



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 20, No. 4

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

April 2012

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IC 63, The Cometary Nebula



Photo courtesy of CCAS Member Dave Hockenberry. See Page 9 for details

Membership Renewals Due

04/2012	Baker Imburgia Popovich Swearingen
05/2012	Fletcher Long Znamensky
06/2012	Aylam Hebding Kovacs Mazziotta & Family Siskind

Important April 2012 Dates

- 6th** • Full Moon, 3:19 p.m.
- 11th** • Daylight Savings Time starts at 2:00 a.m.
- 14th** • Last Quarter Moon, 9:25 p.m.
- 22nd** • New Moon, 10:37 a.m.
- 30th** • First Quarter Moon, 3:41 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 21, 2012** - CCAS Special Observing Session, Anson Nixon Park, Kennett Square. The observing session starts at sunset.

Spring 2012 Society Events

April 2012

4th • PA Outdoor Lighting Council monthly meeting, Bucktown Branch of National Penn Bank, 1111 Ridge Rd, (Rt. 23 just west of Rt. 100) in South Coventry Township, PA, starting at 7:30 p.m. Meetings are open to the public. For more information and directions, visit the [PA Outdoor Lighting Council](#) website.

10th • 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 p. m. to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. CCAS Member Speaker: Dennis O'Leary, "NASA's Discovery Missions: Recent Solar System Revelations—Part Two."

20th • West Chester University Planetarium Show, "The Angry Red Planet," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour. For more information and reservations, visit the planetarium's [webpage](#).

20th • Open call for articles and photographs for the May 2012 edition of Observations.

21st • CCAS Special Observing Session, Anson Nixon Park, Kennett Square. The observing session starts at sunset.

26th • Deadline for newsletter submissions for the May 2012 edition of [Observations](#).

May 2012

2nd • PA Outdoor Lighting Council monthly meeting, Bucktown Branch of National Penn Bank, 1111 Ridge Rd, (Rt. 23 just west of Rt. 100) in South Coventry Township, PA, starting at 7:30 p.m. Meetings are open to the public. For more information and directions, visit the [PA Outdoor Lighting Council](#) website.

8th • 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 p. m. to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. Speaker: TBA.

18th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA (inclement weather date May 19th). The observing session starts at sunset.

20th • Open call for articles and photographs for the June 2012 edition of Observations.

26th • Deadline for newsletter submissions for the May 2012 edition of [Observations](#).

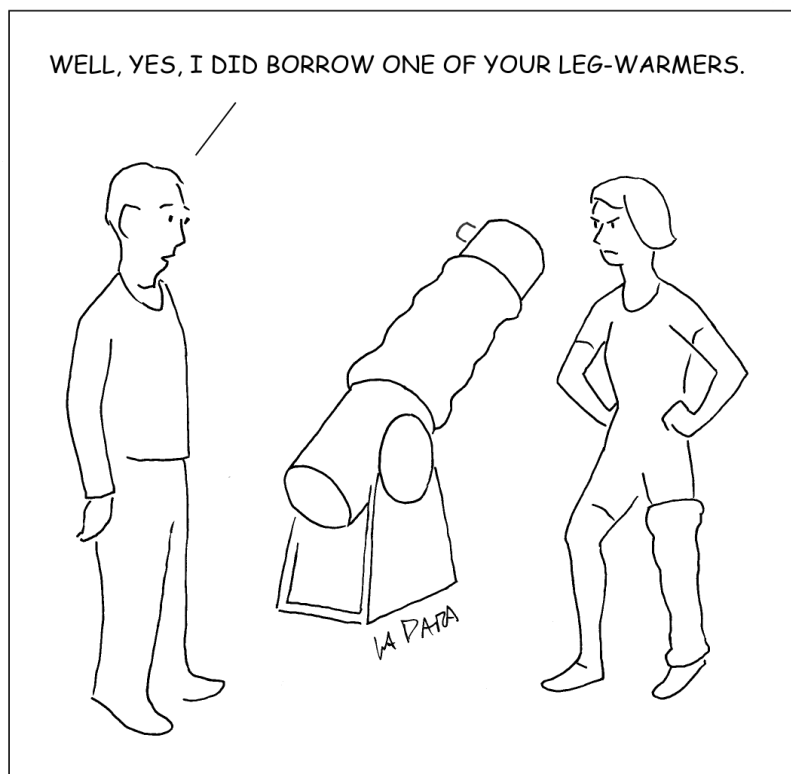
Minutes from the March 13, 2012 CCAS Monthly Meeting

by Ann Miller, CCAS Secretary

- There were 22 people in attendance
- CCAS Observing Chair Don Knabb opened the meeting with the monthly tellurium Tour for March. Highlights this month include Venus, Jupiter and the Pleiades in close alignment 3/26, Mars in Opposition 3/3 allowing viewing from sunset to sunrise, Saturn in good viewing position in later evening, and Spring Galaxy season highlighted by the Leo Triplet.
- CCAS Vice President Liz Smith announced the following astronomy events:
 - Rittenhouse Astronomical Society 3/14 program to celebrate the anniversary of the Friendship 7 mission.
 - Philadelphia Science Festival which will include a Citywide Telescope Night 4/27 starting at 6:30 PM. Volunteers with telescopes are needed for this event.
 - T-shirt/Sweatshirt Orders for CCAS due 3/24 to Kathy Buczynski.
- Dennis O'Leary, CCAS member and NASA Solar System Ambassador, presented the first of a two-part series "Science on the Edge of our Solar System." The NASA Discovery missions were presented in order of launch date, starting with the NEAR/Shoemaker mission in 2/1996 to the GRAIL launched in 9/2011. A free download was highlighted that both retrospectively and prospectively follow these missions. This is available on the Web at <http://solarsystem.NASA.gov/eyes>

Nicholas's Humor Corner

by Nicholas La Para



Astro Photography – Scintillation Squiggles Effect

by Monika Landy-Gyebnar, Space Weather.com

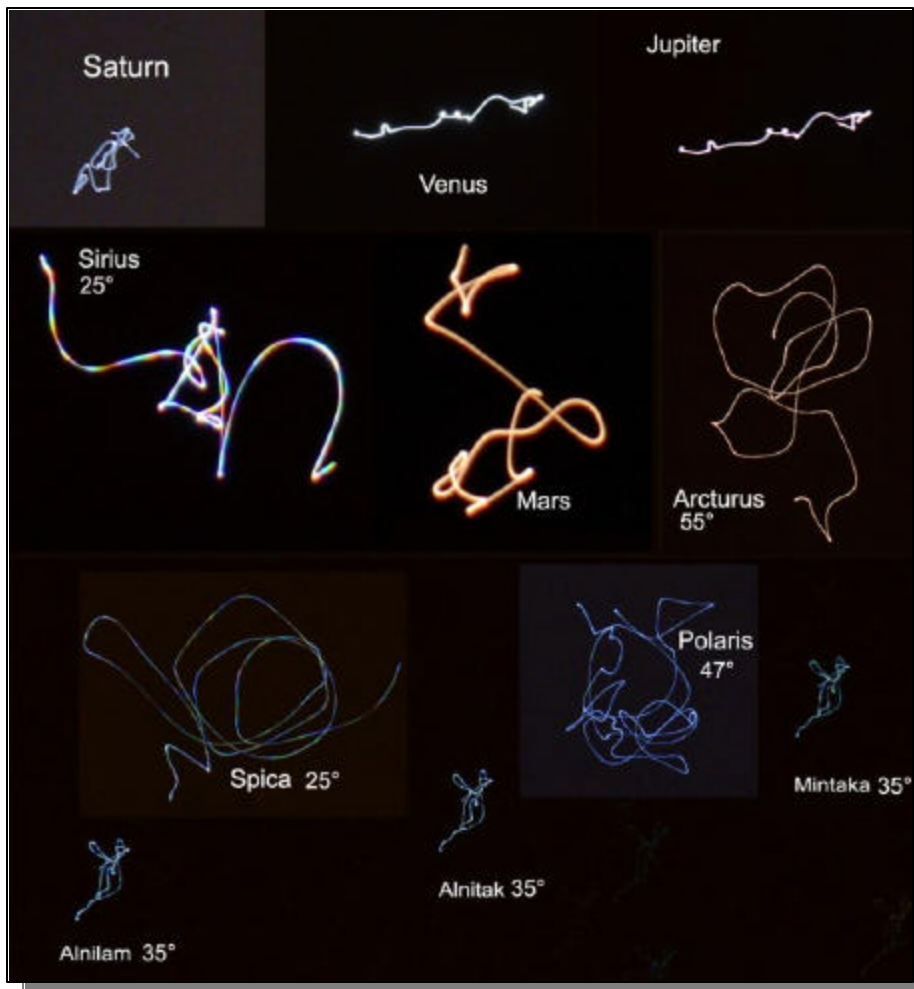


Image Courtesy of Monika Landy-Gyebnar, Veszprem, Hungary. Date taken: March 15, 2012.

Everyone knows that the stars are twinkling - this is the scintillation caused by our atmosphere. People who are interested in astronomy also know that this effect is not visible when one looks at a planet.

This scintillation can be photographed if the camera is shaking during the exposition (2-3 sec. is enough). If we take a photo of a star with a shaking camera the result is a waving line with many colors - or no changing colors if we photograph a planet. The scintillation effect is more

noticeable on stars near the Horizon and less visible on the ones high above. The difference of their colors is also more visible this way. A whole constellation can be photographed with e.g. 50mm focal length and a single star or planet with 200-300mm.

Demonstrating this is a "must do" thing when someone gives a lecture or show on astronomical observations for "outsiders". If you accidentally kick your tripod during the exposition don't delete the picture immediately, but check it first for the scintillation

This Month's Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our meeting this month is on April 10, 2012, 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 this month is CCAS member Dennis O'Leary, who will present "NASA's Discovery Missions - recent Solar System Revelations - Two."

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 our meetings in May and June of this year. If you are interested in presenting at either of these meetings, or even during our upcoming autumn sessions, please contact me at programs@ccas.us.

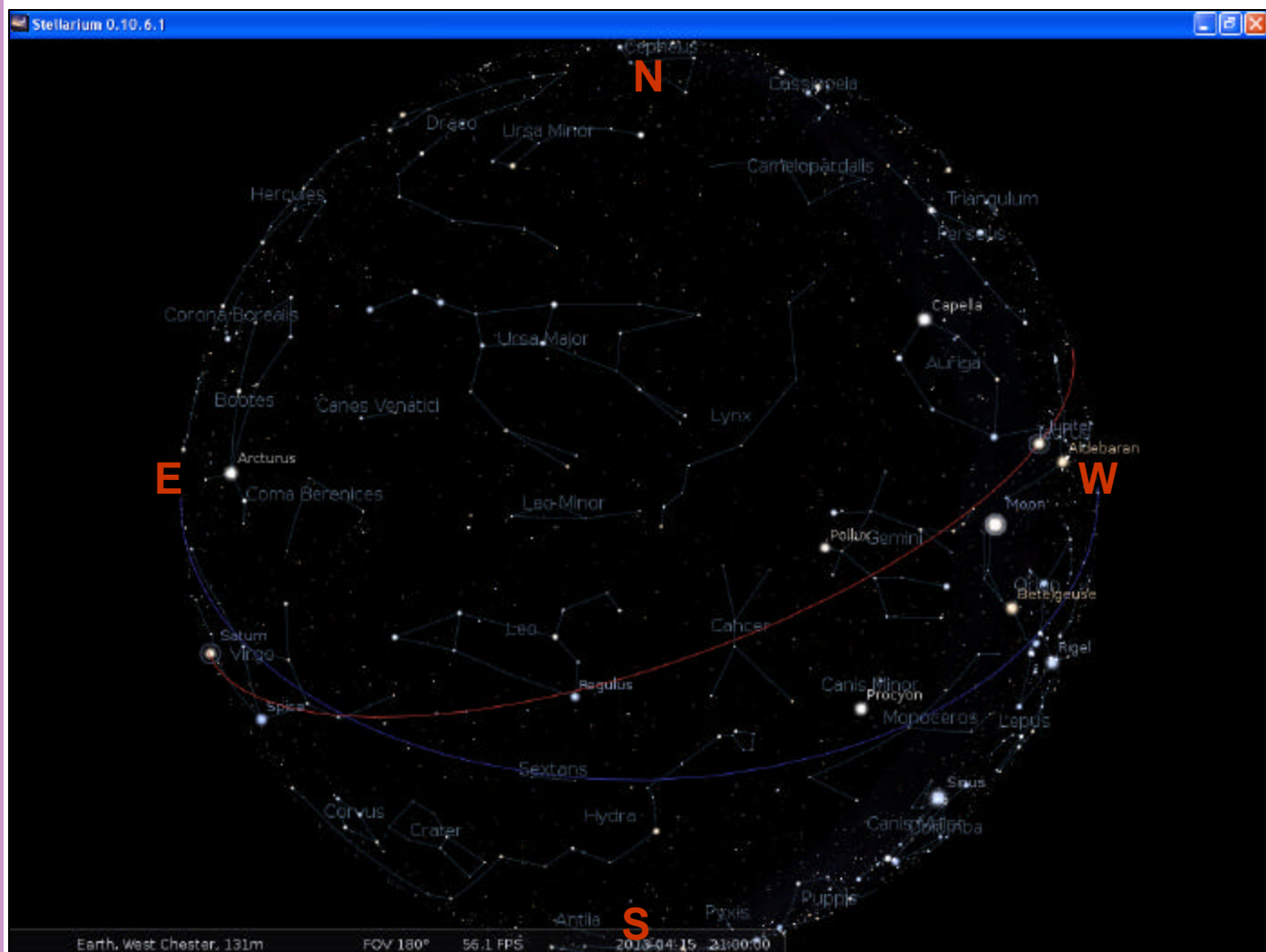
made visible this way! If you do want to photograph the effect you can simply hold the camera in your hand, the result is guaranteed! :-)

The pictures were taken with Nikon D5100 camera and 300mm Nikkor lens, f5.6, ISO 1600 - 3200, 2-2.5 sec. exp. The pictures were cropped and I also created a composite of different objects, names and also the altitude of the stars are written on it.

The Sky Over Chester County

April 15, 2012 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
04/01/2012	6:17 a.m. EDT	6:44 a.m. EDT	7:25 p.m. EDT	7:53 p.m. EDT	12h 41m 26s
04/15/2012	5:54 a.m. EDT	6:22 a.m. EDT	7:40 p.m. EDT	8:08 p.m. EDT	13h 17m 20s
04/30/2012	5:32 a.m. EDT	6:01 a.m. EDT	7:55 p.m. EDT	8:24 p.m. EDT	13h 53m 16s

Moon Phases					
First Quarter	04/29/2012	5:57 p.m. EDT	Last Quarter	04/13/2012	6:50 a.m. EDT
Full Moon	04/06/2012	3:19 p.m. EDT	New Moon	04/21/2012	3:18 a.m. EDT

April 2012 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

April 2-3	Venus passes near the Pleiades
April 6	Full Moon, 3:19 p.m.
April 6	Saturn and Spica are near the Full Moon
April 13	Last Quarter Moon, 6:50 a.m.
April 15	Saturn is at opposition and reaches peak brightness
April 21	New Moon, 3:18 a.m.
April 21-22	The Lyrid meteor shower peaks
April 22	The Moon is near Jupiter
April 23	The Moon is near the Pleiades
April 24	The Moon is near Venus
April 29	First-quarter Moon, 5:57 a.m.

The Best Sights this Month: Bright planets continue to fill the night sky with light during April. With Venus and Jupiter in the west, Mars in the south and Saturn in the east we have great opportunities for naked eye and telescopic observing throughout all of April.

Mercury: Mercury is not in good position for viewing during April.

Venus: Venus continues to shine brightly high in the western sky just after the Sun sets. A beautiful sight will be on the evening of April 2nd and 3rd when Venus will pass close to the Pleiades star cluster. Use binoculars or a wide field telescope to see this arrangement.

Mars: The Red Planet is in excellent position for telescopic viewing during April. I took a good look at it in mid-March but could not pick out any surface features, so I'll be trying again during April

before Mars shrinks as it falls behind in our race around the Sun.

Jupiter: Jupiter is falling deeper into the sunset every day, so catch a glimpse of the king of the planets before it heads below the horizon into the dawn sky in May.

Saturn: The ringed beauty reaches opposition on April 15th so it is visible all night. Wait until near midnight for the best view when you will be looking through the least amount of atmosphere.

Uranus and Neptune: Both gas giants are too close to the Sun to easily observe during April.

The Moon: The Moon is full this month on April 6th. 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.

Constellations: Say good-bye to our friend Orion setting in the west as his pal Hercules rises in the east. Bright Arcturus in Bootes is also rising in the east, followed by the lovely Corona Borealis. Leo the Lion is at center stage with bright Mars hiding in his belly fur.

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: Comet C/2009 P1 (Garradd) should be shining at magnitude 8 or 9 during April as it travels through the constellation Ursa Major. There is a sky chart in the April issue of Astronomy if you want to seek out this fuzz-ball from the outer solar system.

(Continued on page 10)

Looking Up: The Guardians of the Pole & How to Use Ursa Minor as a Gauge of the Quality of the Night Sky

by Don Knabb, CCAS Treasurer & Observing Chair

Ursa Minor, the Little Bear, or more commonly called The Little Dipper, can be seen any time of the year from our Pennsylvania skies because it is so close to the north celestial pole. In fact Polaris, the North Star, is part of Ursa Minor. The easiest way to find Polaris is to use the two “pointer stars” of the Big Dipper, the stars at the end of the dipper, and follow the line they make toward the north.

Continually circling around Polaris, the two stars at the end of the Little Dipper are named Kochab and Pherkad and they are sometimes called “Guardians of the Pole.” The name Kochab is derived from an Arabic title that apparently refers to its nearness to the north celestial pole, and in fact about 3,000 years ago it was closer to the pole than Polaris. At times Kochab and Pherkad were seen as two calves, because they keep as close to the pole as calves to their mother. The name Pherkad appears to be derived from an Arabic term for calf.

This historical painting of Ursa Minor and Draco the Dragon shows Polaris at the tip of the bear’s tail and Kochab and Pherkad along the bear’s front leg and shoulder.

Interestingly, these two stars were used by some as a time-piece, circling steadily as they do around Polaris like the hands of a celestial clock. Columbus mentioned these stars in the log of his famous journey across the

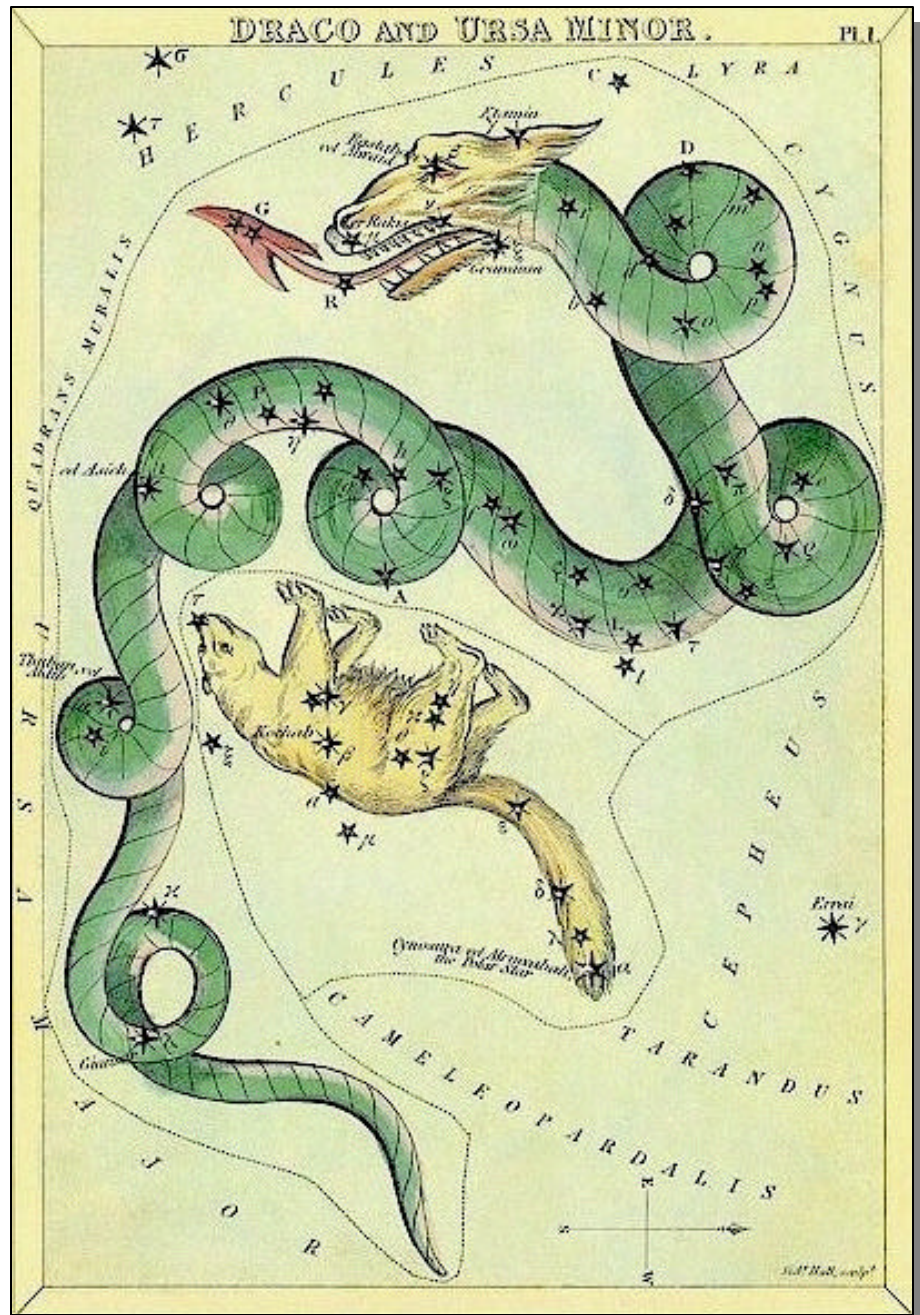


Image credit: Draco, with Ursa Minor, as depicted in Urania's Mirror, a set of constellation cards published in London c. 1825

ocean and many other navigators have found them useful in measuring the hour of the night and their place upon the sea.

I like to use the stars of the Little Dipper as a gauge to measure the seeing quality of the sky. Most

evenings in the West Chester area we can only see the North Star and the Guardian stars. But at a site with darker skies it is easy to pick out the fainter stars of the constellation. I created the picture below using Stellarium

(Continued on page 7)

Through the Eyepiece (cont'd)

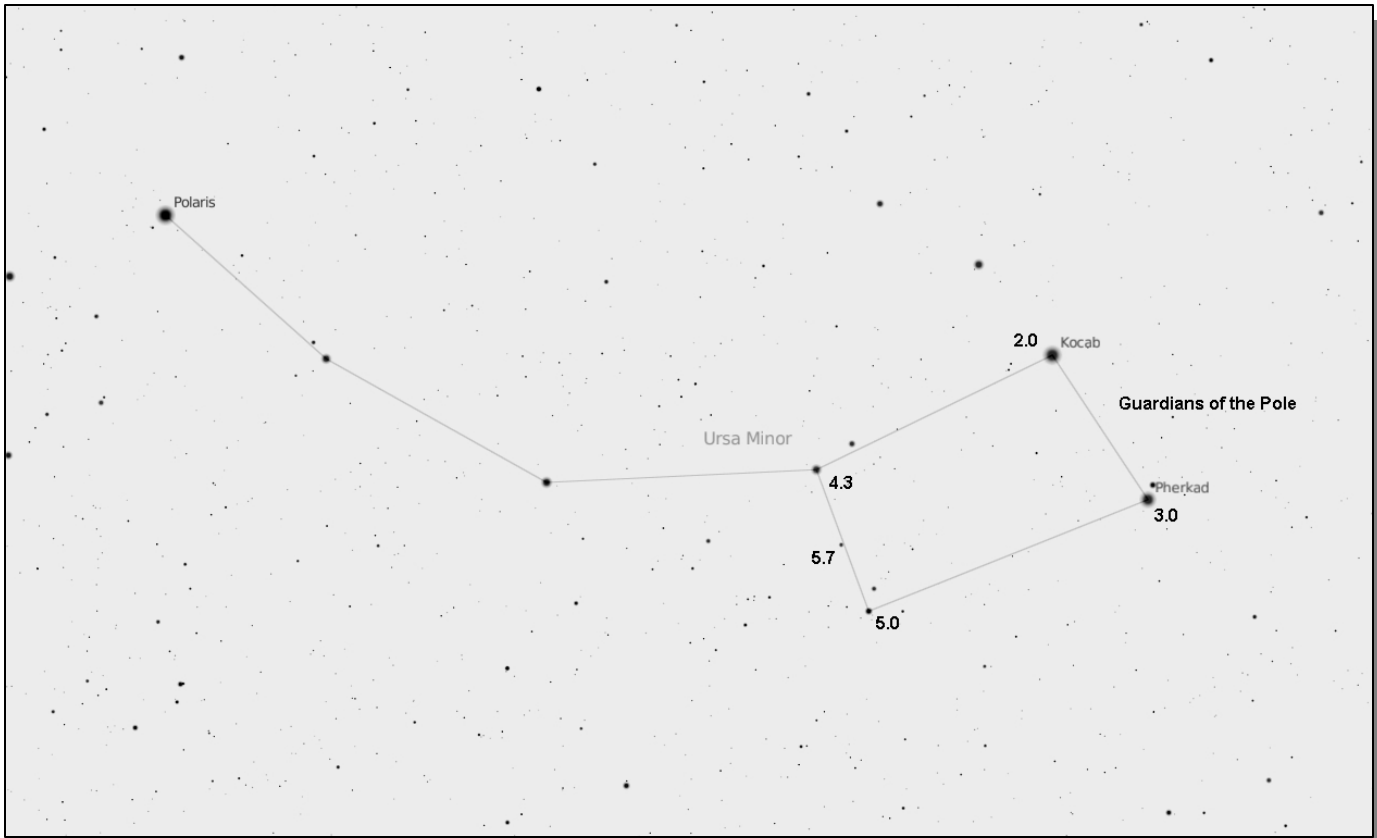


Image credit: Stellarium planetarium software screen capture and IrfanView editing by the author

(Continued from page 6)

planetarium software and Irfan-View, a photo editing program. I added the magnitudes of 5 stars in the constellation. As you see this constellation is very convenient because it gives us stars of approximately magnitude 2, 3, 4, 5 and 6 all in a close grouping and an easily recognized pattern.

So now you have an easy to use “ruler” by which you can measure the quality of the sky any night of the year!

Information credits:

Star magnitudes from the iPad application Sky Safari Pro.

<http://www.space.com/6505-find-dipper.html>

<http://earthsky.org/brightest-stars/kochab-and-pherkad-guard-the-north-celestial-pole>

CCAS Original Astrophotography

by Dave Hockenberry, CCAS Program Chair



IC 63, sometimes called the "Cometary Nebula." This ionized and reflected gas cloud lies about 600 light-years distant in Cassiopeia, lit up by energy from nearby Gamma Cas. Shot 11/2/2011 through AstroTech AT8RC telescope with QSI 583 wsg camera and AstroDon RGB filters, on an AP 1200 GEM. Autoguided with SX Lodestar camera and MaxIm DL. Image capture with MaxIm DL. Calibrated, hot pixel removal, stacked, deconvolved, DDP adjustments and RGB creation in CCDStack. L-RGB merge and further adjustments in Photoshop CS3 and Noise Ninja. FITS Liberator courtesy of ESA. The straight bright line visible at the top is not a satellite, but a diffraction spike from nearby Gamma Cas just outside the field of view.

The Planet in the Machine

by Diane K. Fisher & Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The “butterfly effect” is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

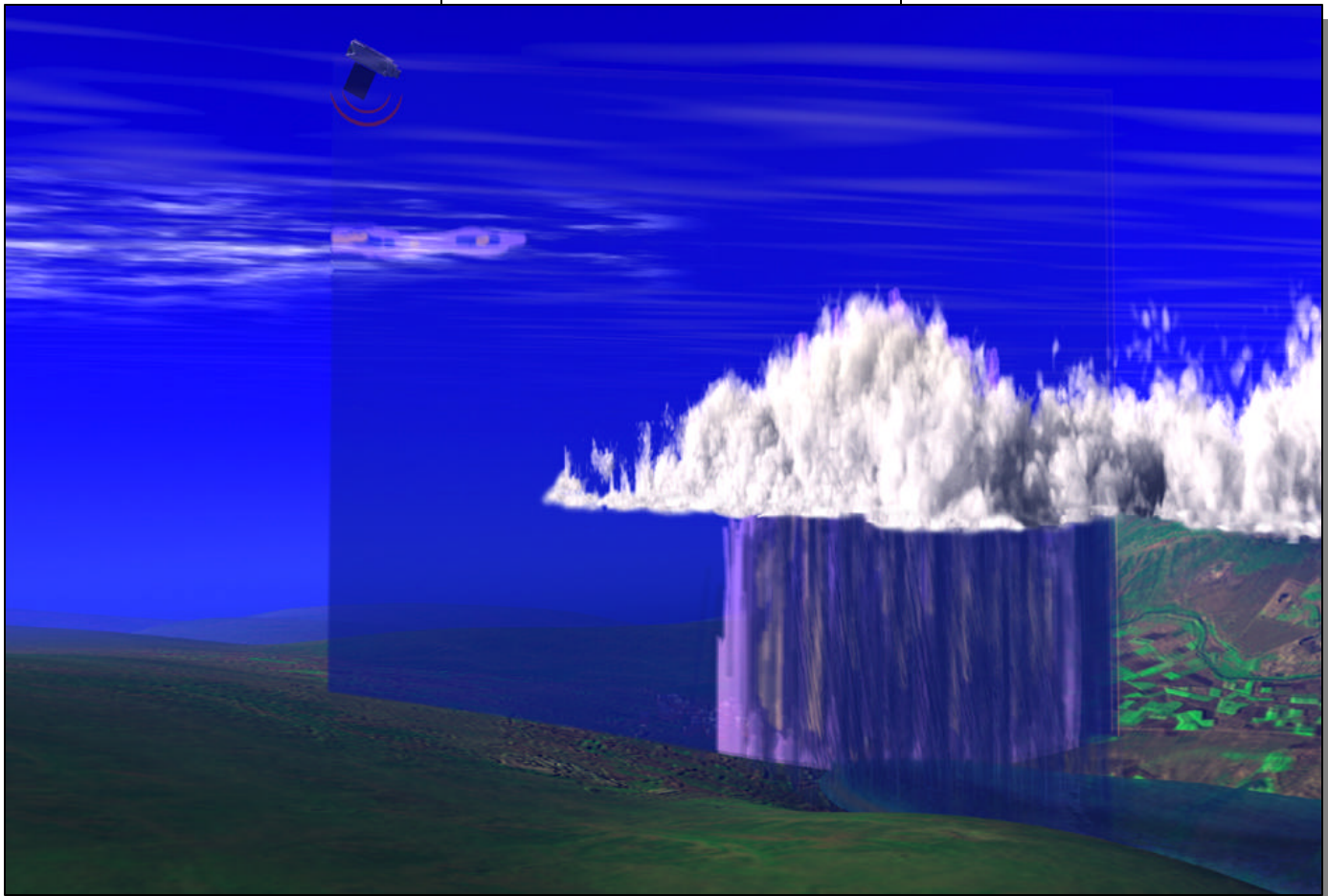


All kidding aside, insects are not in control. The real “butterfly effect” is driven by, for example, global winds and ocean currents, polar ice (melting *and* freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways. And then there’s the human race. If a butterfly can cause a tor-

nado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathe-

(Continued on page 9)



CloudSat is one of the Earth-observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat’s unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun’s energy in the atmosphere. See animation of this data simulation at http://www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html

Space Place (Cont'd)

(Continued from page 8)

mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, bio-

sphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

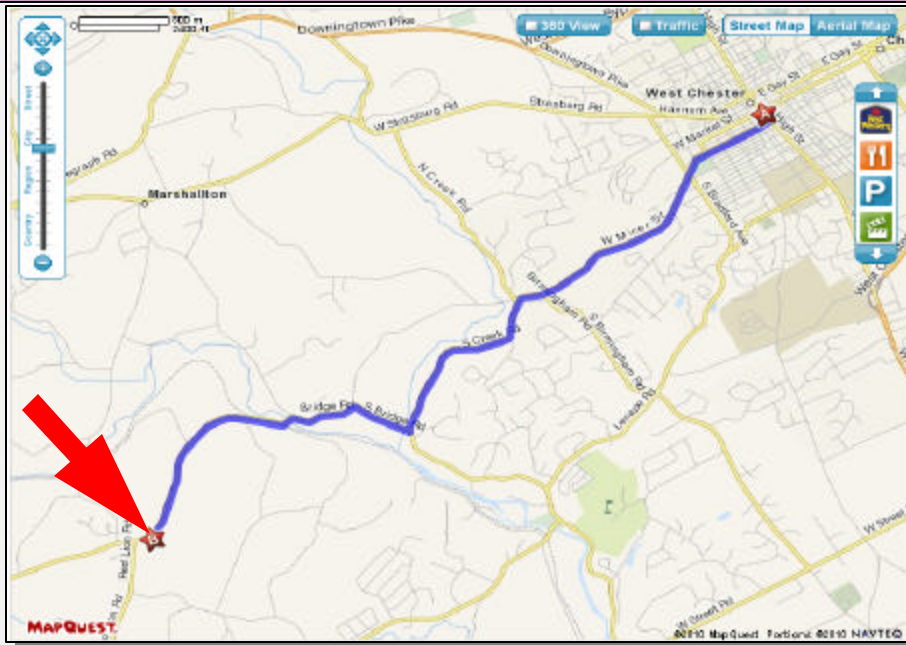
Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-

term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit <http://science.nasa.gov/earth-science/missions/>. Kids can get an easy introduction to Earth system science and play Earthy word games at <http://spaceplace.nasa.gov/ecosphere>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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 year-round) 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 113 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 5)

Meteor Showers: The Lyrid meteor shower occurs on the night of April 21/22. Expect up to 20 meteors per hour at the peak of the shower. This is an excellent year to watch this shower since April 21 is the night of New Moon so the skies will be very dark. Perhaps we'll see some "shooting stars" at our star party at Anson Nixon Park!

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

Feb 2012 Financial Summary

Beginning Balance	\$1,583
Deposits	\$50
Disbursements	\$320
Ending Balance	\$1,313

New Member Welcome!

Welcome new CCAS member Laurie Smith from West Chester. Welcome back Frank Angelini of Downingtown, PA.

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.

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

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
2115 Lazor St.
Apt. 227
Indiana, PA 15701

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 (724) 801-8789 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 724-349-5981
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.

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