



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 23, No. 2      Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009      February 2015

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## Jupiter at Opposition this Month



*Our solar system's largest planet hits opposition this month, making it a perfect time to watch the dance of its four brightest moons. See pg. 3 for the article. Image courtesy of Damian Peach.*

## Membership Renewals Due

02/2015	Rosenblatt & Family Toth Zandler
03/2015	Angelini End LaFrance Sterrett
04/2015	Armored Imburgia Miller Richter

## Important February 2015 Dates

- 3rd** • Full Moon, 6:09 p.m.
- 6th** • Jupiter at Opposition.
- 11th** • Last Quarter Moon, 10:50 p.m.
- 18th** • New Moon, 6:47 p.m.
- 25th** • First Quarter Moon, 12:14 p.m.
- 26th-27th** • Interactions between Io, Ganymede, and Callisto.



## 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, March 21, 2015.** Star Party at Bucktoe Creek Preserve, Kennett Square, PA. Preserve members & the general public pay a small fee; CCAS members participate for free. The event is scheduled for 8:00 PM to 9:30 PM.
- ☼ **Saturday, May 9, 2015.** CCAS special observing session at Hoopes Park, West Chester, PA.

## Winter 2015 Society Events

### February 2015

**4th** • 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.

**6th** • West Chester University Planetarium Live Show: "The Expanding, Accelerating Universe," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

**10th** • 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. Speaker: Dennis O'Leary, NASA Solar System Ambassador: "Exploring the Dwarf Planets."

**12th-13th** • The von Kármán Lecture Series: [No Way Out, Charting Irreversible Climate Change with Jason-3](#), 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 March 2015 edition of [Observations](#).

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

### March 2015

**4th** • 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.

**6th** • West Chester University Planetarium Live Show: "Venus—The Evening Star," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

**10th** • 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. Speaker: TBA.

**26th-27th** • The von Kármán Lecture Series: [Adventures From the Field - \(Down and Dirty\) Stories of Pursuing JPL Science from the Ground up to Space](#), 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 April 2015 edition of [Observations](#).

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

**21st** • Bucktoe Creek Preserve Star Party, Kennett Square, PA.

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

## Minutes from January 2015 Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor, CCAS president welcomed 18 guests and members to our January 13, 2015 meeting.
- Don Knabb, our observing chairman, presented the monthly night sky using Sky Safari Pro because Comet Lovejoy was shown in this format. The path of Lovejoy is easy to follow and by the weekend should be close to the Pleiades.
- Don also reminded members of our upcoming star party at Bucktoe Preserve on Saturday, March 21, 2015.
- David Hockenberry, program chair, introduced our evening's speaker Rob Teeter, owner of Teeter Telescopes. Rob presented "How the Dobsonian Telescope Has Evolved." He also brought 2 of his Dobsonian scopes for members to see.
- Our members were invited to visit the showroom and manufacturing facilities in Rockaway, NJ. Call for an appointment. The contact information for Teeter Telescopes is:

Teeter Telescopes  
www.teeterstelescopes.com  
(732) 991-1248  
270 Route 46, Suite B  
Rockaway, NJ 07866

## February 2015 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on February 10, 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 CCAS member speaker will be Dennis O'Leary, NASA Solar System Ambassador: "Exploring the Dwarf Planets."

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 season. If you are interested in

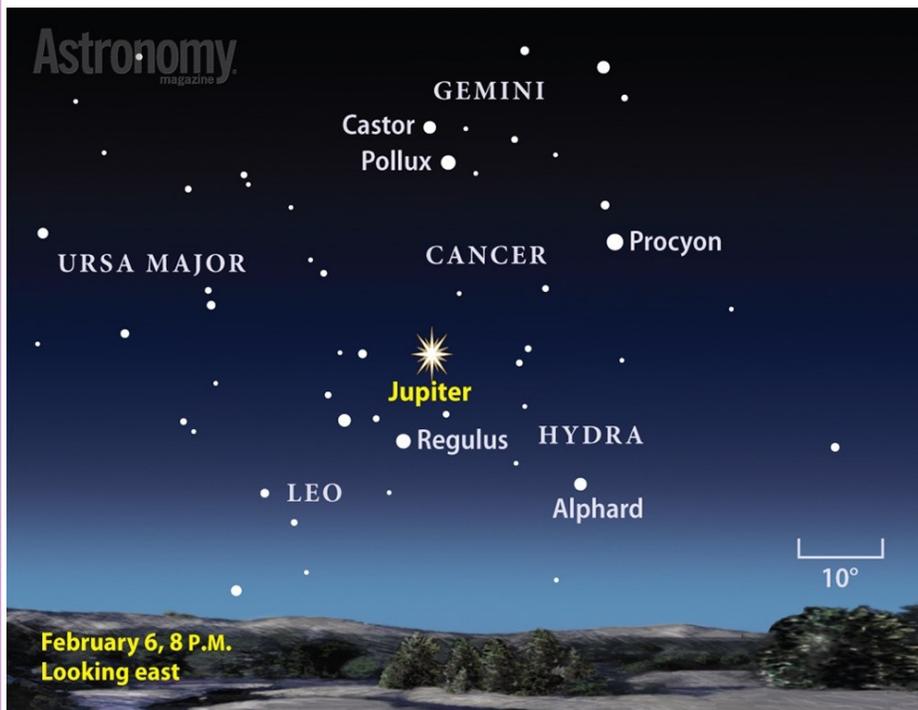


Dennis O'Leary, CCAS NASA Solar System Ambassador

presenting, or know someone who would like to participate, please contact me at [programs@ccas.us](mailto:programs@ccas.us).

## Jupiter Shines Brightest in February

by Eric Betz, *Astronomy Magazine*



Jupiter lies among the relatively faint background stars of Cancer the Crab at its February peak. Image courtesy of Roen Kelly, *Astronomy Magazine*.

Now's the time to break out the telescope for a long look at Jupiter. The king of planets is making its closest approach to Earth, showing off its subtle features and dancing moons.

Jupiter's return to opposition happens every 13 months and makes the gaseous giant loom its largest and brightest in our night sky. When it reaches its peak at 1 p.m. EST February 6, the planet will span 45 arcseconds (1 arcsecond equals 1/3,600 of 1°) and shine at magnitude -2.6. That places Jupiter at three times the brightness of the brightest star in the sky, Sirius. It's easily visible by naked eye, as the only objects in the night sky that are brighter are the Moon and the planet Venus.

Opposition occurs when Jupiter lies directly opposite from the Sun as seen from Earth. That

means the planet will rise at sunset and set at sunrise, placing it in the sky all night long. This alignment also puts the solar system's largest planet highest in the sky at local midnight, where it can be seen through the least amount of Earth's atmosphere for the best possible view. You'll easily spot the planet about halfway between the Bee-



The solar system's largest planet will shine brilliantly during the long winter nights. It spends this period near the border between Cancer and Leo. Image courtesy of Roen Kelly, *Astronomy Magazine*.

hive Cluster (M44), another great binocular target in Cancer the Crab, and 1st-magnitude Regulus, the brightest star in the constellation Leo the Lion.

At opposition, most will find their telescopes reveal Jupiter's two dark belts, which are separated by a brighter equatorial zone. And the planet's increase in apparent size should allow eyepiece views of cloud features in the jovian atmosphere too. Observers also will find it obvious that the planet is not perfectly circular, which is not an illusion. This is caused by the gaseous giant's composition and rapid rotation. In fact, Jupiter spins completely in under 10 hours, which would allow a dedicated viewer to see the entire planet in just one long winter night.

Jupiter's four brightest moons, which Galileo discovered in 1610, will also be an excellent sight. These Galilean satellites — Io, Europa, Ganymede, and Callisto (in order of increasing distance from Jupiter) — seldom line up by distance. This happens on the night of opposition. Between sunset and about 2 a.m. EST, an observer can name the moons just by noting how far east of Jupiter they lie.

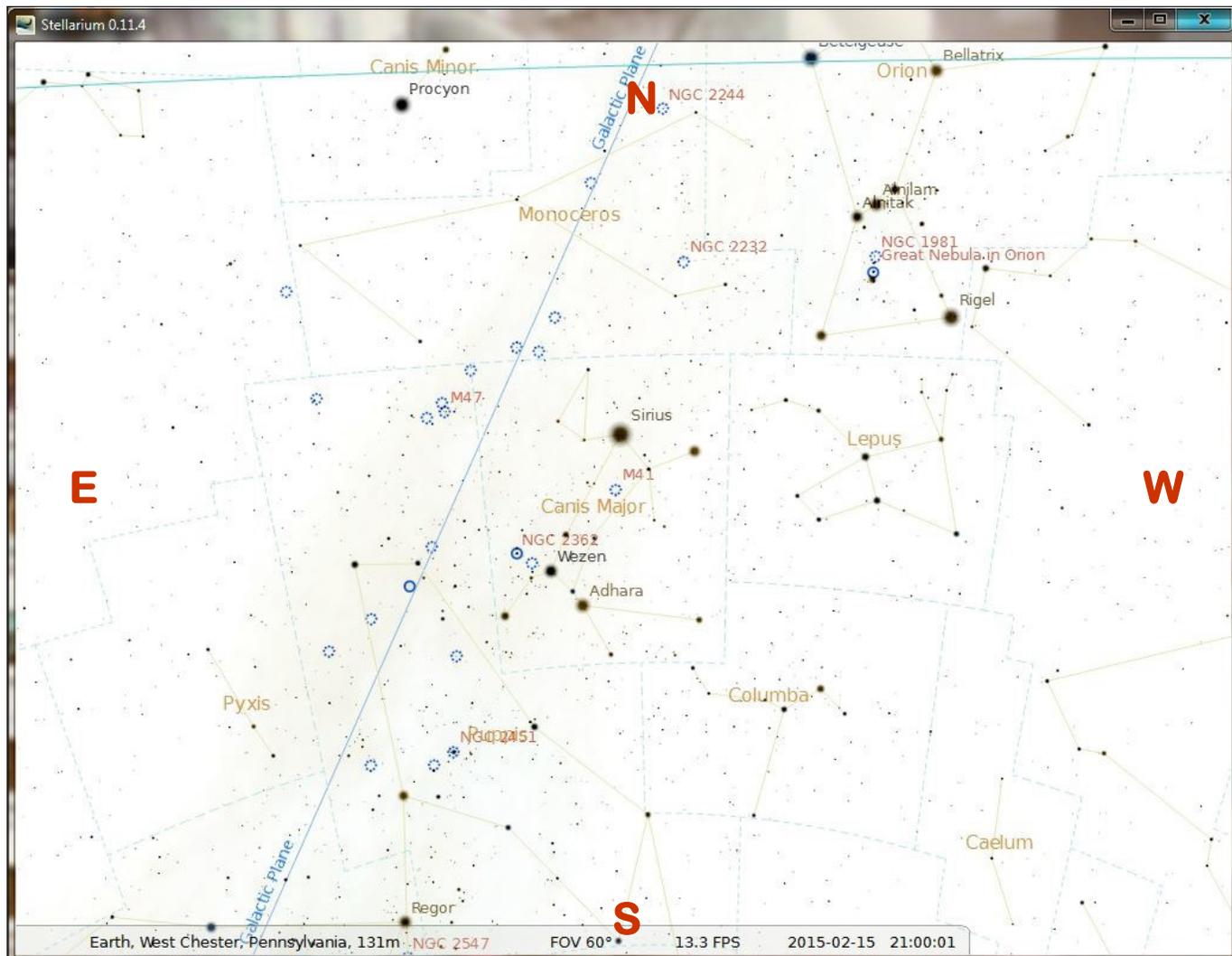
One particularly exciting series of events unfolds on the night of February 26. In a six-hour period above North American skies, there will be four interactions between the moons worth staying up for. Starting at 9:17 p.m. EST, Io will pass in front of Ganymede (an occultation). Then at 10:31 p.m., Io's shadow

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# The Sky Over Chester County

February 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](http://www.stellarium.org).



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
2/01/2015	6:41 a.m. EST	7:09 a.m. EST	5:20 p.m. EST	5:48 p.m. EST	10h 10m 21s
2/15/2015	6:26 a.m. EST	6:54 a.m. EST	5:36 p.m. EST	6:04 p.m. EST	10h 42m 34s
2/28/2015	6:09 a.m. EST	6:36 a.m. EST	5:51 p.m. EST	6:18 p.m. EST	11h 15m 20s

### Moon Phases

Full Moon	2/03/2015	6:09 p.m. EST	Last Quarter	2/11/2015	10:50 p.m. EST
New Moon	2/18/2015	6:47 p.m. EST	First Quarter	2/25/2015	12:14 p.m. EST

## February 2015 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

3	<b>Full Moon, the Snow Moon, is near Jupiter</b>
8	<b>The Zodiacal Light is visible during the next two weeks</b>
11	<b>Last Quarter Moon</b>
18	<b>New Moon</b>
20	<b>Venus, Mars and a thin crescent Moon are close in evening twilight</b>
21	<b>The Moon occults Uranus early this evening and Venus and Mars are very close</b>
25	<b>First Quarter Moon, Lunar X visible</b>
26	<b>Lunar Straight Wall visible</b>

**The best sights this month:** Comet Lovejoy will continue to rise into the sky through February and should still be bright enough to find with binoculars. On the 21st Venus, Mars and a thin crescent Moon will be very close in the evening twilight.

**Mercury:** After January's appearance next to Venus in the sky, Mercury is more elusive in the pre-dawn sky during February.

**Venus:** Our sister planet is shining at magnitude -3.9 and has a close encounter with Mars on February 22/23 when the planets appear only a half degree apart in the evening sky.

**Mars:** The red planet is faint at magnitude 1.2, about 100 times fainter than Venus. You might even need binoculars to find Mars near Venus. Watch as the two planets fly in formation through the sky in mid-month, then slowly separate by late February.

**Jupiter:** The king of the planets is at opposition, when it is opposite the Sun in our sky, on February 6th, so it is visible nearly all night. Late at night Jupiter will be high in the sky and viewed through the least atmosphere, so the view will be stunning!

**Saturn:** Saturn rises during the early morning hours during February and is highest in the sky just before morning twilight.

**Uranus and Neptune:** The Moon occults Uranus during bright evening twilight on February 21st. Stellarium shows Uranus coming out from behind the Moon around 6:55 p.m. It will appear on the lower right side of the Moon. Neptune is not in good position for observing during February, or for many months to come.

**The Moon:** The Moon is full on February 3rd. 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.

**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 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 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 an M82, a pair of relatively bright galaxies.

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**Through the Eyepiece: M44, the Beehive Cluster**  
 by Don Knabb, CCAS Treasurer & Observing Chair

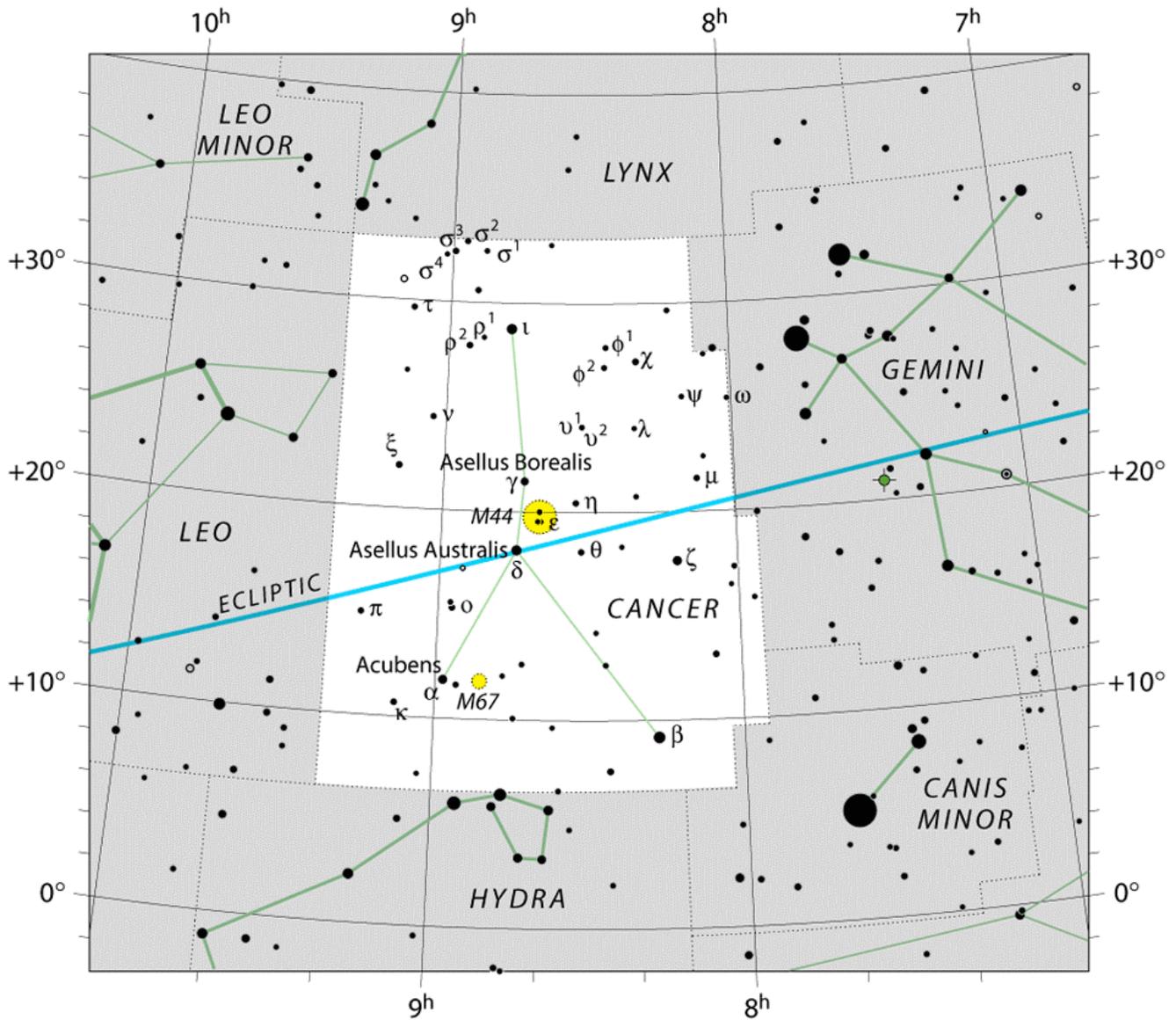


Image credit: IAU and Sky and Telescope magazine

M44 (NGC 2632) is better known by the name the Beehive Cluster, or the Latin equivalent: Praesepe, which not only means a hive but also a crib, or manger.

M44 is found at the center of the constellation Cancer the Crab. It is a favorite object for star parties in early spring. Participants are simply amazed at all the stars in the eyepiece of your telescope,

when they cannot even see the cluster in the sky.

This is a bright open cluster clearly visible to the naked eye on a dark night under excellent conditions, but in our Chester County skies it is best appreciated with binoculars or a telescope with a low power eyepiece. One of the largest clusters, its 1.5 de-

gree size is equivalent to three full moons end-to-end.

According to the new determination by ESA's astrometric satellite Hipparcos, the cluster is 577 light years distant and its age was estimated at about 730 million years.

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## Beehive (Cont'd)



Image credit: Bob Franke, <http://bf-astro.com/>, Focal Pointe Observatory

*(Continued from page 6)*

This grouping is so large it was well-known in antiquity, when it was thought to be a nebula, or gaseous region of the sky. The cluster often served to predict the weather: if the view of the cluster was not crystal clear inclement weather might be on the way.

Galileo was the first to study its stars with a telescope. He counted over forty members, putting to rest the idea of its nebulosity and introducing the idea of star clusters.

There are approximately 350 stars in the Beehive. With larger telescopes more than 200 of the 350 stars in the cluster area have

been confirmed as members (by their common motion). Some others are foreground or background stars, and others may not yet have been determined. It has been estimated that over a hundred of its stars are brighter than our Sun.

Greeks and Romans saw this "nebula" as the manger associated with two donkeys that eat from it, the gamma and delta stars of Cancer. The myth states that these were the donkeys on which the gods Dionysus and Silenus rode into the battle against the Titans, who were frightened by the animals' braying so that the gods won. As a reward, the donkeys were put in sky.

## Observing (cont'd)

*(Continued from page 5)*

**Comets:** Comet Lovejoy continues to rise higher into the sky and may still be a barely visible naked eye object throughout February. I found the comet without optical aid in mid-January at a dark sky site, but doubt it is visible in Chester County skies without binoculars. But binoculars will make the comet easy to find if you "star hop" using a chart from the Sky and Telescope magazine web site. I was thrilled to see more than just a fuzzy spot when observing the comet with a tele-

*(Continued on page 10)*

## Minor Mergers Have Massive Consequences for Black Holes

by Dr. Ethan Siegel

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

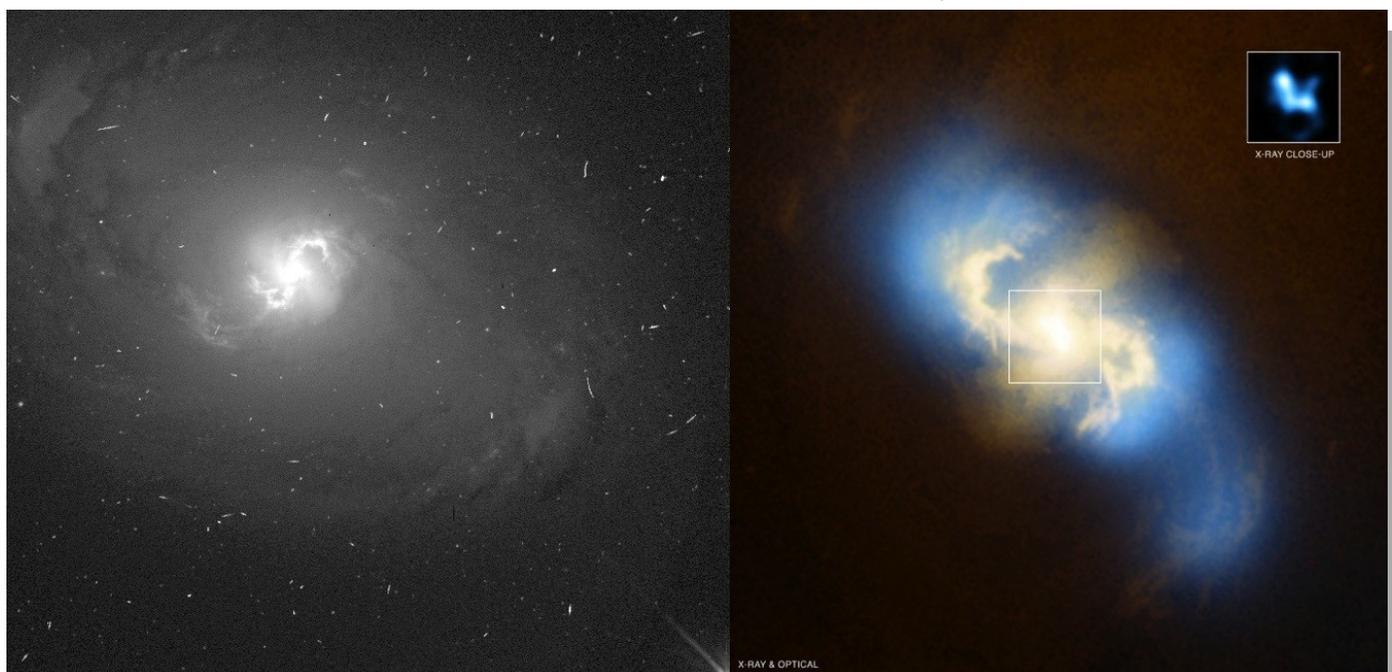
Over time, many generations of stars—and hence, many black



holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous time-scales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some frac-

tion of Milky Way-sized galaxies with not just one, but *multiple* supermassive black holes at their center!

It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only



## Space Place (Cont'd)

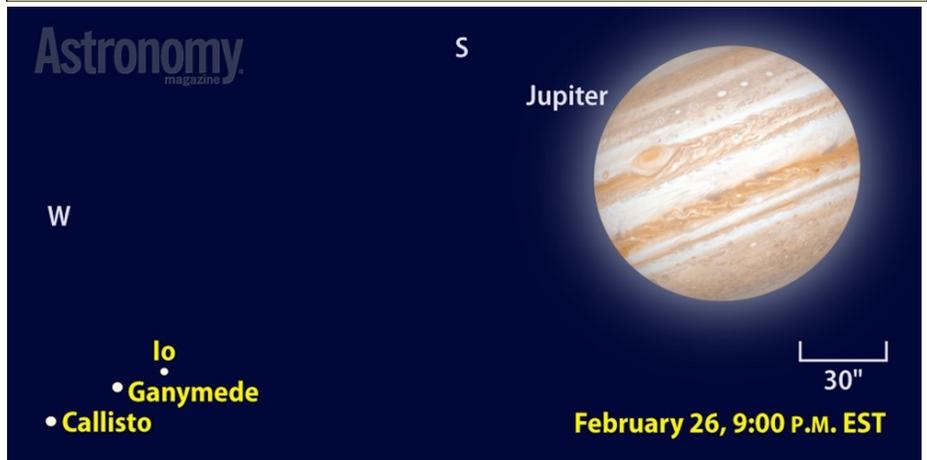
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confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

Check out some cool images and artist reconstructions of black holes from Chandra: <http://chandra.harvard.edu/photo/category/blackholes.html>

Kids can learn all about Black Holes from this cool animation at NASA's Space Place: <http://spaceplace.nasa.gov/black-holes>.

## Jupiter (Cont'd)



Three Jovian moons lie near one another the night of February 26/27. Between 9 p.m. and 3 a.m., four mutual events take place among them. Image courtesy of Roen Kelly, Astronomy Magazine.

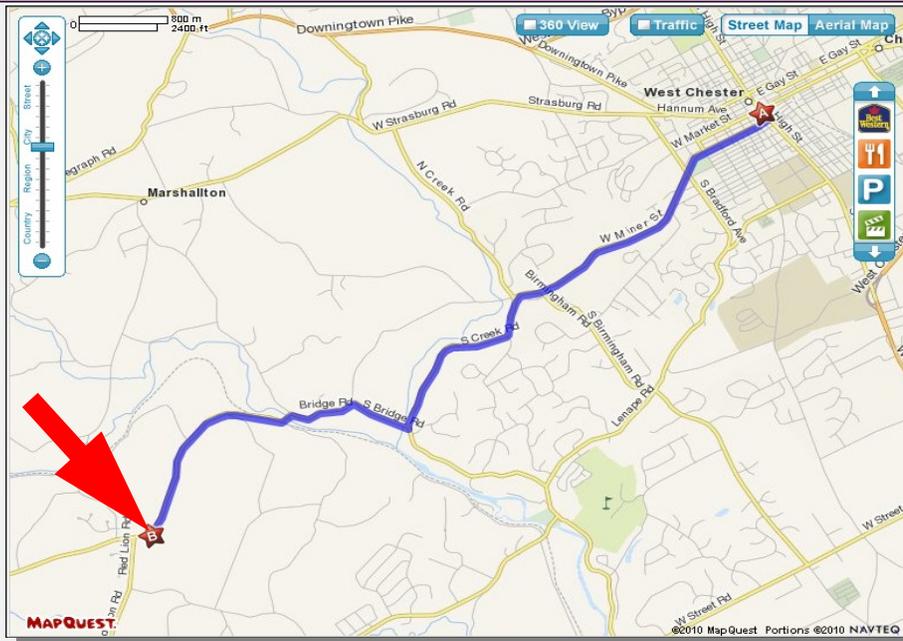
(Continued from page 3)

will envelop Ganymede (an eclipse). At 11:28 p.m., Callisto eclipses Ganymede. And, for the night's final event, Callisto's shadow will engulf Io in an eclipse at 2:49 a.m.

The satellites are easy targets in small telescopes and will put on an inspiring period of dozens of these transits, eclipses, and shadows cast on the planet through August 2015. And for those in

(Continued on page 10)

## 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.

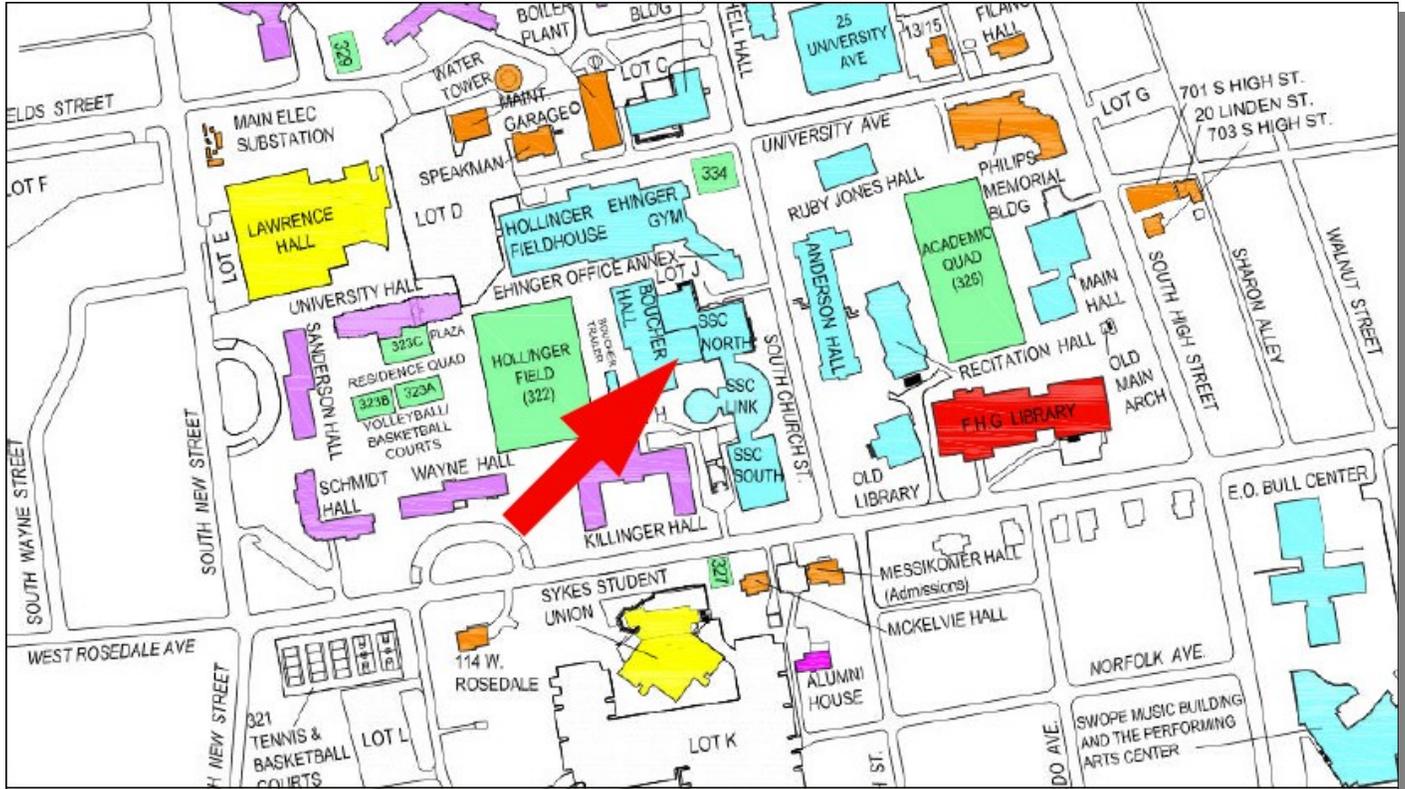
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route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



### Observing (Cont'd)

*(Continued from page 7)*

scope. There is a distinct bright nucleus that shows up around 25X, but is more easily seen at higher magnifications.

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

### Jupiter (Cont'd)

*(Continued from page 9)*

cold climes clouded out or not willing to brave the chill, the planet will remain fantastically bright for much of the coming year.

### CCAS Membership Information and Society Financials

#### Treasurer's Report

by Don Knabb

#### Jan. 2015 Financial Summary

Beginning Balance	\$2,145
Deposits	\$50
Disbursements	\$0
Ending Balance	\$2,195

#### New Member Welcome!

Welcome new CCAS member Pete Kellerman 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.

## 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>

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](mailto: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](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 (443) 282-0619 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 443-282-0619
<b>Public Relations:</b>	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](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**.