASA X-ray Telescopes Find Black Hole May Be a Neutrino Factory

by Lee Mohon, Ed., Chandra X-ray Observatory, Cambridge, Massachusetts, NASA Headquarters, Washington, D.C.



On September 14, 2013, astronomers caught the largest X-ray flare ever detected from the su-

permissive black hole at the center of the Milky Way, known as Sagittarius A* (Sgr A*). This

event, which was captured by NASA's Chandra X-ray Observatory, was 400 times brighter than the usual X-ray output from Sgr A*, as described in the press release. The main portion of this graphic shows the area around Sgr A* in a Chandra image where low, medium, and high-energy X-rays are red, green, and blue respectively. The inset boxes contain images of the region close to Sgr A* and show the giant flare, along with much steadier X-ray emission from a nearby magnetar, to the lower left. A magnetar is a neutron star with a strong magnetic field. A little more than a year later, astronomers saw another flare from Sgr A* that was 200 times brighter than its normal state in October 2014.

Astronomers have two theories about what could be causing these "megafares" from Sgr A*. The first idea is that the strong gravity around Sgr A* tore apart an asteroid in its vicinity, heating the debris to X-ray-emitting temperatures before devouring the remains. Their other proposed explanation involves the strong magnetic fields around the black hole. If the magnetic field lines reconfigured themselves and reconnected, this could also create a large burst of X-rays. Such events are seen regularly on the Sun and the events around Sgr A* appear to have a similar pattern in intensity levels to those.

Sgr A* is about 4.5 million times the mass of our Sun and is located about 26,000 light years from Earth. Researchers

(Continued on page 7)

April 2015 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on April 14, 2015, starting at 7:30 p.m. The meeting will be held in Room 112, Merion Science Center (former Boucher Building), West Chester University. Our guest speaker is Paul Halpern, who will present his new book, "Einstein's Dice and Schrodinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory."

Please note that inclement weather or changes in speakers'

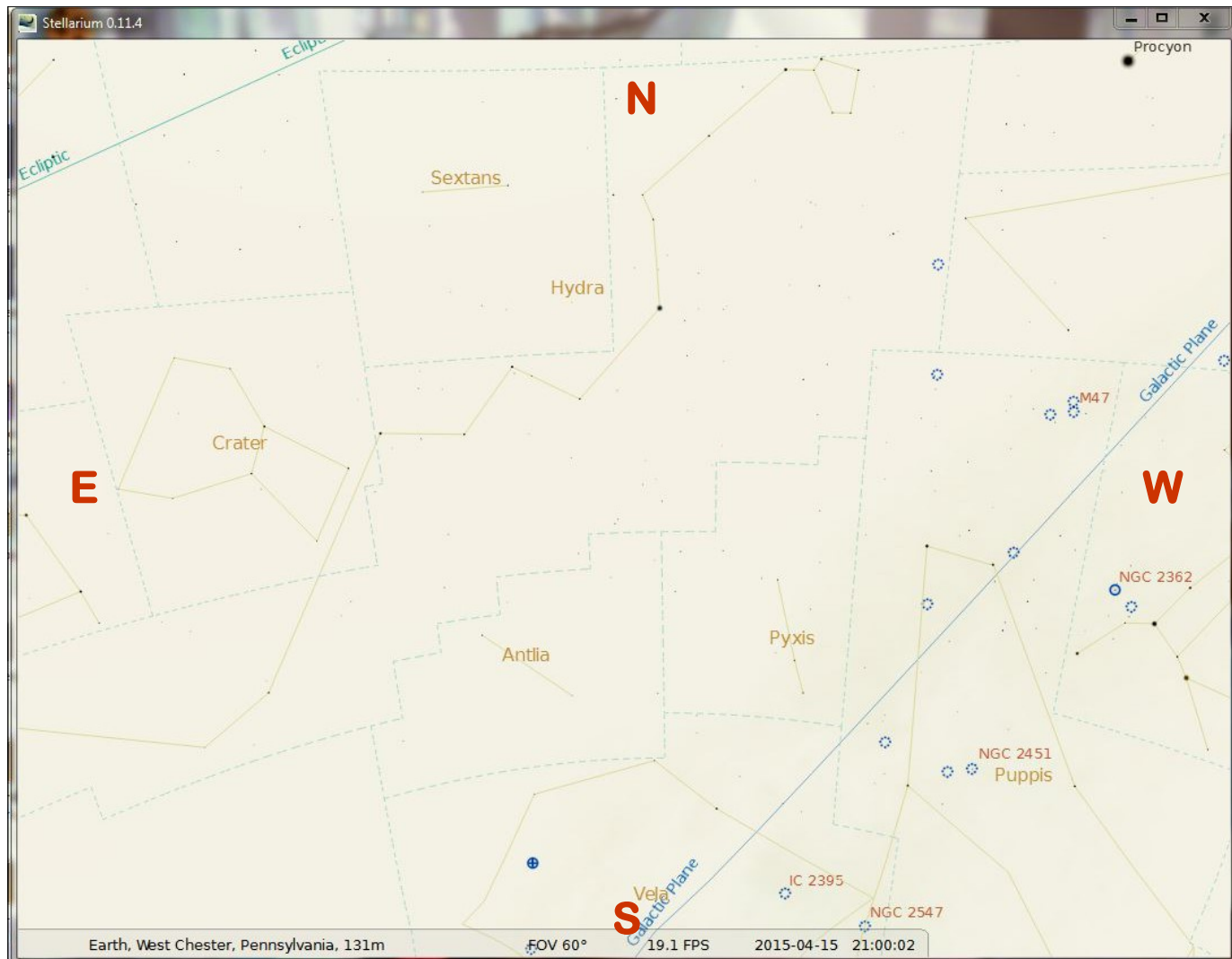
schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

We are looking for presenters for future meetings in our 2015-2016 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

The Sky Over Chester County

April 15, 2015 at 9:00 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
4/01/2015	6:18 a.m. EDT	7:52 a.m. EDT	7:25 p.m. EDT	7:52 p.m. EDT	12h 39m 33s
4/15/2015	5:55 a.m. EDT	6:23 a.m. EDT	7:39 p.m. EDT	8:07 p.m. EDT	13h 15m 31s
4/30/2015	5:33 a.m. EDT	6:02 a.m. EDT	7:54 p.m. EDT	8:23 p.m. EDT	13h 51m 37s
Moon Phases					
Full Moon	4/04/2015	8:07 a.m. EDT	Last Quarter	4/11/2015	11:46 p.m. EDT
New Moon	4/18/2015	2:58 p.m. EDT	First Quarter	4/25/2015	7:56 p.m. EDT

April 2015 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

4	Full Moon, the Pink Moon
4	Total lunar eclipse, totality not visible in Chester County
7	The Moon is near Saturn
11	Last Quarter Moon and Pleiades near Venus
18	New Moon
22	The Lyrid meteor shower peaks
25	International Astronomy Day
25	First Quarter Moon
26	Lunar X and Lunar Straight Wall visible

The best sights this month: We can see all five naked eye planets during April, although it will take some effort to find dim Mars and elusive Mercury. And on April 22nd we are treated to the Lyrid meteor shower on a night without interference by the Moon. There is also a lunar eclipse on April 4th, but we are not in a good location to see much of the event which happens before dawn with totality occurring after the Moon has set. But on April 26th we can see the Lunar Straight Wall and the Lunar X!

Mercury: The planet closest to the Sun is best viewed at the end of April. Look low in the west into the fading glow of the sunset.

Venus: Venus shines brightly just after sunset and does not set until 3 hours after the Sun. Venus has several close encounters during April, passing the Pleiades on April 11th and 12th and Aldebaran on the 19th. Then on the 20th and 21st the crescent Moon joins the show! This will be an excellent wide-field photo opportunity.

Mars: Mars continues to fall into the glow of the sunset and is getting increasingly harder to find. Use binoculars to look for Mars and Mercury on April 22nd when they are just over 1 degree separation.

Jupiter: Jupiter dims slightly to a still brilliant magnitude -2.1 and is high in the sky at nightfall.

See how many of the four Galilean moons you can see and watch how they change night by night, sometimes hour by hour.

Saturn: The ringed planet rises around 9:30 by month's end so it will be well above the horizon by midnight. Saturn is near the constellation Scorpius so it will be easy to find in the eastern sky.

Uranus and Neptune: Neither gas giant is in good position for viewing for the next several months.

The Moon: The Moon is full on April 4th. Native Americans called this the Full Pink Moon. This name came from the herb moss pink, or wild ground phlox, which is one of the earliest flowers of the spring. Other names for this full Moon are the Full Sprouting Grass Moon and among coastal tribes the Full Fish Moon because this was the time that the shad swam upstream to spawn.

From April 19th to the 21st the thin crescent Moon will be near Mercury, Mars, the Pleiades, Venus and Aldebaran. And on April 26th we can see the Lunar Straight Wall and the Lunar X.

Constellations: The Big Dipper, part of the constellation Ursa Major, rides high in the April sky. And if we were to poke a hole in the Dipper's bowl, water would fall on the back of Leo the Lion. Leo is joined by Boötes with the bright star Arcturus and lovely Corona Borealis, the Northern Crown. Hercules can be found rising in the east.

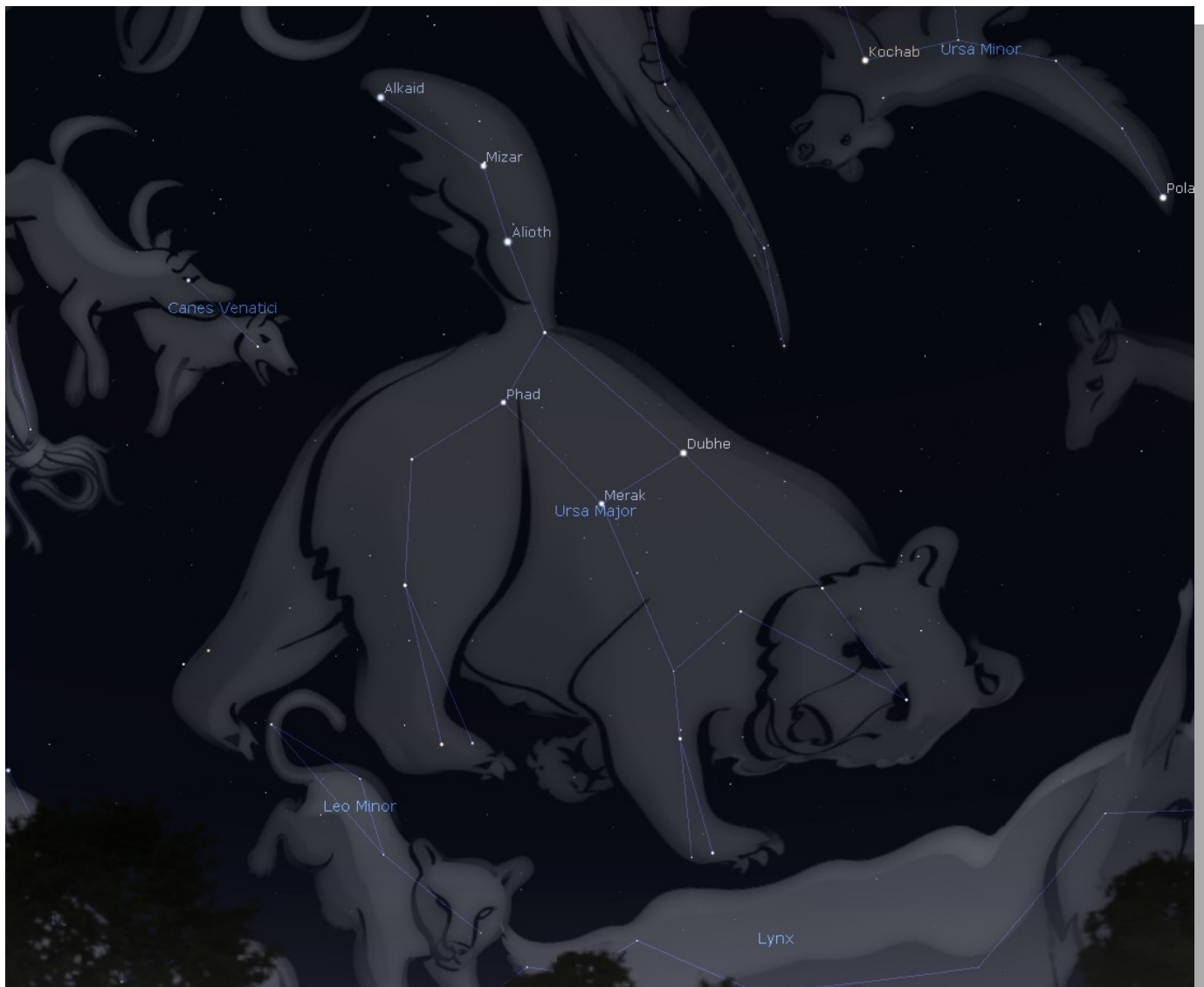
Messier/deep sky: April is a good month to go galaxy hunting. Look for M64 in Coma Berenices, M51, M81 and M82 in Ursa Major and M104 near bright Spica in Virgo. Of course, you will need to go hunting on a night with no bright Moon.

Comets: There are no bright comets in the sky during April.

Meteor showers: The Lyrid meteor shower occurs on the night of April 22/23. Expect up to 20 meteors per hour at the peak of the shower. This is an excellent year to watch this shower since the waxing crescent Moon sets around midnight so the skies will be very dark.

Looking Up: Mizar and Alcor, the famous double star in The Big Dipper

by Don Knabb, CCAS Treasurer & Observing Chair



Graphic of Ursa Major Taken from Stellarium

At any star party there are a few classic objects to see in the sky. One of those objects is the double star Mizar and Alcor in the Big Dipper. It seems that The Big Dipper, that most famous of all asterisms in Ursa Major, is almost always in the sky for our star parties. With a low horizon one can always see Ursa Major in the sky. It is a circumpolar constellation. That is, from our latitude, Ursa Major never sets. Yes, it is low in the sky during the winter months, but star par-

ties are few during those cold months.

At a star party it is always fun to point to the Big Dipper and tell people there is a double star right in front of them that they might not know about. Anyone with reasonable eyesight, if they look closely, will then see that the 2nd star from the end of the Big Dipper's handle is indeed a double star. Those stars are Mizar and Alcor.

Above is a screen shot from the free planetarium software Stellarium.

There is quite a collection of mythology concerning Mizar and Alcor. Mizar and Alcor together are sometimes called the "Horse and Rider." Native Americans named these stars the Squaw and the Papoose. In Japanese mythology, Alcor is known as the lifespan star or "jumyouboshi" as it was be-

(Continued on page 7)

Double Star (Cont'd)

(Continued from page 6)

lieved that one who could not see this star would pass away by year's end.

There are two stories that link Alcor to The Pleiades in Taurus. The Pleiades are often called the Seven Sisters. But it is quite difficult to see more than six stars in this beautiful cluster with the naked eyes. What became of the Lost Pleiad? One story is that the seventh sister was taken away by Mizar, one of the seven brothers of the Big Dipper, and there she remains, little Alcor, at his side. Another story that is Greek in origin also suggests Alcor was once part of the Pleiades and that Alcor was the Lost Pleiad Electra, which had wandered here from her companions and became Alopex, the Fox.

The ability to resolve the two stars with the naked eye is often quoted as a test of eyesight. Mi-

zar shines at magnitude 2.2 while Alcor is quite a bit dimmer at magnitude 4.0. That puts it at the limit in light-polluted skies, so if you can't see Alcor don't assume your eyes are failing!

Mizar and Alcor lie three light-years apart, and though their proper motions show they move together (they are both members of the Ursa Major Moving Group), it was believed long ago that they did not form a true binary star system, but were simply a double star resulting from a chance alignment of the two stars. The pair of Mizar and Alcor are actually much more than a simple double star. It is actually a collection of 6 stars, although not all of these are within the reach of amateur level telescopes.

Mizar is a prime target for someone with a new telescope, as the components are an easy 14 seconds of arc apart, the two taking

at least 5000 years to make their orbit about each other. More remarkably, each of these two components is AGAIN double. The brighter of the two (magnitude 2.27) contains a very close pair a mere 7 or 8 thousandths of a second of arc apart (an angle made by a penny at a distance of 300 miles) that has an orbital period of 20.5 days. The fainter of them (magnitude 3.95) contains a pair with a period of about half a year. Mizar is thus actually a quartet of stars, a double-double.

In 2009, it was reported by astronomer Eric Mamajek and collaborators that Alcor actually is itself a binary, consisting of Alcor A and Alcor B, and that this binary system is most likely gravitationally bound to Mizar, bringing the full count of stars in this complex system to six.

So at our next star party, or anytime you gaze upward at the Big

(Continued on page 10)

Sagittarius A* (Cont'd)

(Continued from page 3)

have been using Chandra to monitor Sgr A* since the telescope was launched in 1999. Recently, astronomers have been closely watching Sgr A* to see if the black hole would consume parts of a nearby cloud of gas known as G2 and cause flares in X-rays. Due to G2's distance from Sgr A* at the time of the September 2013 flare, however, researchers do not think the gas cloud was responsible for the spike in X-rays.

In addition to the giant flares,

the G2 observing campaign with Chandra also collected more data on the magnetar located close to Sgr A*. This magnetar is undergoing a long X-ray outburst, and the Chandra data are allowing astronomers to better understand this unusual object.

These results were presented at the 225th meeting of the American Astronomical Society meeting being held in Seattle, Washington. NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washing-

ton. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

Images Credit: NASA/CXC/Univ. of Wisconsin/Y. Bai. et al.

The Cold Never Bothered Me Anyway

by Dr. Ethan Siegel

For those of us in the northern hemisphere, winter brings long, cold nights, which are often excellent for sky watchers (so long as there's a way to keep warm!) But there's often an added bonus that comes along when conditions are just right: the polar lights, or the Aurora Borealis around the North Pole. Here on our world, a brilliant green light often appears for observers at high northern latitudes, with occasional, dimmer reds and even blues lighting up a clear night.

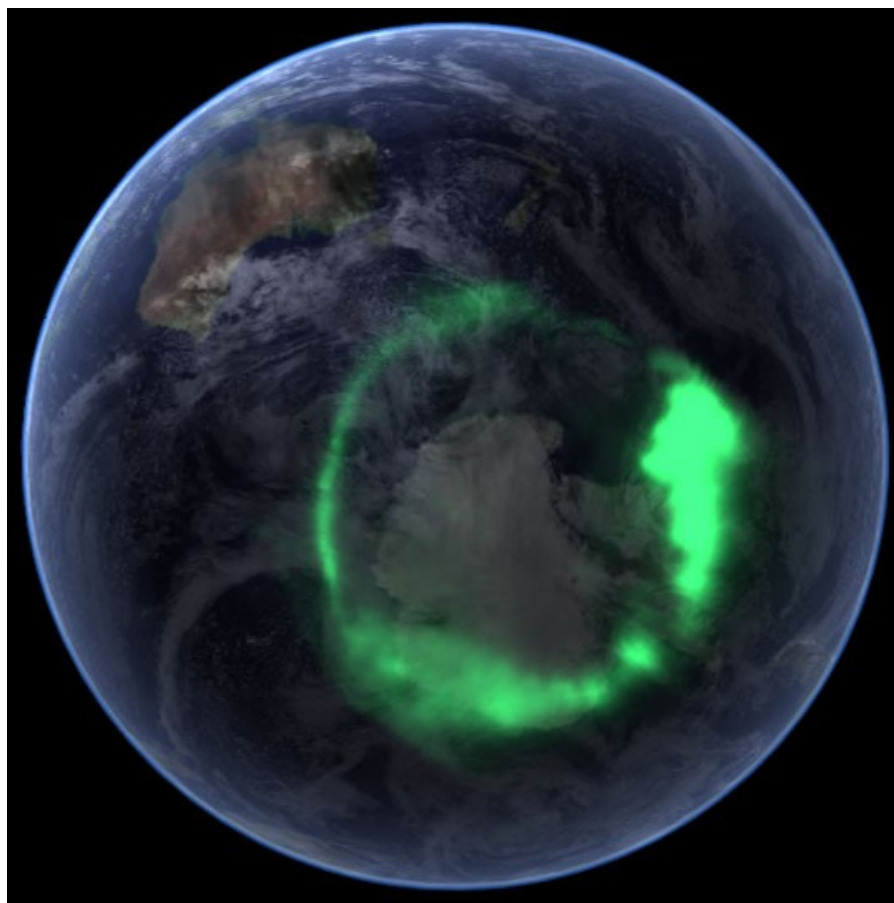
We had always assumed that there was some connection between particles emitted from the Sun and the aurorae, as particularly intense displays were observed around three days after a solar storm occurred in the direction of Earth. Presumably, particles originating from the Sun—ionized electrons and atomic nuclei like protons and alpha particles—make up the vast majority of the solar wind and get funneled by the Earth's magnetic field into a circle around its magnetic poles. They're energetic enough to knock electrons off atoms and molecules at various layers in the upper atmosphere—particles like molecular nitrogen, oxygen and atomic hydrogen. And when the electrons fall back either onto the atoms or to lower energy levels, they emit light of varying but particular wavelengths—oxygen producing the most common green signature, with less common states of oxygen and hydrogen producing red and the occasional blue from nitrogen.

But it wasn't until the 2000s that



this picture was directly confirmed! NASA's Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite (which ceased operations in December 2005) was able to find out how the magnetosphere responded to solar wind changes, how the plasmas were energized, transported and (in some cases)

lost, and many more properties of our magnetosphere. Planets without significant magnetic fields such as Venus and Mars have much smaller, weaker aurorae than we do, and gas giant planets like Saturn have aurorae that primarily shine in the ultra-violet rather than the visible. Nevertheless, the aurorae are a spectacular sight in the evening, particularly for observers in Alaska, Canada and the Scandinavian countries. But when a solar storm comes our way, keep your eyes towards the north at night; the views will be well worth braving the cold!



*Auroral overlays from the IMAGE spacecraft.
Image credit: NASA Earth Observatory (Goddard Space Flight Center) / Blue Marble team.*

Minutes (Cont'd)

(Continued from page 2)

- observe double stars. He explained how he built the micrometer that he showed the club. He also brought his journals that chronicled his 25 years of double star observations and their plotted orbits. He also shared a photo of the 1991 solar eclipse that he took in 1991 in Baja, Mexico. He reminded the club that the next total solar eclipse seen in the USA will occur August 21, 2017. We should start planning now.
- Steve Leiden shared an astronomy article where astronomers identified a star 26 light years from earth.

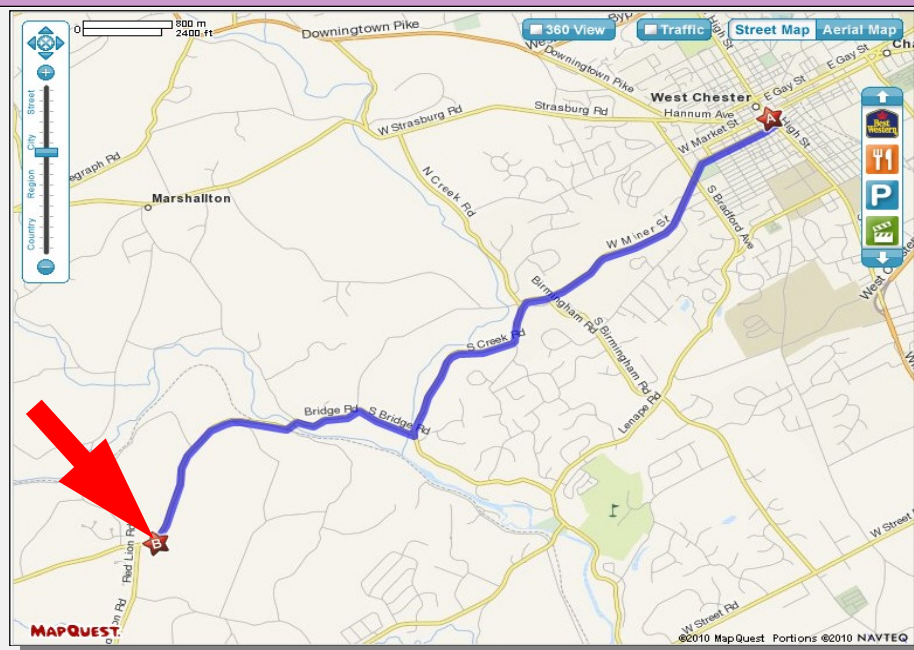
They calculated by radial and tangential velocity that 70,000 years ago it passed through the Ort Cloud.

- Dennis O'Leary updated our group on the Dawn Mission. Dawn is now in orbit around Ceres. Recently released photos reveal bright spots which are being characterized. New Horizons will be at its goal in July.
- David Hockenberry shared several antique astronomy books including an Astronomy text from the late 1800's and a text on telescope construction. He also brought his 3.5 "Questar and Brandon Eye Pieces. David explained the history and development of the Brandon Eye pieces.

The Questar telescope was the subject of the article he penned for last month's Observations.

- Pat Rosenblatt discussed a new theory of tying gravity to Quantum Mechanics. The theory predicts no singularity and explains dark energy and matter.
- Dave Hockenberry discussed The Science of "Interstellar" by Kip Thorne and reminded members that the DVD is due to be released on March 31. It was suggested that we show "Interstellar" for a movie night.

CCAS Directions



Brandywine Valley Association

1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090

<http://brandywinewatershed.org/>

BVA 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 Valley Association

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Valley Association.

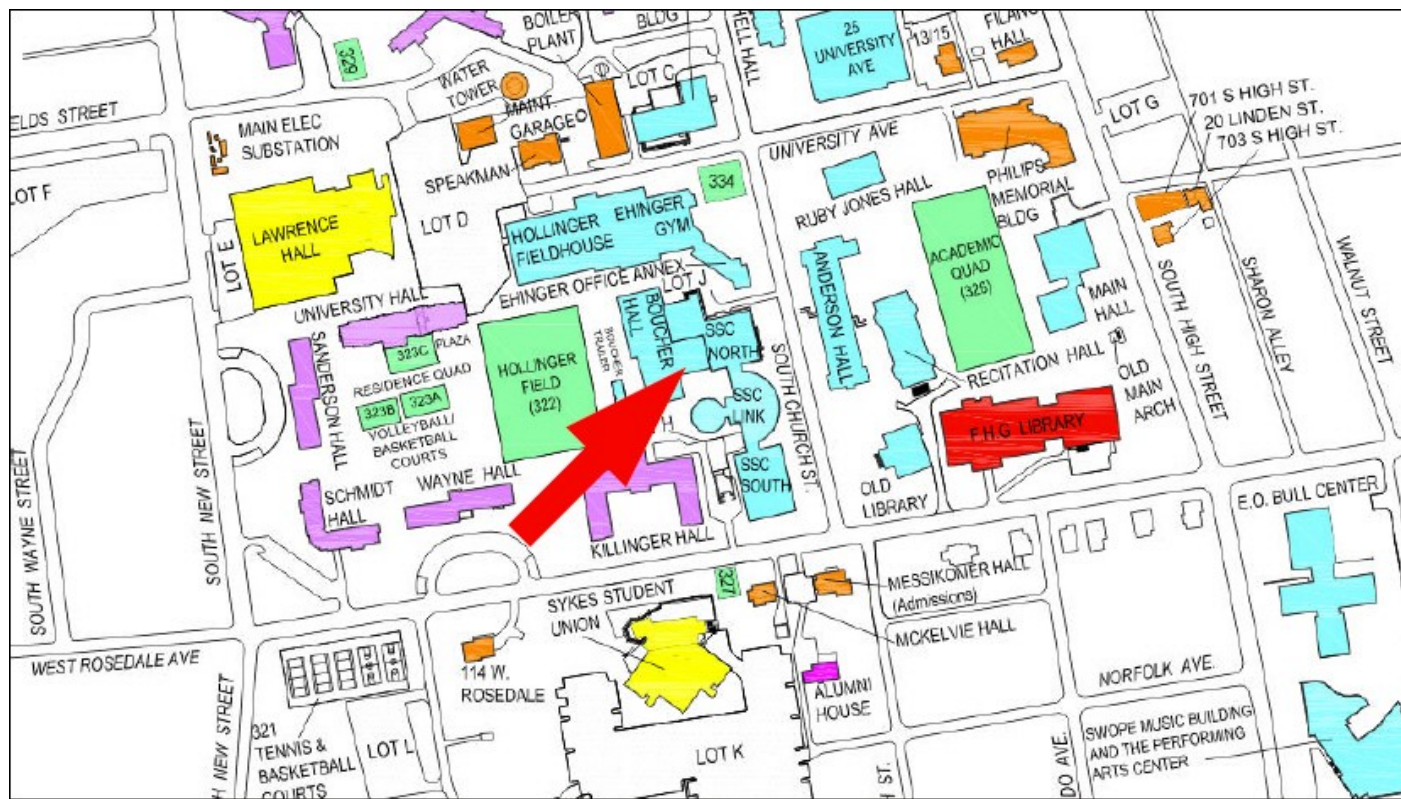
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route 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).

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).



Double Star (Cont'd)

(Continued from page 7)

Dipper, tell someone the story of these stars that at first glance look like one star, but with closer inspection are actually two that can be seen with the naked eye by most people on a reasonably clear night. And with really close inspection by high powered telescopes it is revealed that there are really six stars in the group.

Information credits:

Raymo, Chet. 1982. 365 Starry Nights. New York, NY. Simon & Schuster.
[http://en.wikipedia.org/wiki/Mizar_\(star\)](http://en.wikipedia.org/wiki/Mizar_(star))
<http://stars.astro.illinois.edu/sow/mizar.html>
<http://stars.astro.illinois.edu/sow/alcorn.html>

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

March 2015 Financial Summary

Beginning Balance	\$2,300
Deposits	\$15
Disbursements	\$0
Ending Balance	\$2,315

New Member Welcome!

Welcome new CCAS member James Ruch from Downingtown. We're glad you decided to join 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>

Note that our CCAS Webmaster John Hepler has a link to the IDA home page set up on our Society's home page at <http://www.ccas.us>.

Dark-Sky Website for PA

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"!

CCAS Event Information Phone Number

We've set up a special phone number you can dial to find out if our monthly observing session and other scheduled events will be held or postponed. Call **610-436-0829** after 5 PM ET to hear a recording to find out the latest news.

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!



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>



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

Green Earth Lighting LLC
620 Onion Creek Ranch Rd
Driftwood, Texas 78619

Phone: 512-944-7354

<http://www.greeneearthlighting.com>

Local Astronomy-Related Stores

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



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>



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
313 S. Queen St.
Chestertown, MD 21620

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 (443) 282-0619 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 443-282-0619
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 & Telescope 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**.