Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

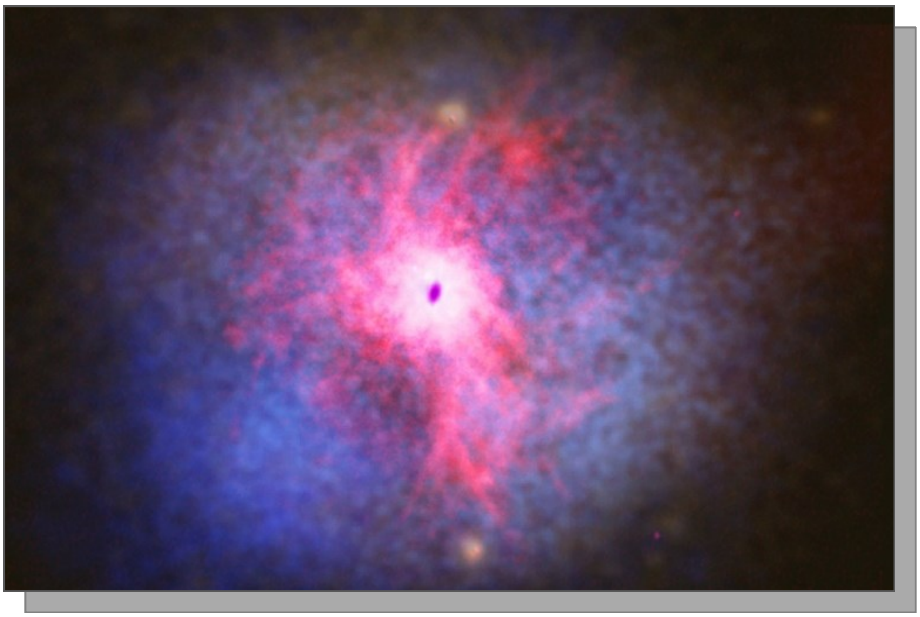
Vol. 22, No. 3 *Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009* *March 2014*

In This Issue

Membership Renewals Due

03/2014	Angelini End LaFrance Sterrett
04/2014	Armored Bower Caccamo Imburgia Richter
05/2014	Cline Fletcher Long O'Hara

Elliptical Galaxy NGC 5044



Multi-wavelength view of the elliptical galaxy NGC 5044.
Digitized Sky Survey/NASA Chandra/Southern Observatory for Astrophysical Research/Very Large Array (Robert Dunn et al. 2010.)
See p.3 for details.

Important March 2014 Dates

1st • New Moon, 3:00 a.m.

8th • First Quarter Moon, 8:27 a.m.

9th • Daylight Savings Time begins.

16th • Full Moon, 1:09 p.m.

20th • First Day of Spring.

23rd • Last Quarter Moon, 94 p.m.

30th • New Moon, 2:45 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.

☼ **Friday, March 21, 2014.** CCAS monthly observing session at BVA. The observation session starts at dusk.

☼ **Saturday, March 22, 2014.** CCAS special observing session at Bucktoe Creek Preserve. The observation session starts at dusk.

☼ **Friday, April 4, 2014**. CCAS Monthly Observing Session at BVA. The observing session starts at dusk.

☼ **Saturday, April 5, 2014**. CCAS special observing session at Hoopes Park, West Chester. The observing session is from 8:00 to 9:30 PM.

Winter/Spring 2014 Society Events

March 2014

5th • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

9th • Daylight Savings Time starts at 2:00 AM.

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: Dr. Ruth Daly, Professor of Astronomy & Physics at Penn State, Berks Campus.

16th-17th • The von Kármán Lecture Series: The Orbiting Carbon Observatory-2 and ISS-RapidScat, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

14th • Reservations start for the April 4th planetarium show at the WCU Planetarium.

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

20th • Vernal equinox: first day of spring.

21st • CCAS monthly observing session at BVA. The observation session starts at dusk.

22nd • CCAS special observing session at Bucktoe Creek Preserve. The observation session starts at dusk.

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

April 2014

2nd • 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.

4th • CCAS monthly observing session at BVA. The observation session starts at dusk.

5th • CCAS special observing session at Anson Nixon Park, Kennett Square. The observation session is scheduled from 8:00 to 9:30 PM.

8th • CCAS Monthly Meeting, Room 112, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: Dr. Tim Lawlor, Professor of Physics at Penn State, Brandywine Campus.

10h-11th • The von Kármán Lecture Series: "For the Benefit of All Mankind": The JPL Technology Transfer Program," Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

11th• Reservations start for the May 2nd planetarium show at the WCU Planetarium.

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

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

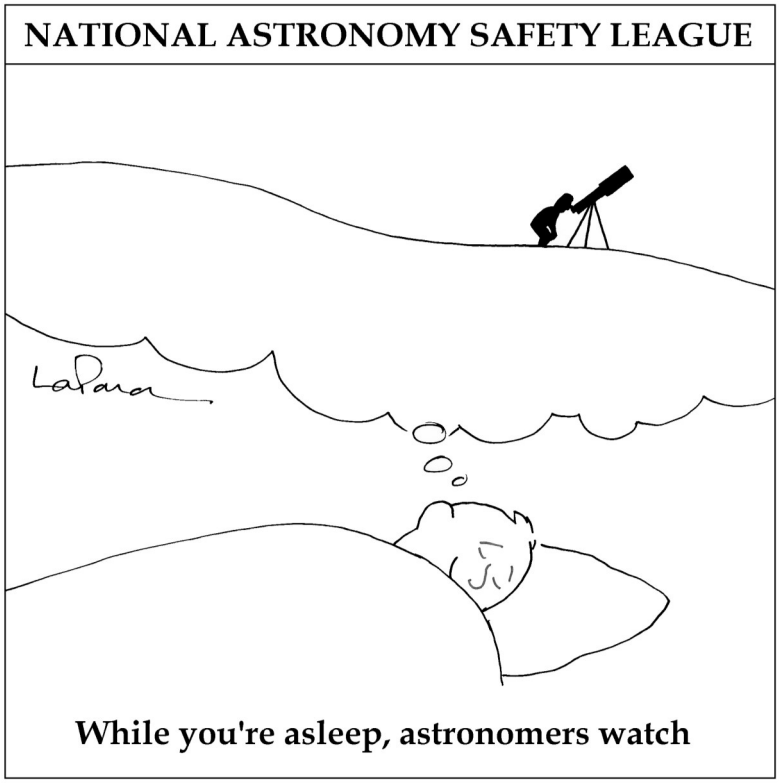
Minutes of the February 11, 2014 Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor welcomed the 18 members and guests of CCAS to the Mather Planetarium of West Chester University on February 11, 2014. We were delighted to meet future members Sawyer and Duncan who accompanied Grandpa Angelini for the planetarium show.
- Dr. Karen Van Landingham, associate professor of astronomy at WCU and the director of the Mather Planetarium, presented an overview of the new Spitzer Planetarium equipment to our group. She also showed trailers for some of the movies that have been purchased to show on the planetarium dome. Movies can be purchased and donated to the planetarium. Dr. Van Landingham thanked the CCAS Members for purchasing numerous chairs. All of the chairs have been sold out. Future plans to revamp the outside entrance to the planetarium will add a Hubble Photo gallery as well as WCU student art work.
- David Hockenberry presented video of an unidentified moving object found in his astroimages of NCG4395.
- Total lunar eclipse to occur in April. Discussion was initiated to have observing for this event.
- Next meeting will be March 11, 2014 at our usual meeting room.

Nicholas's Humor Corner

by Nicholas La Para

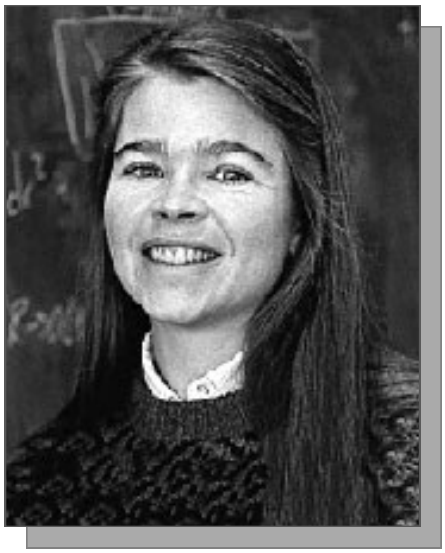


March 2014 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on March 11, 2014, starting at 7:30 p.m. The meeting will be held in **West Chester University Planetarium** (Schmucker Science Center), West Chester University. Our guest speaker is Dr. Ruth Daly, Professor of Astronomy & Physics at Penn State, Berks Campus. Her presentation is entitled, "Black Holes in the Universe."

On April 8th our guest speaker is Dr. Tim Lawlor, Astronomy Professor at Penn State, Brandywine Campus; and on May 13th, John Conrad, CCAS member and NASA Solar System Ambassador will be our speaker.



Dr. Ruth Daly

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 2014-2015 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Bullying Black Holes Force Galaxies to Stay Red and Dead

courtesy of ESA, Noordwijk, Netherlands

The Herschel Space Observatory has discovered massive elliptical galaxies in the nearby universe containing plenty of cold gas, even though the galaxies fail to produce new stars. Comparison with other data suggests that while hot gas cools down in these galaxies, stars do not form because jets from the central supermassive black hole heat or stir up the gas and prevent it from turning into stars.

Giant elliptical galaxies are the most puzzling type of galaxy in the universe. Since they mysteriously shut down their star-forming activity and remain home only to the longest-lived of their stars — which are low-mass ones and appear red — astronomers often call these galaxies "red and dead."

Up until now, it was thought that red-and-dead galaxies were poor in cold gas — the vital raw material from which stars are born. While cold gas is abundant in spiral galaxies with lively star formation, the lack of it in giant ellipticals seemed to explain the absence of new stars.

Astronomers have long been debating the physical processes leading to the end of their star formation. They speculated that these galaxies somehow expelled the cold gas, or that they had simply used it all to form stars in the past. Although the reason was uncertain, one thing seemed to have been established: These galaxies are red and dead because they no longer possess the means to sustain the production of stars.

This view is being challenged by a new study based on data from the European Space Agency's (ESA) Herschel Space Observatory.

"We looked at eight giant elliptical galaxies that nobody had looked at with Herschel before, and we were delighted to find that, contrary to previous belief, six out of eight abound with cold gas," said Norbert Werner from Stanford University in California.

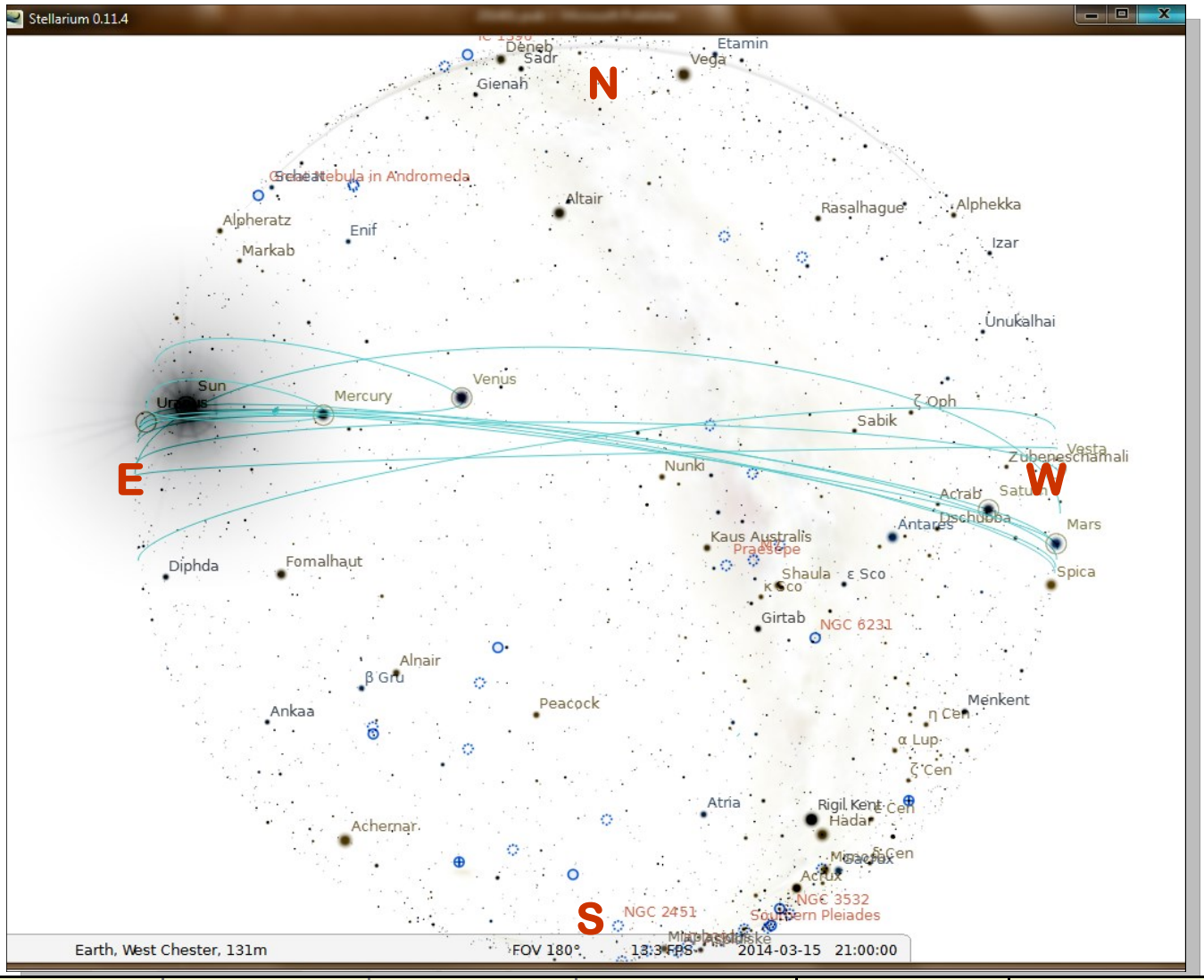
This is the first time that astronomers have seen large amounts

(Continued on page 9)

The Sky Over Chester County

March 15, 2014 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
03/01/2014	6:07 a.m. EST	6:34 a.m. EST	5:53 p.m. EST	6:20 p.m. EST	11h 18m 33s
03/15/2014	6:45 a.m. EDT	7:12 a.m. EDT	7:08 p.m. EDT	7:34 p.m. EDT	11h 55m 18s
03/31/2014	6:19 a.m. EDT	6:46 a.m. EDT	7:24 p.m. EDT	7:51 p.m. EDT	12h 37m 32s

Moon Phases					
New Moon	03/01/2014	3:00 a.m. EST	Full Moon	03/16/2014	1:09 p.m. EDT
First Quarter	03/08/2014	8:27 a.m. EST	Last Quarter	03/23/2014	9:46 p.m. EDT
New Moon	03/30/2014	2:45 p.m. EDT			

March 2014 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1	**New Moon, a 15 hour old very thin crescent might be visible**
8	**First-quarter Moon**
9	**Daylight Saving time begins**
9	**The Lunar Straight Wall is visible**
10	**The Moon is near Jupiter**
16	**Full Moon**
18	**The Moon is near Mars**
20	**Vernal equinox**
20	**The Moon is very close to Saturn**
23	**Last Quarter Moon**
30	**New Moon**

The best sights this month: Jupiter continues to rule the evening sky through March. But stay up a little later and you can find Mars in the east, a small reddish "star" rising about 3 ½ hours after sunset.

Mercury: Mercury is not in a good position for viewing during March.

Venus: Venus reaches greatest elongation west of the Sun on March 22nd and will be shining brightly in the east during the hours before dawn.

Mars: The red planet brightens dramatically from the start to the end of March, improving from a magnitude of -0.5 to -1.3 at the end of the month. It spends March fairly close to the bright star Spica in the constellation Virgo.

Jupiter: Jupiter is in excellent position for naked eye or telescopic viewing as soon as darkness falls. I never tire of watching the dance of the 4 bright moons around the king of the planets. The moment when a moon appears or disappears at the very edge of Jupiter's disk is always a delight.

Saturn: Saturn is rising around midnight, so it is best viewed a few hours before sunrise. As much as I love seeing Saturn, I will wait a few months so I don't lose my beauty sleep!

Uranus and Neptune: Neither gas giant is in favorable position for viewing during March.

The Moon: There were no New Moons during February, but there are two in March! For an observing challenge, find a view with a low western horizon and look for a very thin crescent Moon just after sunset. The New Moon will be only about 15 hours old and will be very close to the horizon.

Full moon is on March 16th. This is the Full Worm Moon according to Native Americans. As the temperature begins to warm and the ground begins to thaw, earthworm casts appear (an earthworm cast is a nice word for worm poop), heralding the return of the robins. This full moon is also called the Full Crow Moon, the Full Crust Moon and the Full Sap Moon.

Constellations: In mid-March around 9:00 pm the winter constellations are in the western half of the sky heading toward their summer sleep before too many weeks have passed. Catch the Pleiades, Taurus and Orion before we lose them to the spring constellations that are rising in the east. In the spring group Leo the Lion is heading toward center stage. The Big Dipper in Ursa Major is high overhead. Follow the arc of the Dipper handle to bright Arcturus in Boötes.

Messier/deep sky: Take a few more gazes at the Orion Nebula before it settles into the west as spring marches on. The Big Dipper is high in the sky so take this opportunity to look for galaxies M81 and M82. With a low power eyepiece in your telescope they might be in the same field of view depending on your equipment. For more of a challenge, look for the 10th magnitude galaxies M65 and M66 in Leo

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

Meteor showers: There are no major meteor showers during March.

Through the Eyepiece: M94, The Galaxy with Rings within Rings

by Don Knabb, CCAS Treasurer & Observing Chair

Every spring, the thoughts of astronomers everywhere turn to galaxies! So as I did last month, I'd like to share with you an article about a galaxy that is easily observed with a moderate size telescope and is not difficult to find in the sky. You might even be able to find this galaxy with binoculars if they are supported by a mount and you are under dark skies.

Messier 94 (also known as NGC 4736) is a spiral galaxy in the constellation Canes Venatici. Although some references describe M94 as a barred spiral galaxy, the "bar" structure appears to be more oval-shaped. The galaxy is also notable in that it has two ring structures.

This striking mage of Messier 94 as seen by the infrared eyes of NASA's Spitzer Space Telescope shows us the dual ring structure of this amazing galaxy.

M94 contains both an inner ring with a diameter of 70" and an outer ring with a diameter of 600". These rings appear to form at resonance locations within the disk of the galaxy. The inner ring is the site of strong star formation activity and is sometimes referred to as a "starburst ring". It is identified as a "starburst ring" because of the frenetic pace of star formation in this confined area. Starbursts like this can often be triggered by gravitational encounters with other galaxies, but in this case may instead be caused by the galaxy's oval shape.

Image credit: http://www.spitzer.caltech.edu/images/5578-sig13-004-Galactic-Wheels-within-Wheels-

Tucked in between the inner starburst ring and the outer ring-like arms we find the galaxy's disk, striated with greenish filaments of dust. While, at first glance, these dusty arcs look like a collection of rings, they actually follow tightly wound spiral arcs.

M94 is one of the brightest galaxies within the M94 Group, a group of galaxies that contains between 16 and 24 galaxies. This group is one of many that lie within the Virgo Supercluster (i.e. the Local Supercluster).

Locating Messier 94 is fairly easy. Beginning with the "Big Dipper" asterism of Ursa Major, look for a very conspicuous star about a palm's width from the last star in the "handle". This is Cor Caroli, and the double Alpha star of the constellation of Canes Venatici. If you are observing from a dark sky location, relax your eyes until you see the other two primary stars that make up the shallow triangle of the constellation. You'll find M94 located almost centrally between them. From slightly more light polluted skies, use Cor Caroli as your starting point

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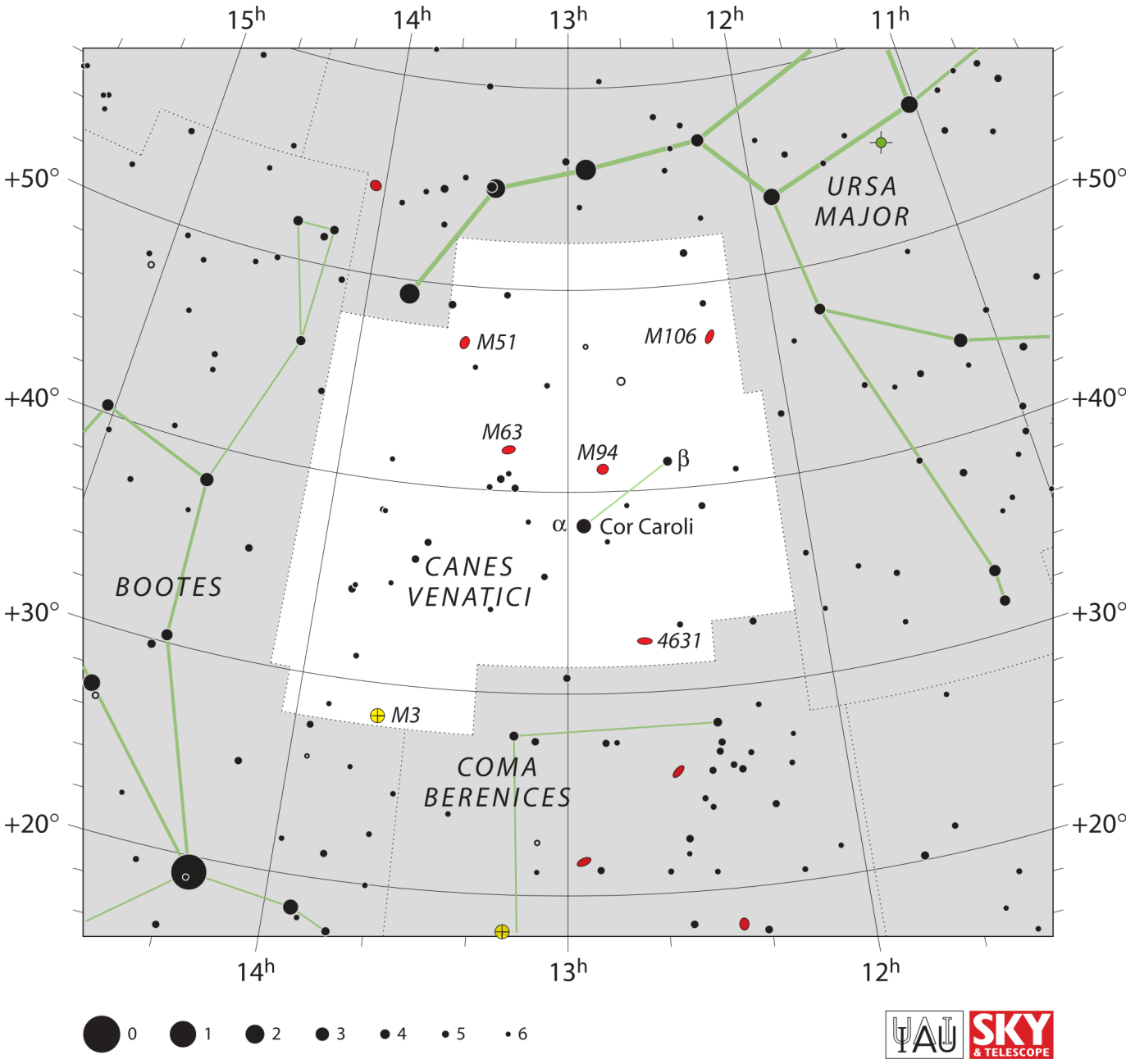
Eyepiece (Cont'd)



Star map credit: http://en.wikipedia.org/wiki/File:Canes_Venatici_IAU.svg

(Continued from page 6)

and you can also locate M94 about two finger widths north. It will appear as a round, hazy patch in larger binoculars and small telescopes and show spiral structure to in a larger aperture telescope. At magnitude 8, Messier 94 will stand up to suburban lighting conditions and partial moonlight.

M94 was discovered by Pierre Méchain on March 22, 1781. Getting the report of his friend, Charles Messier observed it, determined its position and cataloged it on March 24, 1781. In his notes he states: "Nebula without star, above the Heart of Charles [Alpha Canum Venaticorum]".

On March 18, 1787, Sir William Herschel got a much better look with his larger telescope, enough of a look to see structure. In his unpublished notes he

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A Two-Toned Wonder from the Saturnian Outskirts

by Dr. Ethan Siegel

Although Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!

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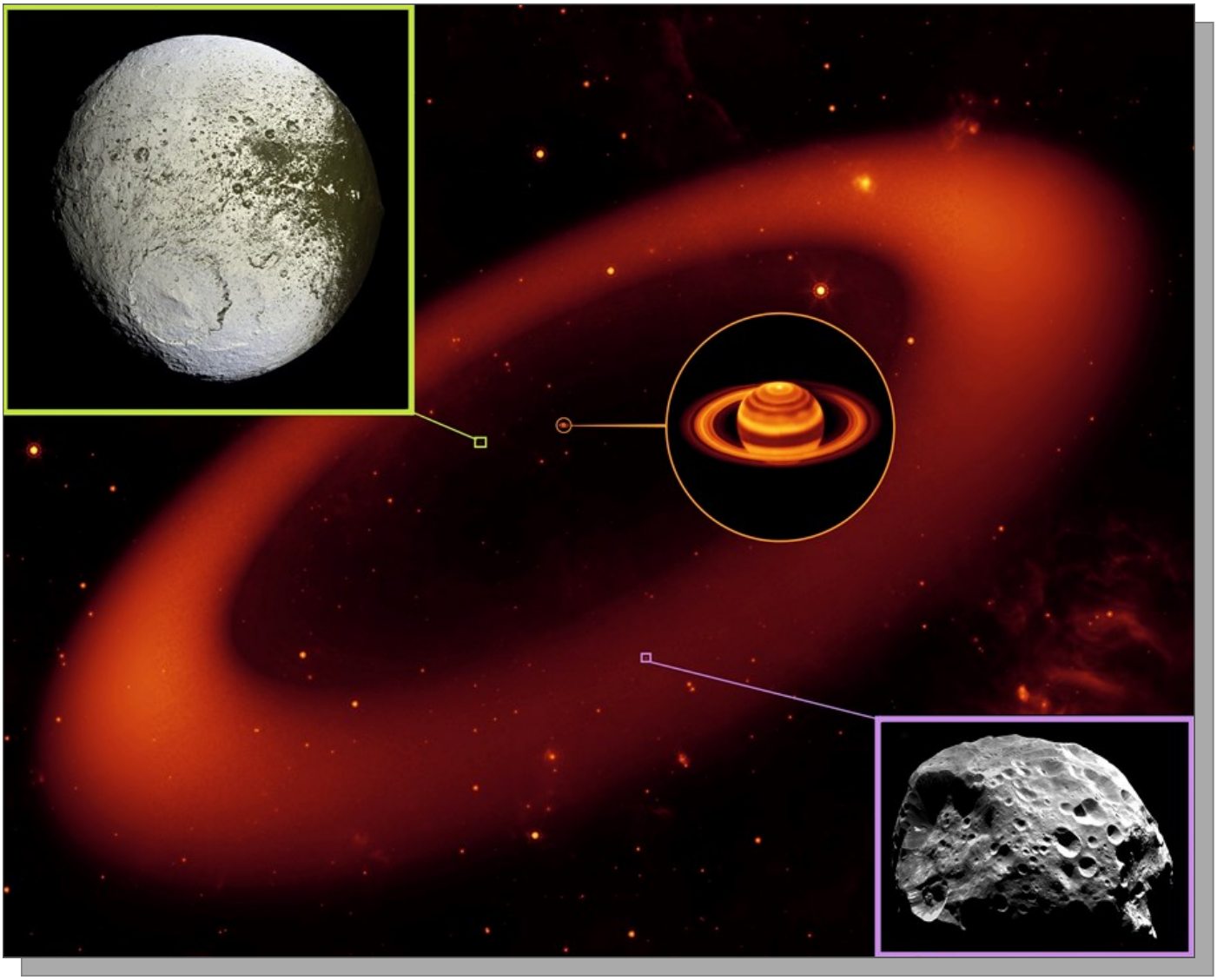


Images credit: Saturn & the Phoebe Ring (middle) - NASA / JPL-Caltech / Keck; Iapetus (top left) - NASA / JPL / Space Science Institute / Cassini Imaging Team; Phoebe (bottom right) - NASA / ESA / JPL / Space Science Institute / Cassini Imaging Team.

Space Place (cont'd)

(Continued from page 8)

In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of 3.5 million km, but the culprit of the mysterious dark side is *four times* as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other Moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning *quadrillions* of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode the bright surface layer away, revealing a darker substrate?

In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain *just enough* extra heat from the Sun during Iapetus' day to sublimate the ice around it, which resolidifies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

Learn more about Iapetus here: http://saturn.jpl.nasa.gov/science/moons/iapetus.

Kids can learn more about Saturn's rings at NASA's Space Place: http://spaceplace.nasa.gov/saturn-rings.

Black Holes (Cont'd)

(Continued from page 3)

of cold gas in red-and-dead galaxies that are not located at the center of a massive galaxy cluster.

The cold gas manifested itself through far-infrared emissions from carbon ions and oxygen atoms. Herschel's sensitivity at these wavelengths was instrumental to the discovery.

"While we see cold gas, there is no sign of ongoing star formation," said co-author Raymond Oonk from ASTRON, the Netherlands Institute for Radio Astronomy. "This is bizarre: With plenty of cold gas at their disposal, why aren't these galaxies forming stars?"

The astronomers proceeded to investigate their sample of galaxies across the electromagnetic spectrum because gas at different temperatures shines brightly at different wavelengths. They used optical images to probe the warm gas, at slightly higher temperatures than the cold one detected with Herschel, and X-ray data from NASA's Chandra X-ray Observatory to trace the hot gas, up to tens of millions of kelvins.

"In the six galaxies that are rich in cold gas, the X-ray data show telltale signs that the hot gas is cooling," said Werner. This is consistent with theoretical expectations: Once cooled, the hot gas would become the warm and cold gas that is observed at longer wavelengths. However, in these galaxies the cooling process somehow stopped, and the cold gas failed to condense and form stars.

(Continued on page 11)

Eyepiece (Cont'd)

(Continued from page 7)

writes: "Very brilliant, a large, luminous nucleus of more than 20″ diameter with faint chevalure and branches extending 6 or 8′." M94 would be later observed by Herschel's son John many times, where he once described it as "Not resolved but resolvable. A very interesting object, being a nebula very suddenly much brighter toward the middle on a great scale."

This optical image shows the beauty of M94. The three stars in the foreground are members of our Milky Way Galaxy. You can also find numerous small, distant background galaxies in

(Continued on page 12)

Image credit: http://en.wikipedia.org/wiki/File:Messier_94.jpg, copyright R. Jay GaBany

Black Holes (cont'd)

(Continued from page 9)

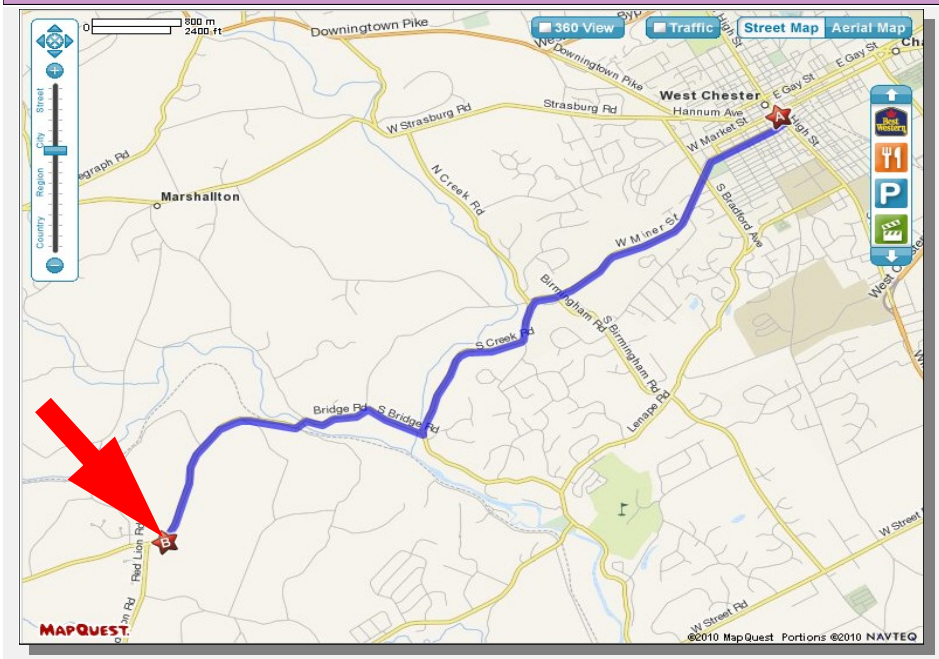
In the other two galaxies of the sample — the ones without cold gas — the hot gas does not appear to be cooling at all. "The contrasting behavior of these galaxies may have a common explanation — the central supermassive black hole," said Oonk.

While the six galaxies with plenty of cold gas harbor moderately active black holes at their centers, the other two show a marked difference. In the two galaxies without cold gas, the central black holes are accreting matter at frenzied pace, as confirmed by radio observations showing powerful jets of highly energetic particles that stem from their cores. The jets could be an effect of the hot gas cooling down and flowing toward the center of the galaxies. This inflow of cold gas can boost the black hole's accretion rate, launching the jets that are observed at radio wavelengths.

The jets, in turn, have the potential to reheat the galaxy's reservoir of cold gas or even push it beyond the galaxy's reach. This scenario can explain the absence of star formation in all the galaxies observed in this study and, at the same time, the lack of cold gas in those with powerful jets.

"These galaxies are red, but with the giant black holes pumping in their hearts, they are definitely not dead," said Werner. "Once again, Herschel has detected something that was never seen before — significant amounts of cold gas in nearby red-and-dead galaxies," said Göran Pilbratt from ESA, "nevertheless, these galaxies do not form stars, and the culprit seems to be the black hole."

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.

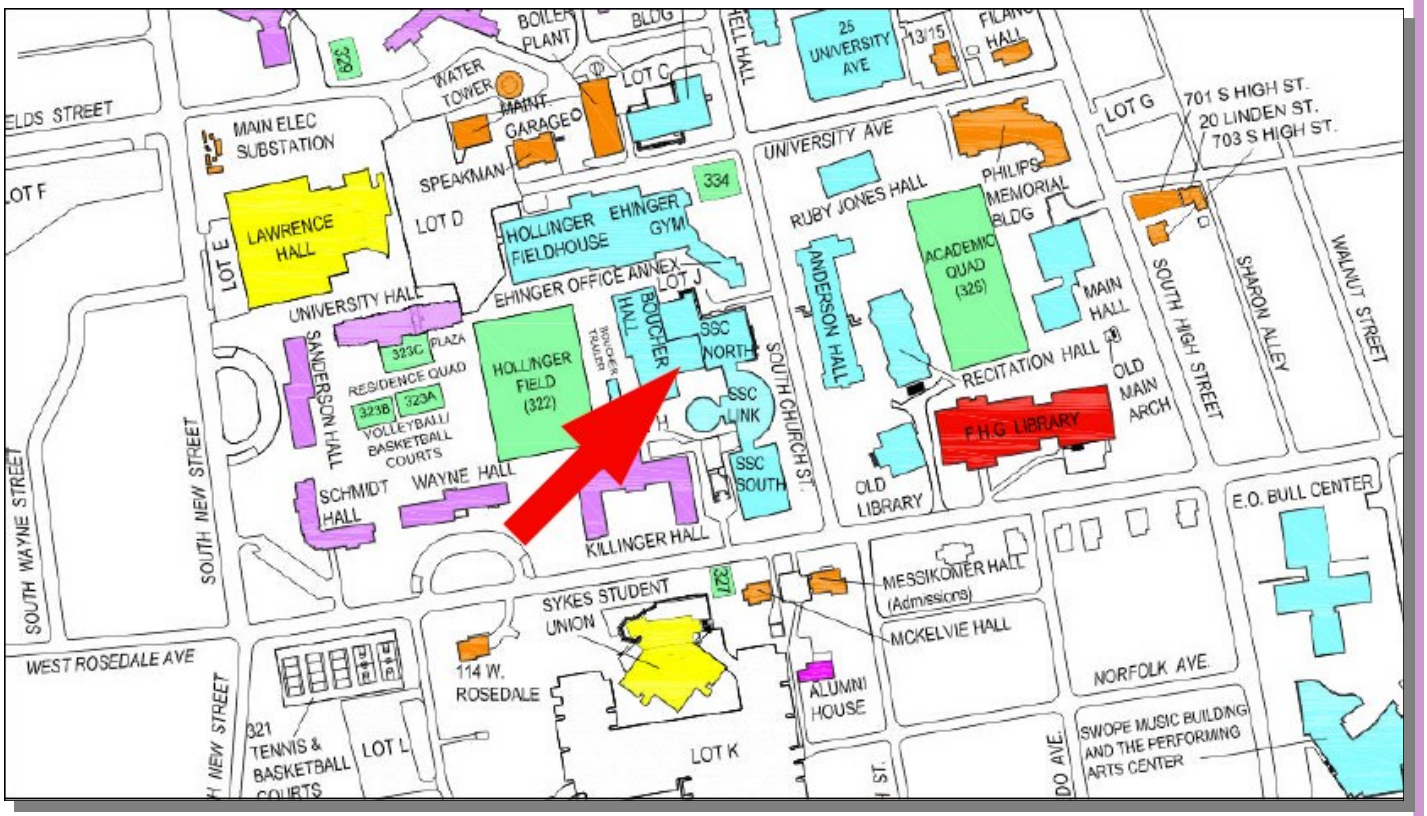
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route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



Eyepiece (Cont'd)

(Continued from page 10)

the photograph.

So when the snow melts and we find ourselves once again under the stars at the Brandywine Valley Association, let's try to see M94 "live and up close".

Credits:

Pasachoff, Jay M. 2000. A Field Guide to the Stars and Planets. New York, NY. Houghton Mifflin.
Dickinson, Terence 2006. Nightwatch: a practical guide to viewing the universe. Buffalo, NY. Firefly Books
http://en.wikipedia.org/wiki/Messier_94
http://www.universetoday.com/48442/messier-94/
http://www.spitzer.caltech.edu/images/5578-sig13-004-Galactic-Wheels-within-Wheels-

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

Feb. 2014 Financial Summary

Beginning Balance	$1,971
Deposits	$50
Disbursements	$0
Ending Balance	$2,021

New Member Welcome!

Welcome new CCAS members Charles McElwee of West Chester, 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

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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.**