



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 25, No. 2 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 February 2017

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## Saturn's B Ring as Seen by Cassini

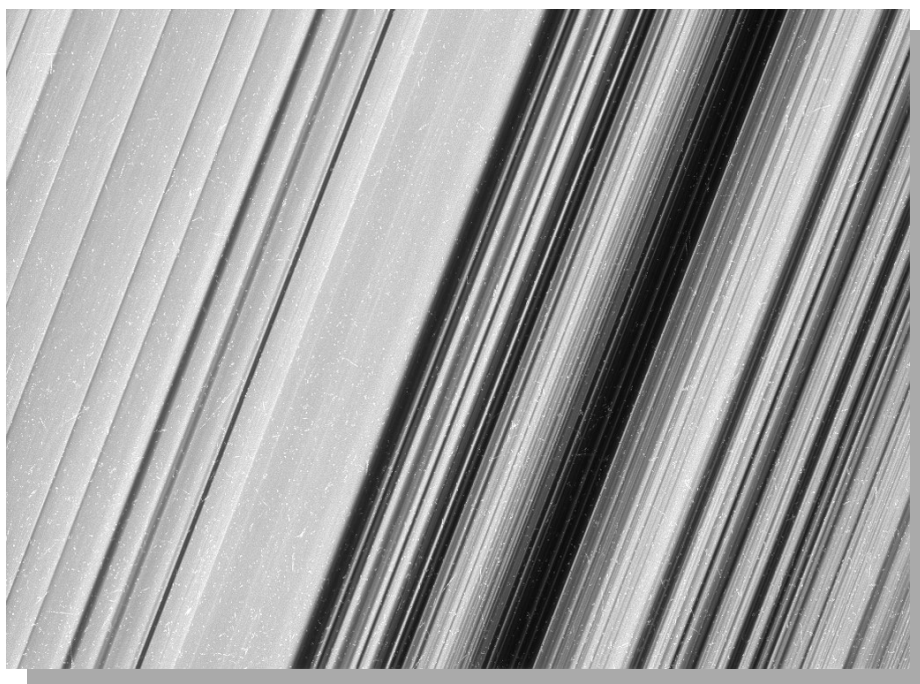


Image credit: NASA/JPL-Caltech/Space Science Institute. See pg. 3 for more information.

## Membership Renewals Due

02/2017	DiGiovanni Gallagher La Para Munson Ruggeri
03/2017	Angelini Fulton Sterrett
04/2017	Hepler Imburgia Miller Richter

## February 2017 Dates

- 3rd • First quarter Moon, 11:18 p.m. EST
- 10th • Full Moon, the Full Snow Moon, 7:32 p.m. EST
- 10th • Penumbral Lunar Eclipse, 7:32 p.m. EST
- 18th • Last quarter Moon, 2:33 p.m. EST
- 26th • New Moon, 9:58 a.m. EST
- 27th • Uranus is near Mars



## 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.

- ☼ **Saturday, April 1, 2017** - CCAS Special Observing Session, Hoopes Park West Chester, PA, from 8:00 to 9:30 p.m. This event is open to the general public.
- ☼ **Saturday, April 29, 2017** - CCAS Special Observing Session celebrating International Astronomy Day, Nottingham County Park, Nottingham, PA, from 8:00 to 10:00 p.m. This event is open to the general public.

## Winter 2017 Society Events

### February 2017

**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** • Reservations open for the February 24th planetarium show. To make a reservation, visit the [WCU Public Planetarium Shows](#) webpage.

**10th** • Penumbral lunar eclipse starts at 5:34 p.m., maximum eclipse at 7:43 p.m.; eclipse ends at 9:53 p.m.

**9th-10th** • The von Kármán Lecture Series: [Glacial Ice Melt and Sea Level Rise](#), at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**14th** • CCAS Monthly Meeting, Room 112, Merion Science Center (former Boucher Building), West Chester University. Meet & Greet over coffee and refreshments for members and non-members alike from 7:00 to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. CCAS Member Speaker: John Conrad, NASA Solar System Ambassador, "Cassini-Huygens to Saturn and Titan."

**20th** • Open call for articles and photographs for the March 2017 edition of [Observations](#).

**24th** • West Chester University Planetarium Show: "A Star is Born," in the Schmucker Science Building. The show starts at 7 p.m. and run approximately one hour in length. For more information and reservations, visit the [WCU Public Planetarium Shows](#) webpage.

**26th** • Deadline for newsletter submissions for the March 2017 edition of [Observations](#).

### March 2017

**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.

**9th-10th** • The von Kármán Lecture Series: [The Cold Atom Laboratory Mission: The Coldest Spot in the Universe](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**10th** • Reservations open for the March 31st planetarium show. To make a reservation, visit the [WCU Public Planetarium Shows](#) webpage.

**14th** • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. Meet & Greet over coffee and refreshments for members and non-members alike from 7:00 to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. CCAS Guest Speaker: Gordon Richards, PhD, from Drexel University will present "The LSST and Upcoming Discoveries."

**20th** • Open call for articles and photographs for the April 2017 edition of [Observations](#).

**26th** • Deadline for newsletter submissions for the April 2017 edition of [Observations](#).

**31st** • West Chester University Planetarium Show: "A Universe of Galaxies" in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit the [WCU Public Planetarium Shows](#) webpage.

## Minutes from the January 10, 2017, CCAS Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor, CCAS president, welcomed 24 members and guest to the January 10, 2017 meeting. Roger reminded members of the upcoming club activities including Astronomy Breakfast Club which meets once a month at local restaurants. He also acknowledged the club newsletter, Observations, and the excellent articles including a recent article on the Cassini mission.
- Don Knabb, CCAS observing chair, presented the monthly night sky using the Sky Safari app. He pointed out how to find Comet 45P/Honda-Mirkos-Pajdusakora in the southwest night sky.
- Don presented a few news articles and photos that Linda Lurcott shared with him at the CCAS Holiday Party from the files of Ed Lurcott. He shared the "birth certificate" of CCAS which was founded 9/21/93. Don is working to scan this information into the club website so that all club members will have access to these archival resources.
- Roger introduced our guest speaker, Phil Rossomando, Outreach Coordinator for the Planetary Society-Philadelphia Region. The talk was started with a short video introduction from Bill Nye, Chairman of the Planetary Society. The 3 major missions of the Planetary Society are: "Create, advocate, and educate" the public about the cosmos and space exploration.
- The Planetary Society funds "science and engineering projects to discover more about our planetary neighborhood."

(Continued on page 7)

## February 2017 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on February 14, 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 speaker will be CCAS member John Conrad, NASA Solar System Ambassador. He will present "Cassini-Huygens to Saturn and Titan."

For our March meeting, Gordon Richards, PhD from Drexel University will present "The LSST and Upcoming Discoveries." In April, CCAS Member Denis O'Leary will be our featured speaker. For our meeting in

May, Ed Guinan, PhD, from Villanova University will present "Proxima Centauri B – Is Anybody Home at our Closest Star?"

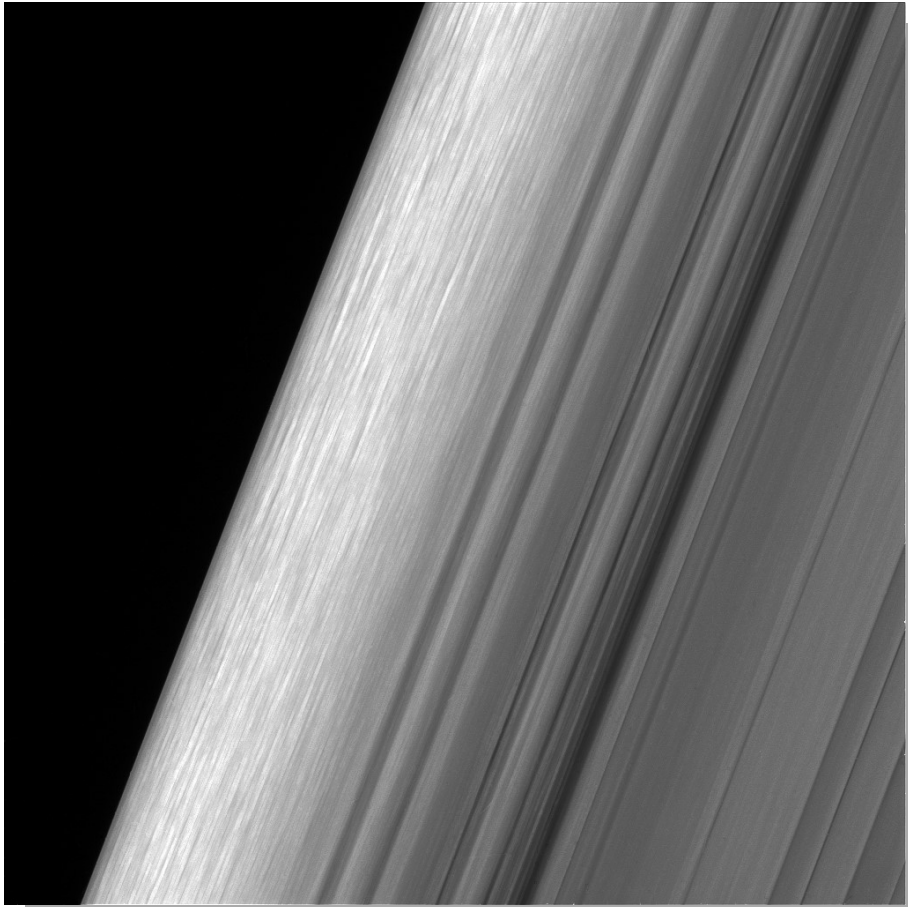
Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

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



## Close Views Show Saturn's Rings in Unprecedented Detail

by NASA/Jet Propulsion Laboratory



*This image shows a region in Saturn's outer B ring. NASA's Cassini spacecraft viewed this area at a level of detail twice as high as it had ever been observed before.  
Image Credit: NASA/JPL-Caltech/Space Science Institute*

Newly released images showcase the incredible closeness with which NASA's Cassini spacecraft, now in its "Ring-Grazing" orbits phase, is observing Saturn's dazzling rings of icy debris.

The views are some of the closest-ever images of the outer parts of the main rings, giving scientists an eagerly awaited opportunity to observe features with names like "straw" and "propellers." Although Cassini saw these features earlier in the mission, the spacecraft's current, special orbits are now providing opportunities to see them in greater detail. The new images

resolve details as small as 0.3 miles (550 meters), which is on the scale of Earth's tallest buildings.

Cassini is now about halfway through its penultimate mission phase -- 20 orbits that dive past the outer edge of the main ring system. The ring-grazing orbits began last November, and will continue until late April, when Cassini begins its grand finale. During the 22 finale orbits, Cassini will repeatedly plunge through the gap between the rings and Saturn. The first finale plunge is scheduled for April 26.

For now, the veteran spacecraft is shooting past the outer edges of the rings every week, gathering some of its best images of the rings and moons. Already Cassini has sent back the closest-ever views of small moons Daphnis and Pandora.

Some of the structures seen in recent Cassini images have not been visible at this level of detail since the spacecraft arrived at Saturn in mid-2004. At that time, fine details like straw and propellers -- which are caused by clumping ring particles and small, embedded moonlets, respectively -- had never been seen before. (Although propellers were present in Cassini's arrival images, they were actually discovered in later analysis, the following year.)

Cassini came a bit closer to the rings during its arrival at Saturn, but the quality of those arrival images was not as high as in the new views. Those precious few observations only looked out on the backlit side of the rings, and the team chose short exposure times to minimize smearing due to Cassini's fast motion as it vaulted over the ring plane. This resulted in images that were scientifically stunning, but somewhat dark and noisy.

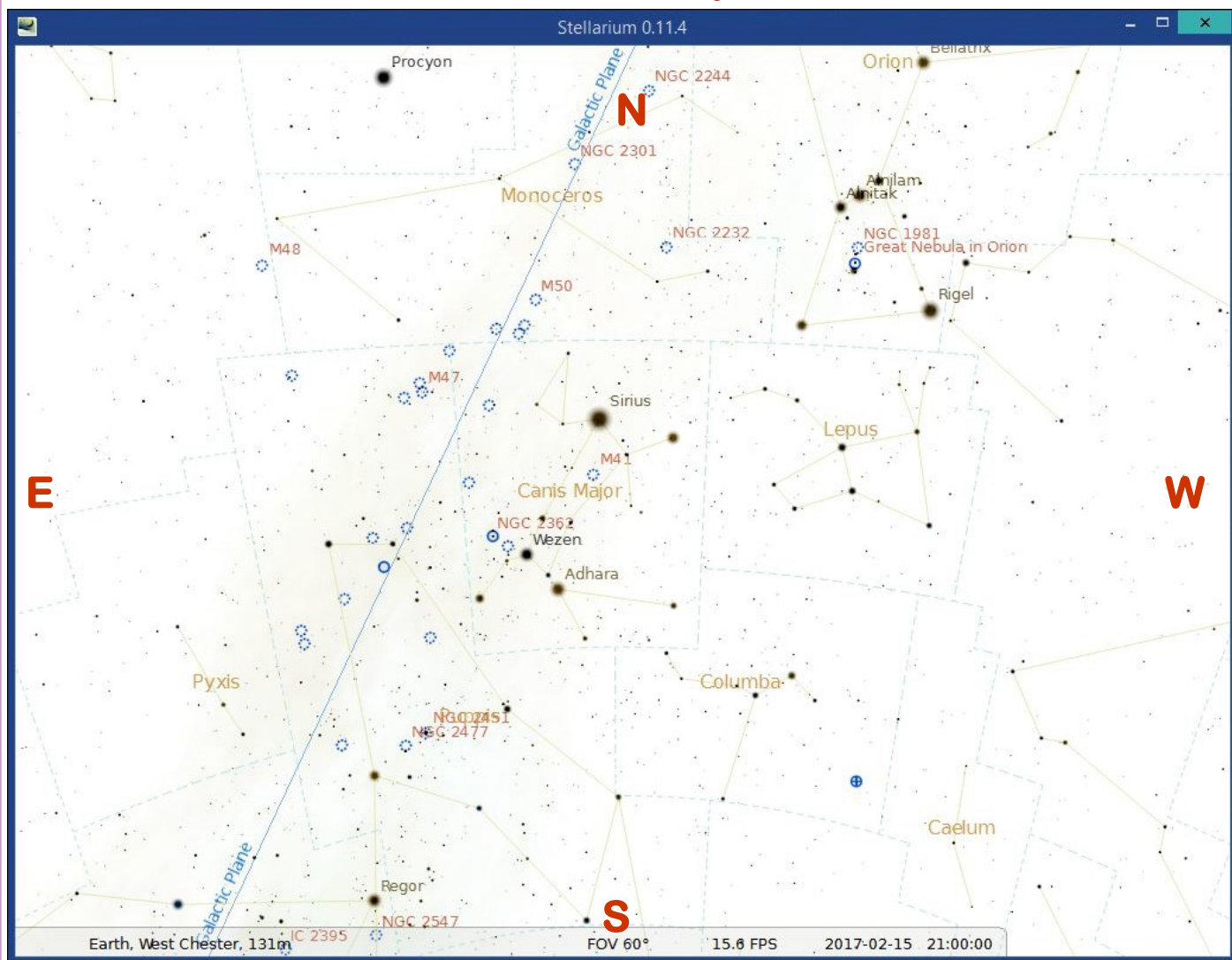
In contrast, the close views Cassini has begun capturing in its ring-grazing orbits (and soon will capture in its Grand Finale phase) are taking in both the backlit and sunlit side of the rings. Instead of just one brief pass lasting a few hours, Cassini is making several dozen passes during these final months.

*(Continued on page 7)*

# The Sky Over Chester County

February 15, 2017 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](http://www.stellarium.org).



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
2/01/2017	6:40 a.m. EST	7:09 a.m. EST	5:20 p.m. EST	5:49 p.m. EST	10h 11m 27s
2/15/2017	6:25 a.m. EST	6:53 a.m. EST	5:37 p.m. EST	6:05 p.m. EST	10h 43m 49s
2/28/2017	6:08 a.m. EST	6:35 a.m. EST	5:52 p.m. EST	6:19 p.m. EST	11h 16m 39s
Moon Phases					
First Quarter	2/03/2017	11:18 p.m. EST	Full Moon	2/10/2017	7:32 p.m. EST
Last Quarter	2/18/2017	2:33 p.m. EST	New Moon	2/26/2017	9:58 a.m. EST

## February 2017 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

3	First quarter Moon, 11:18 p.m. EST
4	The Lunar Straight Wall (Rupes Recta) is visible
5	The Moon is near Aldebaran this evening
13	The Zodiacal Light is visible from a dark site after evening twilight for the next two weeks
10	Full Moon, the Full Snow Moon, and a penumbral Lunar Eclipse, 7:32 p.m. EST
10	Regulus in Leo the Lion is nearby the Full Moon
18	Last Quarter Moon, 2:33 p.m. EST
26	New Moon, 9:58 a.m. EST
27	Uranus is near Mars this evening

**The best sights this month:** We will be treated to a “deep” penumbral Lunar Eclipse on the night of February 10<sup>th</sup>, starting around 6:15 p.m. with the maximum shadow visible on the Moon around 7:45 p.m.

The last two weeks of February are an excellent opportunity to view the Zodiacal Light just after the sky turns dark. Look to the west at a dark observing site to see this faint glow. According to *earth-sky.org*, people previously thought the zodiacal light originated somehow from phenomena in Earth’s upper atmosphere, but today we understand it as sunlight reflecting off dust grains that circle the Sun in the inner solar system. These grains are thought to be left over from the process that created our Earth and the other planets of our solar system 4.5 billion years ago.

**Mercury:** Mercury is low in the pre-dawn sky during February.

**Venus:** This is a great month to observe our sister planet, which shines at magnitude -4.8 all month. Venus reaches a peak sunset altitude of 40 degrees on the 3<sup>rd</sup>, and shows its maximum illuminated area on the 16<sup>th</sup>. By month’s end it will appear as a dramatic crescent in a telescope.

**Mars:** The red planet is easy to find to the upper left of Venus. Mars is a bit over 5 degrees from Venus at the beginning of February, but steadily pulls away the rest of the month. A telescope will show that the disk of Mars is one tenth the size of the disk of Venus. On the 26<sup>th</sup> Mars is just over a half degree away from Uranus.

**Jupiter:** The king of the planets rises around 11 p.m. at the start of February and around 9 p.m. by month’s end.

**Saturn:** Saturn is low in the eastern sky before dawn through February.

**Uranus and Neptune:** Uranus is just over a half degree away from Mars on the 26<sup>th</sup>, and no star that close to Mars shines as bright as 6<sup>th</sup> magnitude Uranus so it should be relatively easy to find. Neptune is hidden in the glow of the setting Sun during February.

**The Moon:** Full Moon occurs on February 10<sup>th</sup>. According to Native Americans this is the Full Snow Moon since the heaviest snow usually falls during this month. Some tribes also referred to this Moon as the Full Hunger Moon, since harsh weather conditions in their areas made hunting very difficult. As mentioned in the best sights this month, we will be treated to a “deep” penumbral Lunar Eclipse on the night of February 10<sup>th</sup>, starting around 6:15 p.m. with the maximum shadow visible on the Moon around 7:45 p.m.

**Constellations:** Go outside around 8 p.m. and look south to see Orion the Hunter filling the southern sky. Above and to his right is the “V” shape of the face of Taurus the Bull with bright Aldebaran shining like one of the bull’s eyes. Just beyond the bull’s head is the Pleiades, the Seven Sisters. Running under Orion’s feet is Lepus the Rabbit and to the east (left) of Lepus is Canis Major, Orion’s “big dog” hunting companion with the brightest star in the sky, Sirius, shining like a jewel in Canis Major’s collar. The twins of Gemini are nearly overhead and glancing to the east you’ll see Leo the Lion rising, a sign of warmer spring nights to come!

**Messier/deep sky:** Winter is a great time to use binoculars to seek out Messier objects in the sky since

(Continued on page 7)



## Looking Up: The Zodiacal Light

by Don Knabb, CCAS Treasurer & Observing Chair

At certain times of year, a faint cone of light appears in the western sky just after darkness falls. This eerie glow is the Zodiacal Light. The reason for the name "Zodiacal" Light is because it is usually seen projected against the zodiacal constellations.

The best time to see the Zodiacal Light is when the ecliptic appears nearly vertical to our horizon. For Chester County observers the Zodiacal light is most easily visible from a dark location under clear and transparent skies just after evening twilight in the west in February and March, and in the morning eastern sky, just before the start of twilight in October. Since I am not often out observing before dawn, these next few weeks are, for me, the best opportunity to see the Zodiacal Light. It is so faint that it is completely masked by either moonlight or light pollution, so I don't know if we will be able to see this in Chester County skies.

The zodiacal light is a faint, roughly triangular, whitish glow which appears to extend up from the vicinity of the Sun along the ecliptic or zodiac. The Zodiacal Light decreases in intensity with distance from the Sun, but on very dark nights it has been observed in a band completely around the ecliptic.

The Zodiacal Light is caused by an enormous cloud of cosmic dust extending outward from the Sun and past the orbit of the Earth. The particles have diameters between a couple of micrometers and a few millimeters.



*Dominic Cantin photographed the Zodiacal Light near Quebec City, Canada, in August 2000 in this 2-minute exposure. The bright spot is the planet Venus.*

According to *earthsky.org*, people previously thought the zodiacal light originated somehow from phenomena in Earth's upper atmosphere, but today we understand it as sunlight reflecting off dust grains that circle the Sun in the inner solar system.

These grains are thought to be left over from the process that created our Earth and the other planets of our solar system 4.5 billion years ago.

Many people confuse the Zodi-

*(Continued on page 7)*

## Looking Up (cont'd)

*(Continued from page 6)*

acal light with twilight since it occurs in roughly the same area of sky, although careful attention to the time of the true end of astronomical twilight will remove any doubt about whether you are seeing the Zodiacal light or the sky brightening from lingering twilight. You can find that time for any date and location from this website: [http://www.sunrisesunset.com/custom\\_srss\\_calendar.asp](http://www.sunrisesunset.com/custom_srss_calendar.asp).

Since the band of dust that forms the Zodiacal light completely circles the sun, it actually stretches across the entire night sky. At the anti-solar point, that point in the sky exactly opposite the sun in the sky, lies a very subtle, and very faint brightening of the dust called the Gegenschein, which is German for "counter-glow". The Gegenschein is most easily seen at midnight when it is highest in the sky, and in those times of the year when it is in a part of the sky with few stars from late September to early November in Pisces, and from late January to early February in Cancer.

Interestingly, the Zodiacal Light and Gegenschein can only be seen with the unaided eye, and not through any optical instruments such as binoculars or telescopes because of its large size and low surface brightness.

Information credits:

[http://en.wikipedia.org/wiki/Zodiacal\\_light](http://en.wikipedia.org/wiki/Zodiacal_light)  
[http://www.space.com/spacewatch/zodiacal\\_light\\_021101.html](http://www.space.com/spacewatch/zodiacal_light_021101.html)  
[http://www.astropix.com/HTML/H\\_OTHER/ZLITE.HTM](http://www.astropix.com/HTML/H_OTHER/ZLITE.HTM)  
<http://earthsky.org/astronomy-essentials/everything-you-need-to-know-zodiacal-light-or-false-dusk>

## Cassini (cont'd)

*(Continued from page 3)*

"As the person who planned those initial orbit-insertion ring images -- which remained our most detailed views of the rings for the past 13 years -- I am taken aback by how vastly improved are the details in this new collection," said Cassini Imaging Team Lead Carolyn Porco, of Space Science Institute, Boulder, Colorado. "How fitting it is that we should go out with the best views of Saturn's rings we've ever collected."

After nearly 13 years studying Saturn's rings from orbit, the Cassini team has a deeper, richer understanding of what they're seeing, but they still anticipate new surprises.

"These close views represent the opening of an entirely new window onto Saturn's rings, and over the next few months we look forward to even more exciting data as we train our cameras on other parts of the rings closer to the planet," said Matthew Tiscareno, a Cassini scientist who studies Saturn's rings at the SETI Institute, Mountain View, California. Tiscareno planned the new images for the camera team.

Launched in 1997, Cassini has been touring the Saturn system since arriving in 2004 for an up-close study of the planet, its rings and moons, and its vast magnetosphere.

For more information about Cassini, visit:

<http://www.nasa.gov/cassini>  
<http://saturn.jpl.nasa.gov>

## Observing Cont'd)

*(Continued from page 5)*

the cold temperatures make it difficult to set up a telescope. Messier objects are a set of over 100 astronomical objects first listed by French astronomer Charles Messier in 1771.

Messier was a comet hunter, and was frustrated by objects which resembled but were not comets, so he compiled a list of them to avoid being fooled by them as he searched for comets. M42, the Orion Nebula, is easy to find in Orion's sword. Below and to Orion's left is M41, the Little

*(Continued on page 10)*

## Minutes (Cont'd)

*(Continued from page 2)*

- The advocacy is to "shape space policy and to educate the public about how decisions about space are made."
- The society also educates the public about the "benefits of space exploration."
- For more information go to the website [planetary.org](http://planetary.org). There is also a Facebook page for the Planetary Society-Philadelphia Region.
- This chapter is sponsoring a "Chat and Munch" at the Barnes and Nobel in Devon on Saturday, January 21, 2017 at 10 am.
- Phil then gave a presentation "Interstellar Space travel."
- Phil also shared his Planetary Society email address [pros-somando@planetary.org](mailto:pros-somando@planetary.org) and encouraged everyone to contact him with any further questions.

## Comet Campaign: Amateurs Wanted

by Marcus Woo

In a cosmic coincidence, three comets will soon be approaching Earth—and astronomers want you to help study them. This global campaign, which will begin at the end of January when the first comet is bright enough, will enlist amateur astronomers to help researchers continuously monitor how the comets change over time and, ultimately, learn what these ancient ice chunks reveal about the origins of the solar system.

Over the last few years, spacecraft like NASA's Deep Impact/EPOXI or ESA's Rosetta (of which NASA played a part) dis-

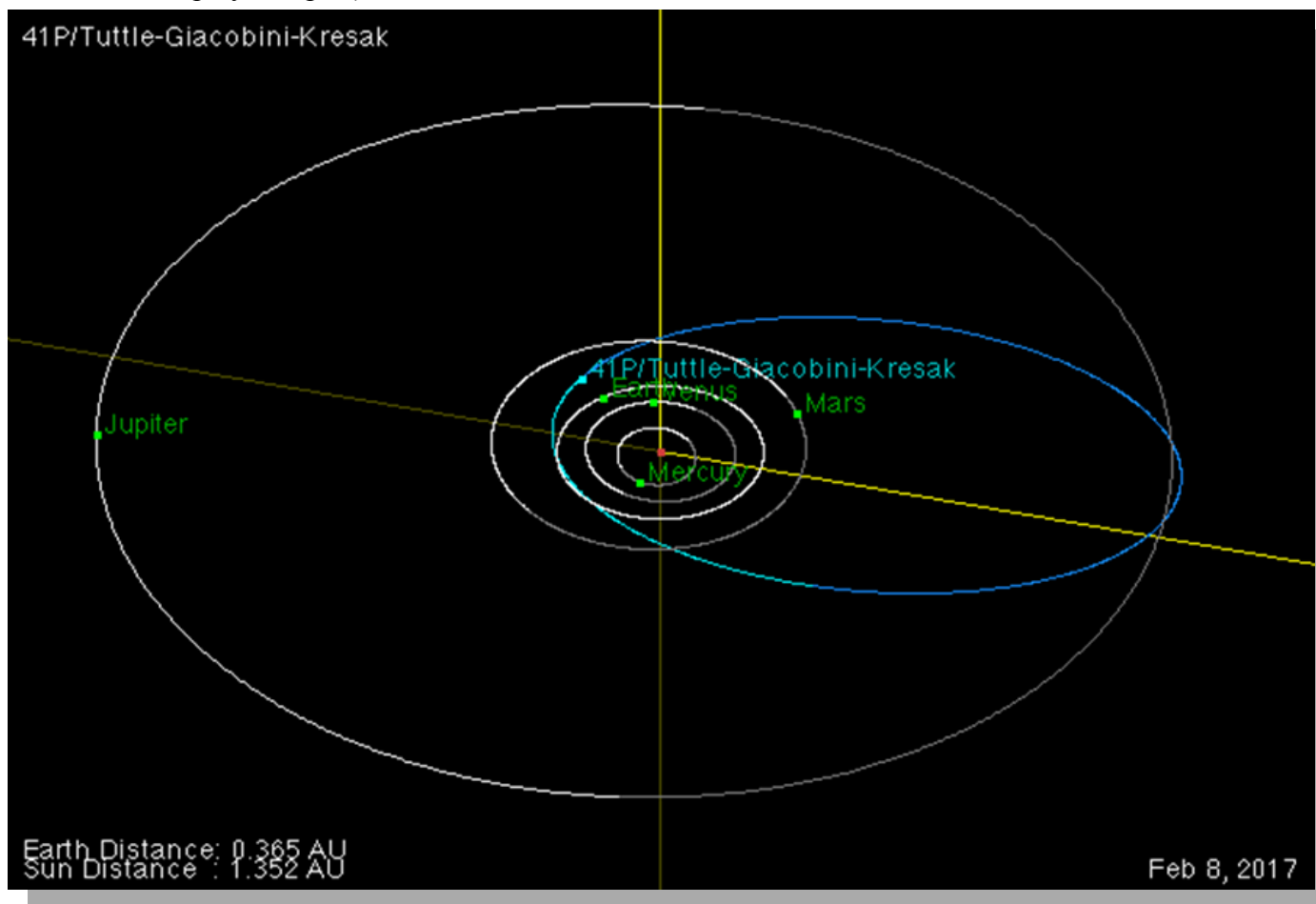


covered that comets are more dynamic than anyone realized. The missions found that dust and gas burst from a comet's nucleus every few days or weeks—

fleeting phenomena that would have gone unnoticed if it weren't for the constant and nearby observations. But space missions are expensive, so for three upcoming cometary visits, researchers are instead recruiting the combined efforts of telescopes from around the world.

"This is a way that we hope can get the same sorts of observations: by harnessing the power of the masses from various amateurs," says Matthew Knight, an astronomer at the University of Maryland.

(Continued on page 9)



An orbit diagram of comet 41P/Tuttle-Giacobini-Kresak on February 8, 2017—a day that falls during the comet's prime visibility window. The planets orbits are white curves and the comet's orbit is a blue curve. The brighter lines indicate the portion of the orbit that is above the ecliptic plane defined by Earth's orbital plane and the darker portions are below the ecliptic plane. This image was created with the Orbit Viewer applet, provided by the Osamu Ajiki (AstroArts) and modified by Ron Baalke (Solar System Dynamics group, JPL). <http://ssd.jpl.nasa.gov/sbdb.cgi?orb=1;sstr=41P>



## Space Place (Cont'd)

(Continued from page 8)

By observing the gas and dust in the coma (the comet's atmosphere of gas and dust), and tracking outbursts, amateurs will help professional researchers measure the properties of the comet's nucleus, such as its composition, rotation speed, and how well it holds together.

The observations may also help NASA scout out future destinations. The three targets are so-called Jupiter family comets, with relatively short periods just over five years—and orbits that are accessible to spacecraft. "The better understood a comet is," Knight says, "the better NASA can plan for a mission and figure out what the environment is going to be like, and

what specifications the spacecraft will need to ensure that it will be successful."

The first comet to arrive is 41P/Tuttle-Giacobini-Kresak, whose prime window runs from the end of January to the end of July. Comet 45P/Honda-Mrkos-Pajdusakova will be most visible between mid-February and mid-March. The third target, comet 46P/Wirtanen won't arrive until 2018.

Still, the opportunity to observe three relatively bright comets within roughly 18 months is rare. "We're talking 20 or more years since we've had anything remotely resembling this," Knight says. "Telescope technology and our knowledge of comets are just totally different now

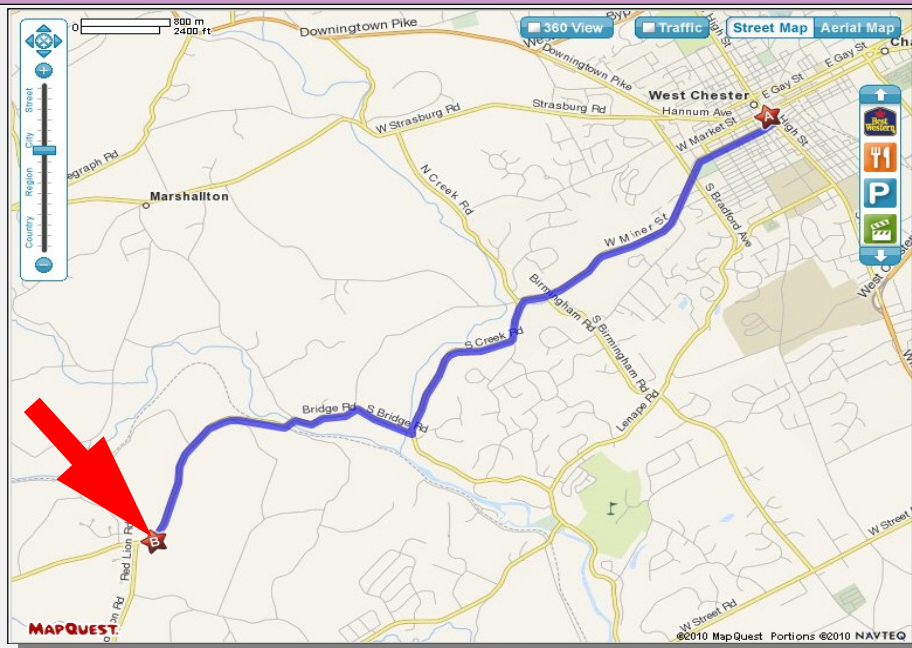
than the last time any of these were good for observing."

For more information about how to participate in the campaign, visit <http://www.psi.edu/41P45P46P>.

Want to teach kids about the anatomy of a comet? Go to the NASA Space Place and use Comet on a Stick activity! <http://spaceplace.nasa.gov/comet-stick/>

*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](http://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.

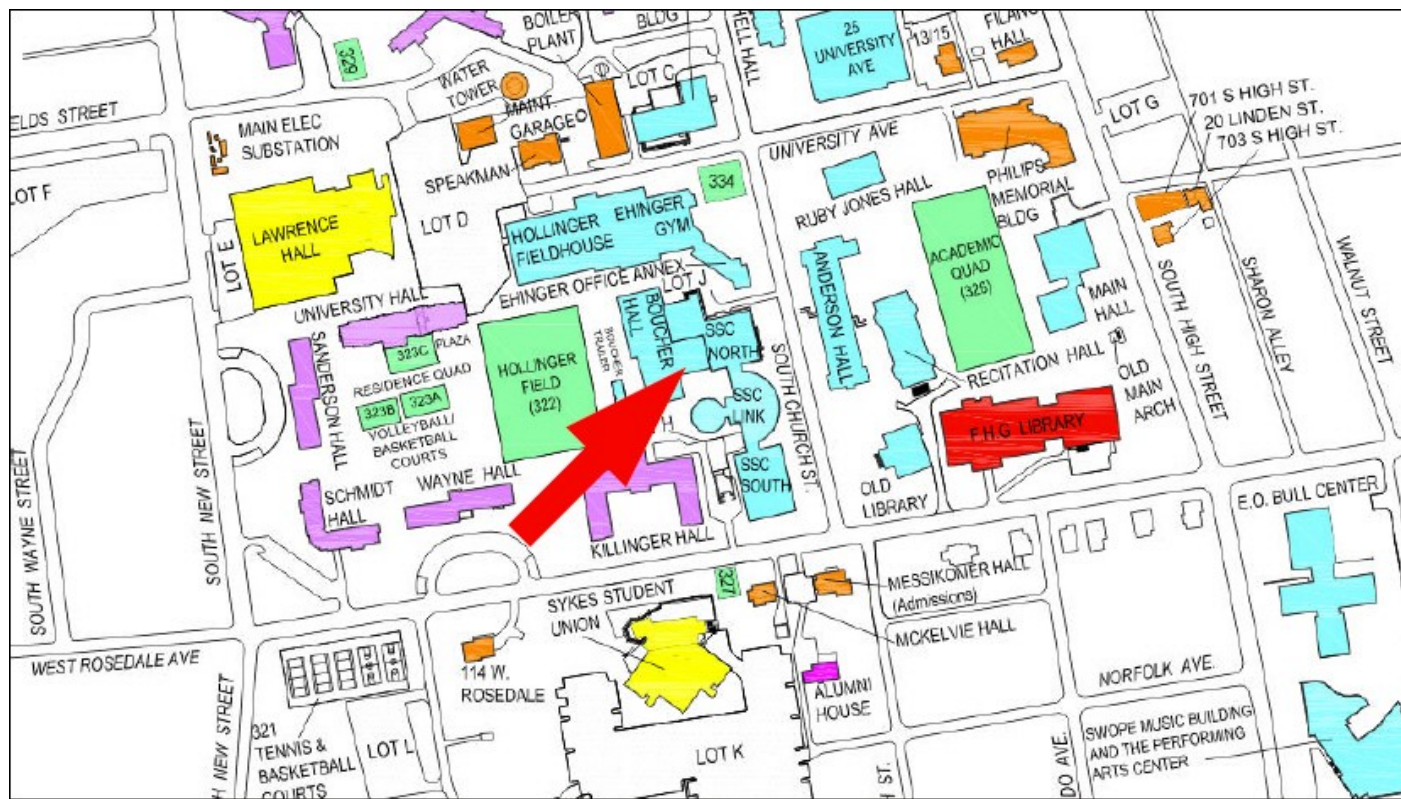
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route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

## 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).



### Observing (Cont'd)

(Continued from page 7)

Beehive, near Sirius in Canis Major. Harder to find because of the lack of bright stars in the area of Cancer the Crab is M44, the "big" Beehive. For more of a challenge, look toward the North, above and to the left of the Big Dipper to find M81 and M82, a pair of relatively bright galaxies.

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

**Meteor showers:** There are no major meteor showers during February.

### CCAS Membership Information and Society Financials

#### Treasurer's Report by Don Knabb

##### Jan. 2017 Financial Summary

Beginning Balance	\$1,351
Deposits	\$95
Disbursements	<u>\$0</u>
Ending Balance	\$1,446

#### New Member Welcome!

Welcome back CCAS member David Toth of Phoenixville, PA. 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.



## 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](mailto: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



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!

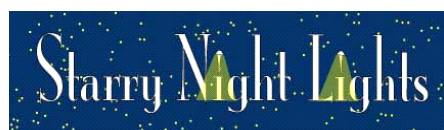
Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

<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!



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 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 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](mailto:newsletter@ccas.us)

Or mail the contribution, typed or handwritten, to:

**John Hepler**  
21103 Stripper 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](mailto: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](mailto: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:

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



### CCAS Membership Information

The present membership rates are as follows:

<b>REGULAR MEMBER.....</b>	\$25/year
<b>SENIOR MEMBER.....</b>	\$10/year
<b>STUDENT MEMBER.....</b>	\$ 5/year
<b>JUNIOR MEMBER.....</b>	\$ 5/year
<b>FAMILY MEMBER.....</b>	\$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](mailto: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**.