Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 21, No. 12 Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009 December 2013

In This Issue

Membership Renewals Due

12/2013	Bogusch O'Leary
01/2014	Golub Labroli Linskens Loeliger Lurcott, Stan Prasad
02/2014	DiGiovanni Kalinowski & Family La Para

Have a safe and happy holiday filled with family, friends, and joy.

Important December 2013 Dates

2nd • New Moon, 7:23 p.m.

9th • First Quarter Moon, 10:12 p.m.

17th • Full Moon, 4:29 a.m.

21st • Winter Solstice at 12:11 p.m.

25th • Last Quarter Moon, 8:48 a.m.

26th • Comet ISON makes closest approach to Earth (40 million miles)

CCAS Holiday Party

Barb and Don Knabb have graciously offered once again to host our end-of-year holiday party. Members and their families are invited to their home on December 14, 2013, at 7 p.m. The address is 988 Meadowview Lane and their phone number is 610 436 5702. A Google Maps search will provide good directions to their house. Their home is at the end of a cul-de-sac and 988 is on the mailbox. They have a long driveway and the house has the garage facing the street. Please RSVP to dknabb00@comcast.net so they know how much food to plan. They'll have sandwiches and snacks and beer and wine.

Autumn/Winter 2013 Society Events

December 2013

2nd • Reservations start for the December 20th planetarium show at the WCU Planetarium.

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.

12th • The von Kármán Lecture Series: The Planck Space Telescope: Revealing the Ancient Universe,, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

14th • CCAS Annual Holiday Party. The party is open to members and their families. See page 1 for details and location.

20th • West Chester University Planetarium Show: "So You Want to Buy a Star," in the Schmucker Science Building. For more information and reservations, visit the WCU Public Planetarium Shows webpage.

20th • Open call for articles and photographs for the January 2014 edition of Observations.

21st • Winter Solstice occurs at 12:11 PM ET.

26th • Deadline for newsletter submissions for the January 2014 edition of Observations.

January 2014

8th • 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.

11th • CCAS Monthly Meeting, Room 112, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: TBA.

20th • Open call for articles and photographs for the February 2014 edition of Observations.

26th • Deadline for newsletter submissions for the February 2014 edition of Observations.

Minutes of the November 12, 2013 Meeting

by Ann Miller, CCAS Secretary

- 22 guests and members were welcomed to the November 12, 2013 meeting.
- John Conrad, NASA JPL Solar System Ambassador and CCAS member, presented "Eyes on Ison." John gave a NASA update on the Comet Ison as well as its history of discovery and its potential outcomes at perihelion on November 28, 2013
- Our guest speaker for the evening was Dr. Dave Goldberg from the Department of Physics at Drexel University. His topic was "The Universe in the Rearview Mirror-How Hidden Symmetries Shape Reality."
- Dr. Goldberg signed copies of his book of the same name at the conclusion of his talk. For all who enjoyed his wry sense of humor, his Twitter account is @askaphysicist or on Facebook at www.facebook.com/Dr.DaveGoldberg. He also has a column called "Ask a Physicist" on the i09 website.

Nicholas's Humor Corner

by Nicholas La Para

Much Anticipated Comet may be in Trouble

by Amanda Barnett, CNN

Comet ISON shines brightly on the morning of November 19.

Wednesday, November 27, 2013

ISON, the most closely watched comet in recent years, may be falling apart as it nears its close encounter with the sun. Comets are giant snowballs of frozen gases, rock and dust that can be several miles in diameter. When they get near the sun, they warm up and spew out some of the gas and dirt, creating a tail that can stretch for thousands of miles. Most comets are in the outer part of our solar system. When they get close enough for us to see them, scientists study them for clues about how our solar system formed.

When ISON was first discovered, hopes were high that it might become visible to the naked eye, meaning everyone might be able see it, not just those with good telescopes who took the trouble to find it. There was talk it might even rival some of the Great Comets like Halley's or Hale-Bopp and spread a huge tail across the sky.

But some observers on Tuesday reported online that the comet is not nearly as bright as it has been in recent days and that it may be pouring out dust. This could mean the comet's core, or nucleus, has "completely disrupted, releasing an enormous volume of dust," NASA's Comet ISON Observing Campaign says in its November 25 online update.

But other observers say images taken by NASA's STEREO spacecraft are "encouraging evidence that the comet still exists," Padma Yanamandra-Fisher with the ISON campaign told reporters on the campaign's Facebook page. She added that it's too early to tell what kind of shape the comet is in, though.

"I believe the next couple of days will be crucial to determine the post-perihelion appearance of the comet," Yanamandra-Fisher said. Perihelion is the point in an object's path that is closest to the sun.

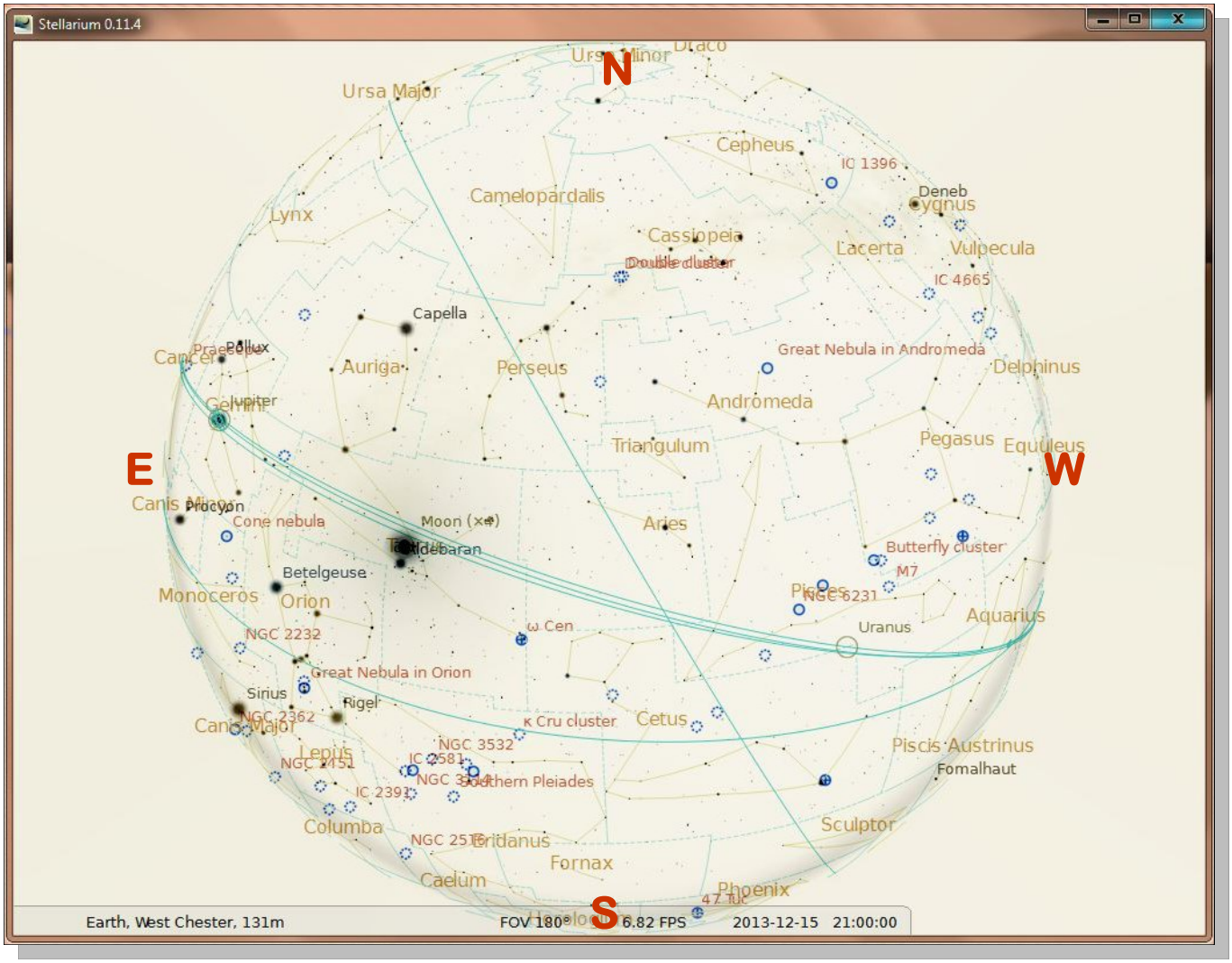
Whatever its final fate, she said, ISON has "provided a wonder-

(Continued on page 8)

The Sky Over Chester County

December 15, 2013 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
12/01/2013	6:33 a.m. EST	7:03 a.m. EST	4:36 p.m. EDT	5:06 p.m. EST	09h 32m 38s
12/15/2013	6:45 a.m. EST	7:15 a.m. EST	4:37 p.m. EDT	5:07 p.m. EST	09h 21m 08s
12/31/2013	6:52 a.m. EST	7:22 a.m. EST	4:46 p.m. EDT	5:16 p.m. EST	09h 23m 13s

Moon Phases					
New Moon	12/02/2013	7:23 p.m. EST	Full Moon	12/17/2013	4:29 a.m. EST
First Quarter	12/09/2013	10:12 p.m. EST	Last Quarter	12/25/2013	8:48 a.m. EST

December 2013 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

2	**New Moon**
5	**The crescent Moon is near Venus**
9	**First-quarter Moon, the Lunar X is visible**
10	**The Lunar Straight Wall is visible**
11	**The Moon is near Uranus**
13/14	**The Geminid meteor shower peaks**
17	**Full Moon**
19	**The Moon is near Jupiter**
21	**Winter solstice occurs at 12:11 p.m.**
25	**Last Quarter Moon**

The best sights this month: Comet ISON is the big question – will it delight or disappoint? We need to wait and see if it holds together as it comes around the Sun. If it does, it will be worthy of waking up well before dawn to see this visitor from the outer solar system. But rising in the east in the evening sky we can see an object that is dependable and never fails to amaze us, the king of the planets, Jupiter. In the west, bright Venus shines all month just after sunset.

Mercury: December is not a good month for observing Mercury.

Venus: Venus reaches maximum brightness early in December, shining at an amazing magnitude -4.9! This is also a great month to observe Venus's phase as it catches up to us in our race around the Sun. It will present a nice crescent in a telescope. Enjoy Venus now, because in January it becomes a dawn object.

Mars: The red planet will rise just a bit after midnight by month's end and is finally beginning to brighten and show a reasonable size disk in a telescope.

Jupiter: It is a joy to look out our bathroom window and see Jupiter rising in the east as I brush my teeth! It will be even better when it clears the trees enough for me to set up a telescope. On the evenings of December 9th and 10th Jupiter is very close to a star in the constellation Gemini the Twins.

Saturn: December is not a good month to observe Saturn, unless you like setting up a telescope in the dark and cold hour before dawn. Not me, I'll wait until next spring and summer!

Uranus and Neptune: I observed Uranus and Neptune in late October and they continue to be easily observed during December. Uranus was a distinct green disk, while Neptune was a faint blue dot. You can find a sky map to help you locate these gas giants at skypub.com/urnep, the website of Sky and Telescope magazine.

The Moon: Full Moon occurs on December 17th. This is the Full Cold Moon; or the Full Long Night's Moon. It is also sometimes called the Moon before Yule. The term Long Night's Moon is appropriate because the midwinter night is indeed long, and because the Moon is above the horizon for a long time. The midwinter full Moon has a high trajectory across the sky because it is opposite a low Sun. It will give a snow covered lawn an incredibly bright glow!

Constellations: Oddly enough we can still see the Summer Triangle dipping into the west just after it gets dark. But look to the east and you will see the constellations that make it worth dressing warmly and spending some time outside during the cold December nights. Bright Capella in Auriga is high in the east over the "V" of Taurus the Bull. Just behind Taurus is Orion the Hunter, the most easily recognized constellation of the winter months.

Messier/deep sky: There is so much to see in the December sky you won't be lacking targets if Santa brings you any new astronomy equipment! If it is not too cold there is a long list of beautiful objects

(Continued on page 11)

Through the Eyepiece: Kemble's Cascade

by Don Knabb, CCAS Treasurer & Observing Chair

Image credit: Walter MacDonald, http://antwrp.gsfc.nasa.gov/apod/ap000814.html

Whenever I find binocular objects that form a unique pattern in the sky I feel like I have found something special. Such objects as the Coat Hanger Cluster and the Cygnus Star Chain are always fun to share at star parties. Another object that I always look for during winter observing sessions is Kemble's Cascade.

Kemble's Cascade is located in the constellation Camelopardalis: The Giraffe. This constellation is in the far northern sky and has no noteworthy stars. It was created in 1624 by astronomer Jakob Bartsch, who created it to fill a vast region of faint stars surrounded by brighter and more famous constellations such as Cassiopeia, Cepheus, Perseus, Auriga and Ursa Major. Its

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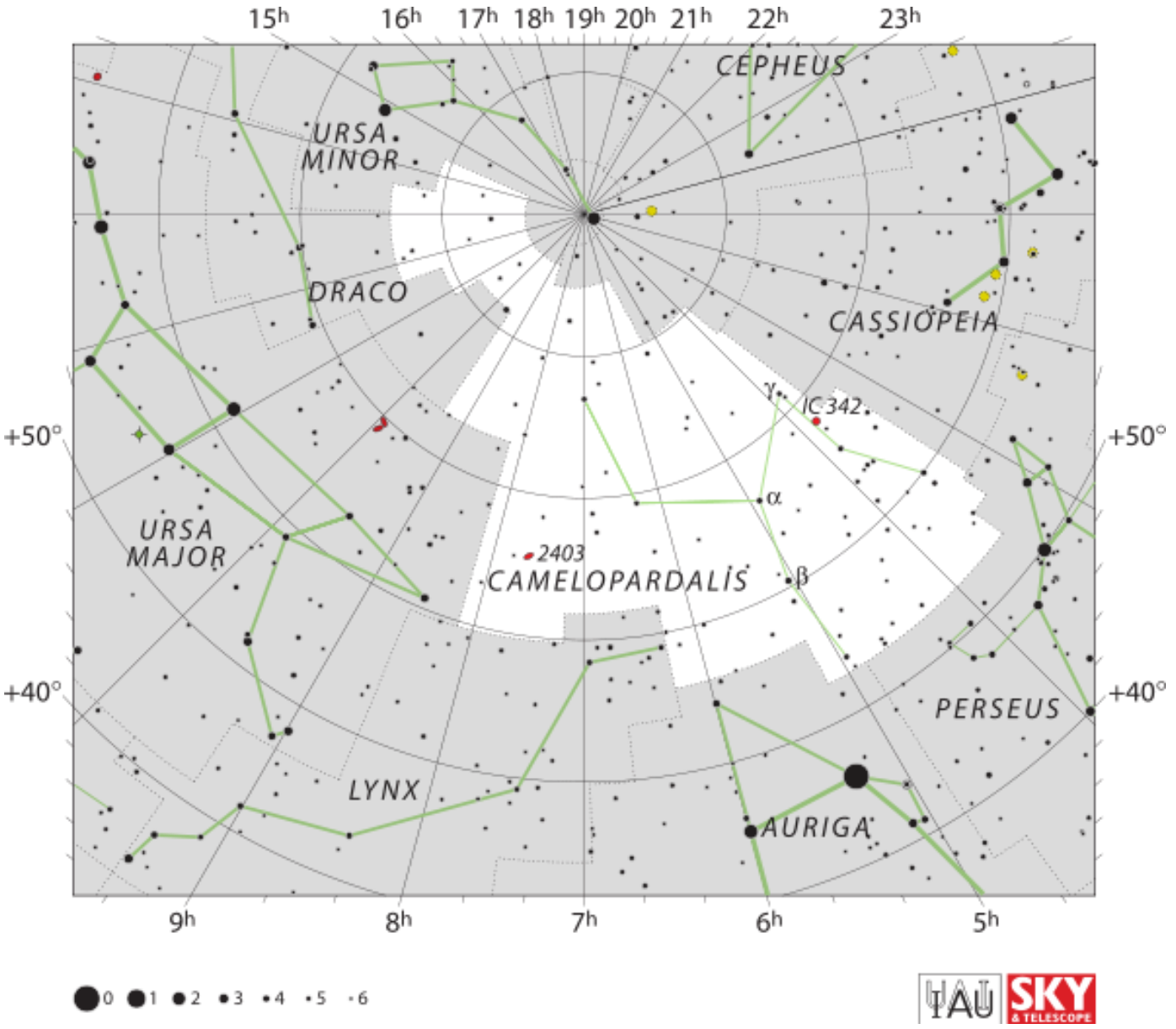
Eyepiece (Cont'd)



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brightest star is only magnitude 4.2 which is just visible under good conditions in Chester County skies.

Kemble's Cascade is an asterism - a pattern created by unrelated stars. It is an apparent straight line of more than 20 colorful 5th to 10th magnitude stars over a distance of approximately five moon diameters, and the open cluster NGC 1502 can be found at one end. To me, the Kemble's Cascade looks like a ski jumper's launching slope.

The photograph on page 6 of Kemble's Cascade was made with a small telescope in New Mexico. The bright object near the bottom left is the relatively compact open cluster of stars known as NGC 1502.

Kemble's Cascade was named by Walter Scott Houston in honor of Father Lucian J. Kemble (1922 - 1999) who wrote a letter to Walter about the asterism, describing it as "a beautiful cascade of faint stars tumbling from the northwest down to the open cluster NGC 1502" that he had discovered while sweeping the sky with a pair of 7x35 binocu-

(Continued on page 9)

Comet (Cont'd)

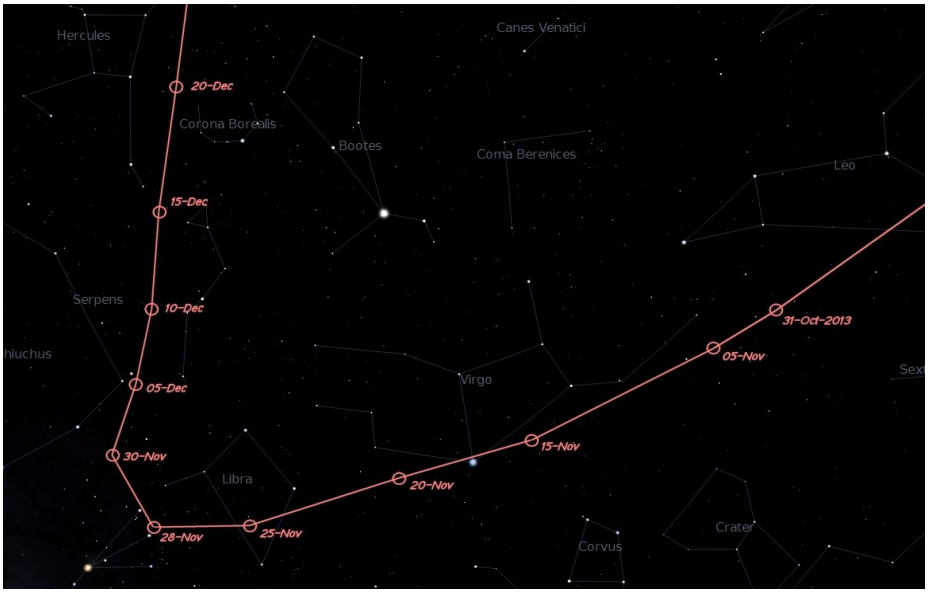

Chart courtesy of http://www.mattastro.com

(Continued from page 3)

ful window into the world of comets. The full understanding of this comet and its place in the taxonomy of comets will only come in hindsight."

ISON was discovered in September of 2012 by astronomers Vitali Nevski and Artyom Novichonok using a telescope near Kislovodsk, Russia, that is part of the International Scientific Optical Network (ISON). ISON —officially named C/2012 S— was 585 million miles away at the time. Its amazing journey through the solar system has been chronicled by amateur astronomers and by space telescopes.NASA has even created a toolkit for ISON fans.

Confusion about its fate isn't new for ISON watchers. "From the moment of discovery, ISON has been a confusing, frustrating, dynamic and unpredictable object. In other words, it has been a very typical comet!" said Karl Battams, an astrophysicist with the Naval Research Laboratory in Washington.

The glare of the sun has blocked most ground-based observations, but NASA has a fleet of spacecraft watching as ISON plunges toward the sun. If it hasn't already broken up, it will skim about 730,000 miles above its surface on Thanksgiving Day and could put on a sky show in early December when it moves out of the glare of the sun.

The comet will make its closest approach to Earth on December 26, and, no, it won't hit us. But for now, we wait to learn ISON's fate. "I am excited at marking the progress of this comet that has captivated the world from its discovery and the possibility of it being a Great Comet," Yanamandra-Fisher told CNN.com. "I am glad that I was able to be part of its journey."

Will comet ISON survive its near brush with the Sun?

Submitted by AFP

Wednesday, November 27, 2013

Washington — US astrophysicists are split over what will happen when the comet ISON passes near the sun Thursday, but a majority think it will break apart.

Comets are frozen balls of space dust left over from the formation of stars and planets billions of years ago.

So when one of them zips close to a hot star, like the Sun, sometimes the icy core simply melts. "Many of us think it could break up into pieces, and some people think it won't survive at all" after its brush near the Sun, said comet expert Carey Lisse of the Johns Hopkins Applied Physics Laboratory during a telephone press conference.

But he conceded, there are others who think the icy mass "will actually survive and come back out" on the other side of the sun, albeit somewhat shrunken down from its encounter with the Sun's heat.

ISON will be just 1.17 million kilometers (727,000 miles) from the sun as it passes by where it will be hit by temperatures of around 2,700 degrees Celsius (4,900 Fahrenheit).

"I think it has a maybe 30 percent chance to make it" past the sun intact, Lisse said.

(Continued on page 9)

Eyepiece (cont'd)

(Continued from page 7)

lars. Lucian J. Kemble was a Franciscan and amateur astronomer from Saskatchewan who contributed greatly to the art of astronomical observation. Father Luc, as he was affectionately known, died of a heart attack in the early hours of February 1999. Kemble's Cascade will be a constant memorial to the man and his work.

Walter Houston was so impressed that he wrote an article on the asterism that appeared in his "Deep Sky Wonders" column in "Sky & Telescope" in 1980, in which he named it "Kemble's Cascade".

Kemble's Cascade is one of the finest binocular objects in the winter sky. Use the most powerful binoculars you can get your hands on to see some of the faint stars in this asterism. To find Kemble's Cascade in the sky chart, start at IC 342, which is a galaxy of magnitude 9.1. Kemble's Cascade is the short arc of stars to the lower right of IC 342.

The stars of Kemble's Cascade do not form a group or cluster physically, it's only a chance alignment of stars, but it is unique in its appearance. At the southeastern end of the chain of stars you will find the 6th magnitude open cluster NGC 1502, containing 15 stars in a 7' area.

I have observed Kemble's Cascade from our backyard near West Chester, but I needed our 20x80 Vixen binoculars to see this asterism. Many of the stars are too faint to see with smaller binoculars in our light polluted skies but I am sure they would be visible with any size binoculars at a dark sky site.

Information credits:

Dickinson, Terence 2006. Nightwatch: a practical guide to viewing the universe. Buffalo, NY. Firefly Books
Knoph, Alfred 1995. Constellations of the Northern Sky. New York, NY. Chanticleer Press
http://en.wikipedia.org/wiki/Kemble%27s_Cascade
http://www.theyorkshirelad.ca/
http://antwrp.gsfc.nasa.gov/apod/ap000814.html
http://www.backyard-astro.com/deepsky/bino/01_b.html
http://www.dibonsmith.com/ngc1502.htm

Survive? (Cont'd)

(Continued from page 8)

The comet "is like a loose snow ball," he explained, saying it is "maybe half or a third water and it's rather weak." It's also smaller than most comets, currently measuring around 1.2 kilometers in diameter.

"The average size for a comet is about three kilometers diameter, so this comet is maybe about half the size of the average, typical comet," he said.

Either way it turns out, astronomers are watching keenly.

"We have never seen a comet like this coming from the Oort cloud and going in the sun grazing orbit," said astrophysicist Karl Battams, of the Naval Research Laboratory in Washington.

We "don't really have any past experience we can use to judge or predict what is going to happen to this one," he said, adding it's "a very peculiar object but also a fascinating object."

Scientists say the comet comes from the very origin of the solar system, 4.5 billion years ago -- preserved "in deep freeze in the Oort cloud halfway to the next star for the last four and a half billion years," Lisse said.

If ISON survives its passage near the Sun, it will be visible at night from December through February, crossing nearest Earth -- about 64 million kilometers away) on December 26.

The US space agency is gathering a round table of astronomers on Thursday starting at 1700 GMT to answer questions from the public and from the scientific community as they follow the comet's brush with the Sun.

The Most Volcanically Active Place is Out of this World!

by Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large.

Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close.

When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing 100 meters at a time!

This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface

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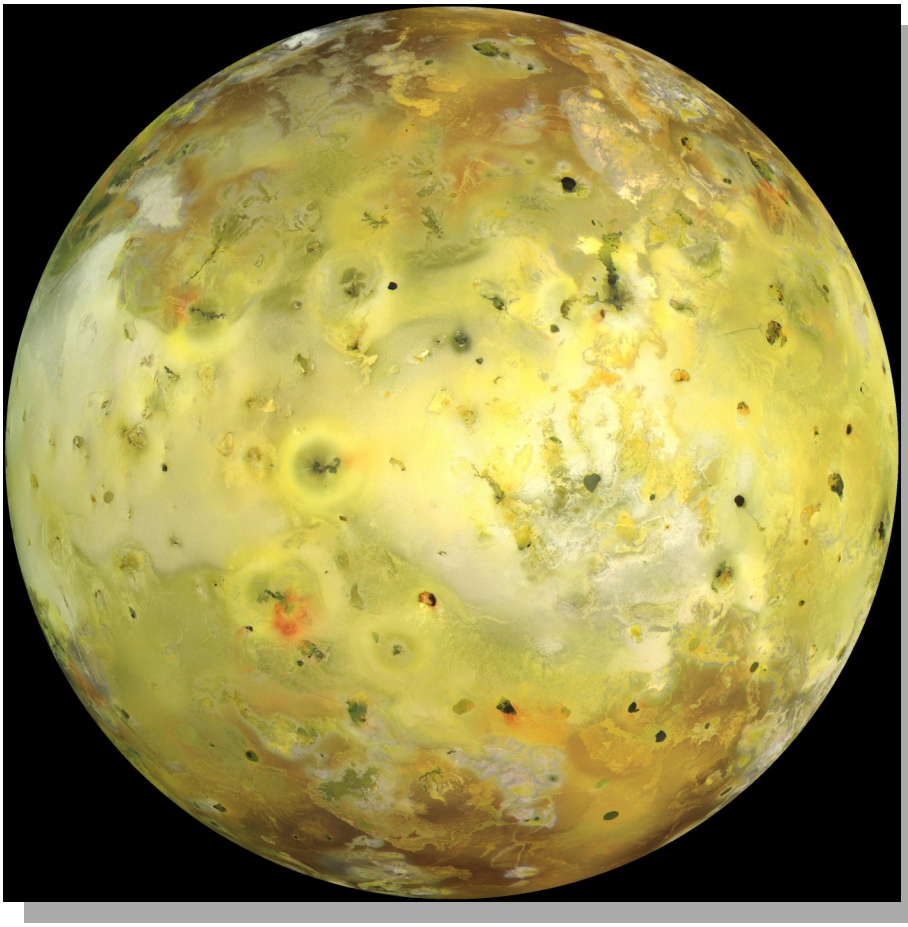


Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Space Place (cont'd)

(Continued from page 10)

opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus

(Continued on page 12)

Observing (Cont'd)

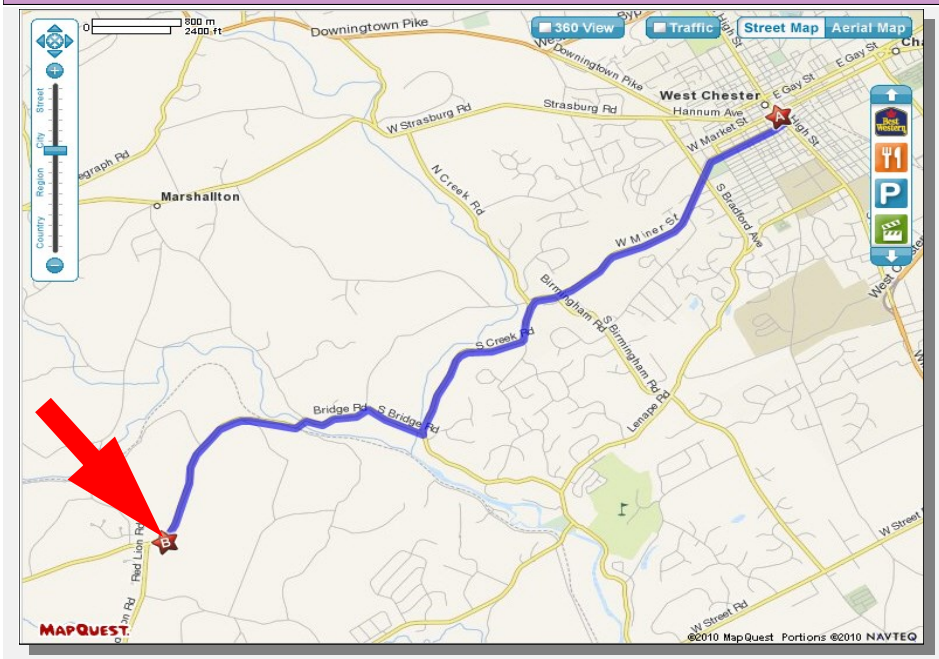
(Continued from page 5)

in easy reach of even a small telescope or any pair of binoculars. First look for the Andromeda galaxy high in the south, and then head east to the three open clusters in Auriga. Use a low power eyepiece in your telescope and zoom in to the Pleiades, although they are better captured in binoculars. Then look nearly straight up and find the Double Cluster in Perseus.

Comets: Will Comet ISON survive its trip around the Sun on Thanksgiving? If it did, we should have some great views before dawn in early December. If the comet survives its close encounter with the Sun it will get higher in the sky and be easier to see in the dawn skies of early December, but it will also begin to fade in brightness. Watch the Sky and Telescope magazine or the Astronomy magazine website for the latest information about this visitor from the Oort cloud.

Meteor showers: The Geminid meteor shower peaks on the night of December 13/14. This very reliable meteor shower will be affected by the Moon to some extent this year. But don't let that pesky bright orb stop you! Bundle up, grab a blanket and lay back on a recliner and look for the bright meteors that can pierce the glow of the Moon.

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.

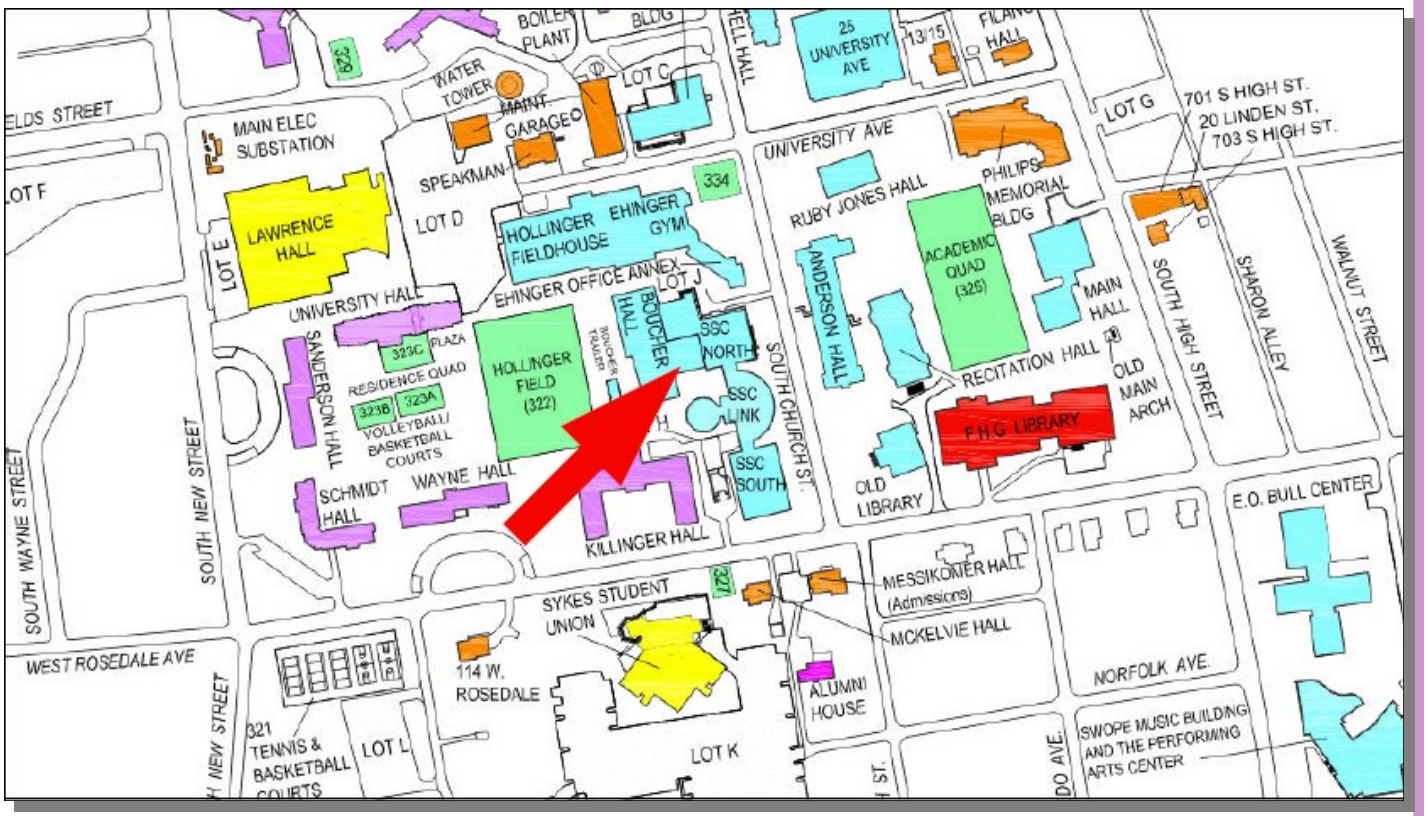
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route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



Space Place (cont'd)

(Continued from page 11)

around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Learn more about Galileo's mission to Jupiter: http://solarsystem.nasa.gov/galileo/.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: http://spaceplace.nasa.gov/volcanoes.

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

Nov. 2013 Financial Summary

Beginning Balance	$1,651
Deposits	$628
Disbursements	$533
Ending Balance	$1,746

New Member Welcome!

Welcome new CCAS members Michael Kurtis and family of Springfield, 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.

CCAS Information Directory

Join the Fight for Dark Skies!

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

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

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

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

http://www.darksky.org

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

Dark-Sky Website for PA

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

http://www.POLCouncil.org

Find out about Lyme Disease!

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

http://www.LymePA.org

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

CCAS Event Information

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!

Starry Night Lights

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

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

http://www.starrynightlights.com

★ ★ ★ ★ ★

Green Earth Lighting
Formerly
Outdoor Lighting Associates

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.greenearthlighting.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

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

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

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

http://www.skiesunlimited.net

★ ★ ★ ★ ★

Spectrum Scientifics
Quality Science Products for All Ages

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

4403 Main Street
Philadelphia, PA 19127

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

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

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

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

CCAS Lending Library

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

Contributing to *Observations*

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

Or mail the contribution, typed or handwritten, to:

John Hepler
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 & Tele*scope Magazine Group Rates

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

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

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

Astronomy Magazine Group Rates

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