Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 29, No. 4 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *April 2021*

In This Issue

Ingenuity on Sol 39

The Mars Ingenuity Helicopter, all four landing legs down, was captured here on sol 39 (March 30) slung beneath the belly of the Perseverance rover. The near ground level view is a mosaic of images from the WATSON camera on the rover's SHERLOC robotic arm. Near the center of the frame the experimental helicopter is suspended just a few centimeters above the martian surface. Tracks from Perseverance extend beyond the rover's wheels with the rim of Jezero crater visible about 2 kilometers in the distance. Ingenuity has a weight of 1.8 kilograms or 4 pounds on Earth. That corresponds to a weight of 0.68 kilograms or 1.5 pounds on Mars. With rotor blades spanning 1.2 meters it will attempt to make the first powered flight of an aircraft on another planet in the thin martian atmosphere, 1 percent as dense as Earth's, no earlier than April 11. Image Credit: NASA / JPL-Caltech / MSSS

Membership Renewals Due

04/2021	Chisholm
	Hepler
	Imburgia
	Miller
	Rossomando
05/2021	Aylam & Martin-Aylam
	Cunningham
	Klapholz
	LaFrance
	Ostanek
	Quinn
	Toth
06/2021	Crabb
	Hanspal
	Harris
	Hebdig
	Mazziotta & Calobrisi
	McCausland
	Thomas

April 2021 Dates

4th • Last Quarter Moon, 6:02 a.m. EDT

11th • New Moon, 10:30 p.m. EDT

16th-17th • Mars is near the Moon

22nd • The Lyrid meteors peak in the predawn hours

20th • The First Quarter, 2:58 a.m. EDT

26th • Full Moon, the Full Pink Moon or the Bullhead Moon, 11:31 p.m. EDT

Membership Dues Increase

CCAS membership dues increased in March 2021. They hadn't changed in 18 years, so it was time to increase the dues to cover increases in the Society's operating costs. All membership types went up $5 except for the Student membership, which remained unchanged.

Here are the old and new rates:

Type	Old Rate	New Rate
Regular	$25	$30
Senior	$10	$15
Student	$5	$5
Family	$35	$40

Spring Society Events

April 2021

5th • Beginner Astronomy Class: Beyond Naked Eye Observing (deep sky stuff) . Online via Zoom starting at 7:30 p.m. EDT.

10th-11th • Northeast Astronomy Forum, Rockland Community College, NY. Virtual event - https://www.neafexpo.com/

13th • CCAS Monthly Meeting, ONLINE via Zoom. The meeting starts at 7:30 p.m. Guest Speaker: Dennis O'Leary, CCAS Member and NASA Ambassador – " NASA Robotic Missions: An Update on New Horizons, Insight, Perseverance, and Juno."

15th • The von Kármán Lecture Series: Science on Ice—What Ice Says About Past, Present, and Future Climate. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the May 2021 edition of Observations.

26th • Deadline for newsletter submissions for the May 2021 edition of Observations.

May 2021

2nd • Spring National Astronomy Day.

11th • CCAS Monthly Meeting, ONLINE via Zoom. The meeting starts at 7:30 p.m. Guest Speaker: Laura Kerber, PhD, Research Scientist, Caltech and NASA's Jet Propulsion Laboratory (JPL); "Mars - Understanding our Neighboring "Habitable" World and its Latest Revelations."

20th • The von Kármán Lecture Series: Space Cameras—A Sharper Image. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the June 2021 edition of Observations.

26th • Deadline for newsletter submissions for the June 2021 edition of Observations.

Minutes from the March 9, 2021, CCAS Monthly Meeting

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry welcomed members and guests to the March 2021 CCAS meeting. Zoom and YouTube were the platforms. Attendance topped out at 55.
- Don Knabb noted that the Zoom Astronomy classes, which CCAS club members conduct, have been very well received. There have been 45 to 65 attendees including members of multiple area astronomy clubs.
- Don then led members on a tour of the March night sky. He told the group to look for the lunar V and X which would be visible on 3/20. Other March sites of interest include the Winter Hexagon, the Orion nebula, many galaxy clusters and the Leo triplet. He noted that earlier in the month, Mars could be seen as close to the Pleiades as it will get until 2038.
- Upcoming 2021 viewing events include the Green Bank Star Quest (7/7 - 7/10) and the annual CCAS Cherry Springs observing trip, which is scheduled for 8/10 - 8/13. Rains dates for the Cherry Springs event are 9/7 - 9/10.
- Bruce Ruggeri, Program Chair, introduced the evening's presenter, Dr. Varoujan Gorjian, a research astronomer at JPL. He has an astronomy and astrophysics PhD from UCLA and has worked at JPL since 1998. His areas of interest and study include the luminosity and fueling of Active Galactic Nuclei, Infrared and Radio imaging of young star forming regions, the Cosmic Infrared Background and Spitzer education and public outreach.
- His topic was The Legacy of the Spitzer Telescope. The Spitzer was launched on 8/25/2003. Its mission was to provide an infrared view of the universe and allow us to see into regions of space that are hidden from optical telescopes. Of its many achievements, Spitzer enabled astronomers to confirm the existence of the nearest rocky planet outside of our solar system. It was the first telescope to directly capture light from exoplanets. Spitzer retired on 1/3/2020 but it has provided the scientific community decades worth of data for study.

April 2021 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on April 13, 2021, starting at 7:30 p.m. The meeting will be held online via Zoom.us. Dennis O'Leary, CCAS Member and NASA Ambassador – " NASA Robotic Missions: An Update on New Horizons, Insight, Perseverance, and Juno."

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

As for future meetings, we are looking for presenters for our 2021-2022 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Supermassive Black Hole Spotted Wandering Through Space

by Ashley Strickland, CNN.com

Digital Sky Survey Galaxy J0437+2456 is thought to be home to a supermassive, moving black hole. Credit: Sloan Digital Sky Survey (SDSS)

Supermassive black holes usually sit like stationary engines at the centers of galaxies, sucking in everything around them. Now astronomers have detected a highly unusual case of one wandering through space. Astronomers previously believed it was possible for supermassive black holes to be actively on the move, but it has been difficult to gather evidence for that theory -- until now.

The study was published on Friday, March 12, 2021, in The Astrophysical Journal. Dominic Pesce, astronomer at The Center for Astrophysics | Harvard & Smithsonian, has worked with collaborating scientists to observe 10 distant galaxies and the supermassive black hole at the center of each system over the last five years. The Center for Astrophysics is a collaborative research effort that combines the Harvard College Observatory and the Smithsonian Astrophysical Observatory.

"We don't expect the majority of supermassive black holes to be moving; they're usually content to just sit around," said Pesce, who is also the lead study author, in a statement. "They're just so heavy that it's tough to get them going. Consider how much more difficult it is to kick a bowling ball into motion than it is to kick a soccer ball -- realizing that in this case, the 'bowling ball' is several million times the mass of our Sun. That's going to require a pretty mighty kick."

The researchers compared the velocities of both galaxies and supermassive black holes during their observation campaign to understand if they were the same. "We expect them to have the same velocity. If they don't, that implies the black hole has been disturbed," Pesce said.

The researchers focused on black holes that included water as a component in their accretion disks, disks full of material that is pulled toward the black hole. When water is part of the material orbiting the black hole inside this disk, it creates a radio light signature known as a maser, which looks a bit like a laser.

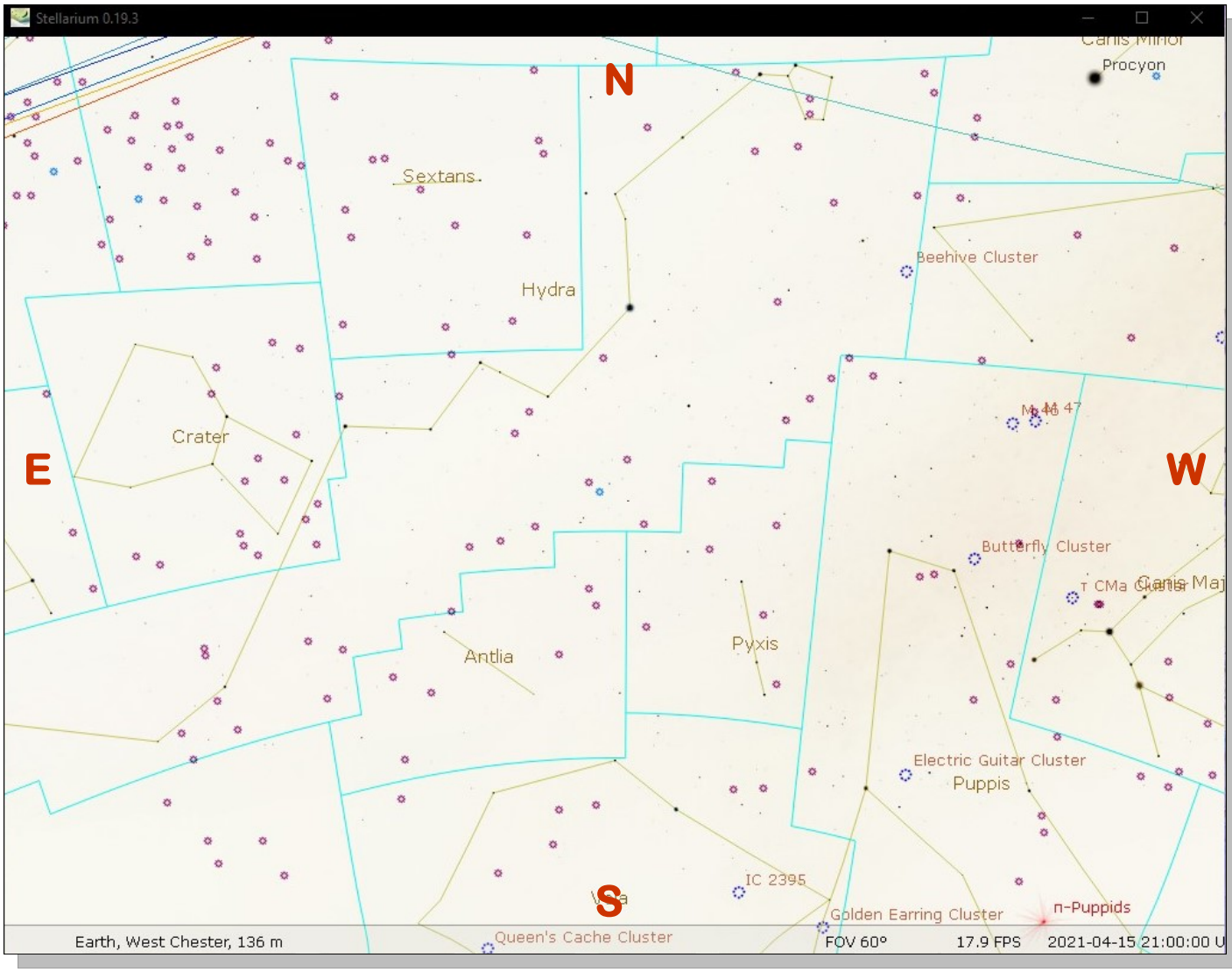
This signal can be used to measure the velocity of the black hole through a radio antenna network used by astronomers. While nine of the supermassive black holes were stationary, one appeared to be on the move. It's 230 million light-years away from Earth and can be found at the center of a galaxy known as J0437+2456. This supermassive black hole is a heavy one, with a

(Continued on page 6)

The Sky Over Chester County

April 15, 2021 at 9:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
04/01/2021	6:18 a.m. EDT	6:46 a.m. EDT	7:26 p.m. EDT	7:54 p.m. EDT	12h 40m 57s
04/15/2021	5:56 a.m. EDT	6:24 a.m. EDT	7:41 p.m. EDT	8:09 p.m. EDT	13h 16m 53s
04/30/2021	5:34 a.m. EDT	6:03 a.m. EDT	7:56 p.m. EDT	8:25 p.m. EDT	13h 52m 51s

Moon Phases					
Last Quarter	04/04/2021	6:02 a.m. EDT	New Moon	04/11/2021	10:30 p.m. EDT
First Quarter	04/20/2021	2:58 a.m. EDT	Full Moon	04/26/2021	11:31 p.m. EDT

April 2021 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

4	**Last Quarter Moon, 6:02 a.m. EDT**
11	**New Moon, 10:30 p.m. EDT**
12	**Look for a very thin crescent Moon low in the west**
16/17	**Mars is near the Moon**
19	**Pollux and Caster, the twins of Gemini, are near the Moon at nightfall**
20	**First Quarter Moon, 2:58 a.m. EDT**
20	**The Lunar Straight Wall is visible this evening**
22	**The Lyrid meteors peak in the predawn hours**
26	**Full Moon, the Full Pink Moon or the Bullhead Moon, 11:31 p.m. EDT**

The best sights this month: Mars is the only planet visible during the evening hours, and the best day for tracking down the red planet is April 25th when Mars will be near open clusters Messier 35 and NGC 2158.

Mercury: Mercury passes behind the Sun (superior conjunction) on April 18th, so April is a poor month to see the planet closest to the Sun. If you really try you might find Mercury low in the west a half hour after sunset on the last day of the month.

Venus: Our sister planet passed behind the Sun late in March, so it is also in poor viewing position viewing during April. If you want a glimpse of the "evening star" you might find it low in the west after sunset during the last few days of the month.

Mars: Mars is the only planet visible during evening hours during April. It will be high in the sky just after the sky darkens, shining at magnitude 1.3. On April 25th grab your binoculars and gaze at Mars as it is nearby Messier 35, a beautiful open cluster in Gemini. And as a bonus, open cluster NGC 2158 is also nearby!

Jupiter: Jupiter will rise around 5 a.m. and shines at magnitude -2.2 during April.

Saturn: Saturn rises about a half hour before Jupiter and will be about 10° above the horizon at the onset of morning twilight.

Uranus and Neptune: Both Uranus and Neptune are poorly positioned for observation during April. Uranus passes behind the Sun on April 30th.

The Moon: The Moon is full on April 26th. Native Americans called this the Full Pink Moon. This name came from the herb moss pink, or wild ground phlox, which is one of the earliest flowers of the spring. Other names for this full Moon are the Full Sprouting Grass Moon and among coastal tribes the Full Fish Moon because this was the time when the shad swam upstream to spawn. Native Canadians called this The Full Bullhead Moon.

Constellations: We can wave good-bye to the winter constellations as they sink below the horizon during April – we will miss you! But the spring constellations are here to enjoy and if you are up late you will even see the Summer Triangle peeking over the eastern horizon. Leo the Lion is at center stage and Ursa Major is high overhead. In the east we have bright Arcturus in Boötes, followed by Corona Borealis, the Northern Crown. If you are up a bit later you will see Hercules rising.

Messier/deep sky: April is a good month to go galaxy hunting. Look for M63 in Canes Venatici, M64 in Coma Berenices, M51, M81 and M82 in Ursa Major and M104 near bright Spica in Virgo. My favorite grouping of galaxies is the Leo Triplet, below Leo the Lion's tail. Set up your telescope on a night with no bright Moon and wait until your target is high in the sky for the best view of these faint, fuzzy, deep sky delights.

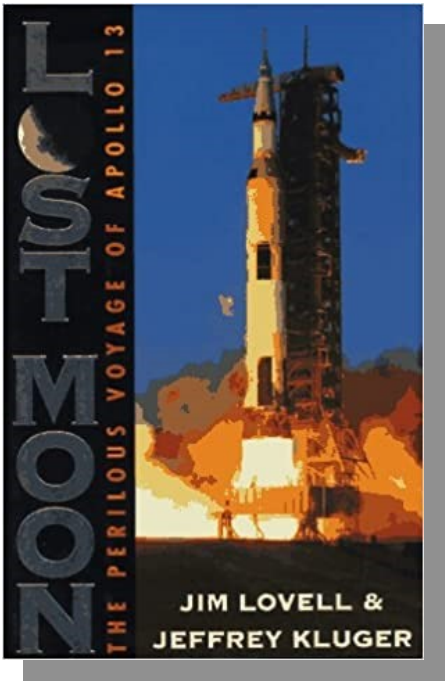
Comets: There are no bright comets visible during April.

Meteor showers: The Lyrid meteor shower peaks on the morning of April 22nd. The 10-day old Moon will wash out most of the meteors, but the Moon sets at 4 a.m. so there will be an hour of good viewing before sunrise begins.

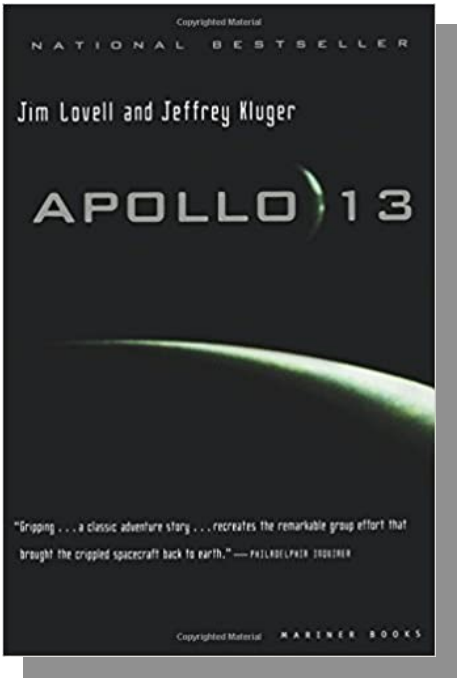
Book Review: *Lost Moon,* by Jim Lovell & Jeffrey Kluger

by Chris Trunk, CCAS Member

With the 50th anniversary of the Apollo 11 lunar landing now in the rear view mirror, April of this year marks another special occasion in the Apollo legacy, the 50th anniversary of the dramatic rescue of the Apollo 13 crew. *Lost Moon* by Apollo 13 commander Jim Lovell and co-author Jeffery Kluger details the events of that near-tragedy. However *Lost Moon* covers way more than just the Apollo 13 incident, delving into Lovell's difficulty gaining entry into the astronaut program, the loss of his good friend Ed White in the Apollo 1 Launchpad fire, and the personal and family hardships that came along with being a test pilot and astronaut.



Hardcover Edition.



Paperback Edition

Be forewarned, it's very hard to put this book down once you start reading. *Lost Moon*, published in 1994, served as the basis for the Oscar-winning film *Apollo 13*. As the saying goes; "the book is much better than the movie" and this one is no exception. The comprehensive & fascinating account covers 378 pages spread over 12 chapters (perhaps the authors didn't want to jinx the book with a 13th chapter), along with four appendices, detailed author's notes, an excellent index, and a small selection of B&W photos. *Lost Moon* is a great read for anyone with even the slightest interest or curiosity about the Apollo program in general or more specifically the Apollo 1 and 13 incidents.

As the 50th anniversary of the Apollo 13 incident approaches, *Lost Moon* and the movie that it

(Continued on page 7)

Black Hole (Cont'd)

(Continued from page 3)

mass that is 3 million times that of the sun.

The study team used follow-up observations from the Arecibo Observatory in Puerto Rico before its collapse and the Gemini Observatory in Hawaii to determine that the supermassive black hole is actually moving at 110,000 miles per hour within the galaxy. The scientists don't know why the black hole is moving, but they have narrowed in on two ideas.

"We may be observing the aftermath of two supermassive black holes merging," said study coauthor Jim Condon, a radio astronomer at the National Radio Astronomy Observatory in Virginia, in a statement. "The result of such a merger can cause the newborn black hole to recoil, and we may be watching it in the act of recoiling or as it settles down again."

It's also possible that the black hole is one of a pair within the galaxy. "Despite every expectation that they really ought to be out there in some abundance, scientists have had a hard time identifying clear examples of binary supermassive black holes," Pesce said. "What we could be seeing in the galaxy J0437+2456 is one of the black holes in such a pair, with the other remaining hidden to our radio observations because of its lack of maser emission."

Only future observations will tell the tale and reveal the cause behind this black hole's journey through space, according to the researchers.

Lost Moon (Cont'd)

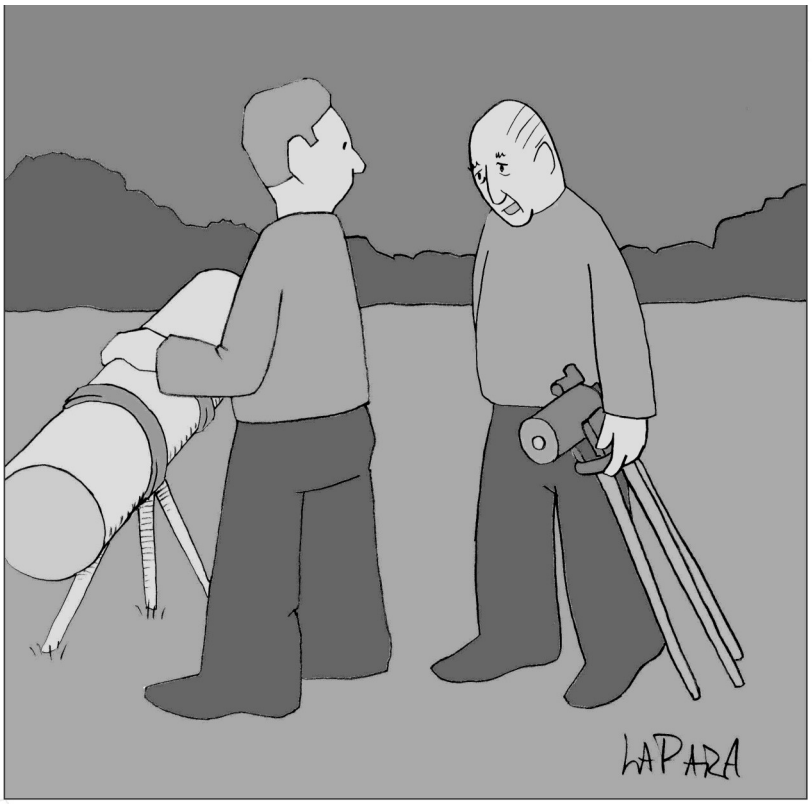
(Continued from page 6)

inspired, serve to remind us that our greatest accomplishments have come from the collective teamwork of a diverse group, not afraid to think outside the box.

The lead author and Apollo 13 Commander, Jim Lovell will be turning 92 in March of this year. A nice follow-up to *Lost M*oon is a lecture that Jim gave on May 11th 2016 at MIT to a large class of Aeronautics and Astronautics students. That video can be viewed on MIT's on-line video library at: https://aeroastro.mit.edu/videos/apollo-13s-capt-jim-lovell-aeroastro-talk-april-27-2016 Jim combines his charm & wit along with a first-hand account of the navigational and life-support

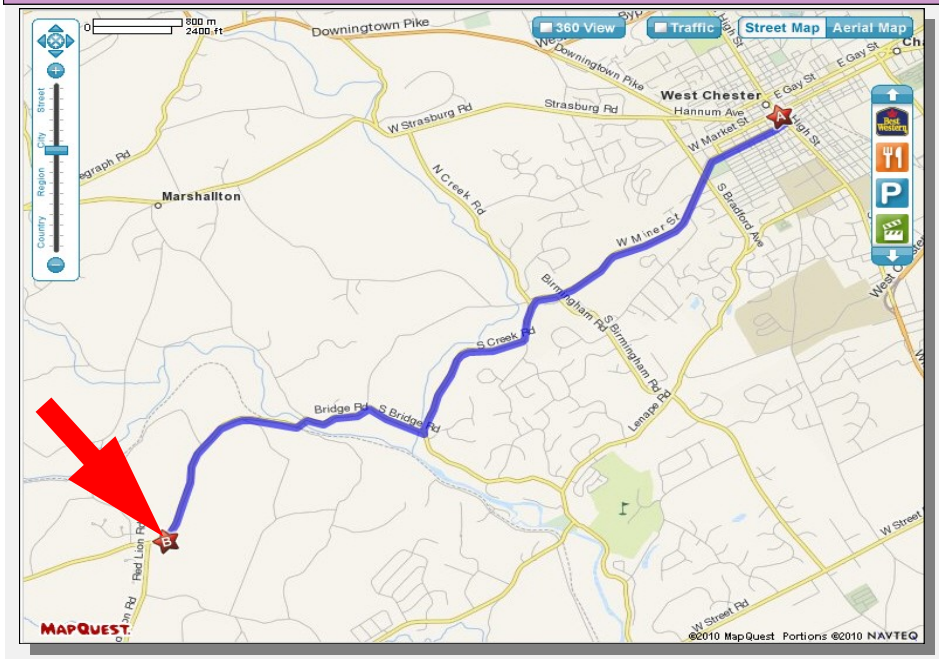
(Continued on page 11)

Classic La Para
by Nicholas La Para



"JUST WHEN THE UNIVERSE IS ACCELERATING, I'M SLOWING DOWN."

CCAS Directions



Brandywine Red Clay Alliance
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

Through the Eyepiece: Globular Cluster M3

by Don Knabb, CCAS Treasurer & Observing Chair

As spring progresses our view of the night sky is once again beginning to turn toward the center of the Milky Way. That, of course, means it is globular cluster time! So grab your binoculars or your telescope and join the search for these treasures of the sky. On a dark night a good view of a globular cluster in your telescope will get a nice response from family and friends.

Messier 3, also known as M3 or NGC 5272, is a globular cluster in the constellation Canes Venatici. It was discovered by Charles Messier in 1764, and resolved into stars by William Herschel around 1784. This globular cluster is one of the largest and brightest, and is made up of around 500,000 stars. It is located at a distance of about 33,900 light-years away from Earth. M3 has an apparent magnitude of 6.2, making it barely visible to the naked eye under ideal, very dark conditions.

A globular cluster is a spherical collection of stars that orbits a galaxy as a satellite. They can contain anywhere from ten thousand to a million stars. These stars orbit the collective center of mass of the cluster in a veritable bee hive of motion, and the cluster itself orbits the Milky Way as a distinct object, occasionally plunging right through the main disk and out the other side. Although the cluster appears extremely dense, the distance between individual stars is actually quite large. As a result, stars within them rarely collide, and globular clusters survive relatively unscathed by their passage through the galaxy's disk.

Image credit: Credits: NASA, ESA, STScI and A. Sarajedini (University of Florida)

It is interesting to contemplate what the night sky might look like if we lived on a planet revolving around a star in M3. Contrary to what seems obvious, one would not be dazzled by a sky swarming with stars. There might be a dozen or so stars much brighter than any we see and perhaps a hundred as bright as our brightest but it would still get dark out. However, as it would be lighter than our darkest skies, we might not have a clue about the dim galaxies and nebulae that lie outside our cluster.

Globular cluster M3 is extremely rich in variable stars, more than in any other globular cluster in our Milky Way galaxy. M3 also contains a relatively large number of so-called Blue Stragglers, blue main-sequence stars which appear to be rather young, much younger than the rest of the globular's stellar population would suggest. A mystery for a long time, these stars are now thought to have undergone dramatic changes in stellar interactions, getting their cooler outer layers stripped away in close encounters, which occasionally occur when stars are passing through the dense central regions of globular clusters.

(Continued on page 9)

Eyepiece (Cont'd)

Image Credit: Stellarium

(Continued from page 8)

M3 is visible to the naked eye only under ideal conditions and stays below the limit of visibility under more average conditions. It can be easily seen with the aid of binoculars or any telescope. In binoculars, it appears as a hazy, nebulous patch. A 4-inch telescope shows its bright compact core within a round and mottled, grainy glow, which fades slowly and uniformly to the outer edges. A 6-inch telescope resolves the outer two thirds of the cluster into faint stars on a background glow formed by the unresolved fainter member stars of the cluster. An 8 -inch telescope shows stars throughout the cluster but not in the very core, which is resolved into stars only by larger telescopes.

Although M3 is in the constellation Canes Venatici, I locate it more easily using the constellation Boötes. As you can see in the Stellarium screen capture, if you find bright Arcturus and scan towards Canes Venatici you can find M3 relatively easily. I have not seen it naked eye but find it easily with hand held binoculars.

(Continued on page 12)

NASA Night Sky Notes: Watch the Lion—Celestial Wonders in Leo

by David Prosper

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.

Leo is a prominent sight for stargazers in April. Its famous sickle, punctuated by the bright star Regulus, draws many a beginning stargazer's eyes, inviting deeper looks into some of Leo's celestial delights, including a great double star and a famous galactic trio.

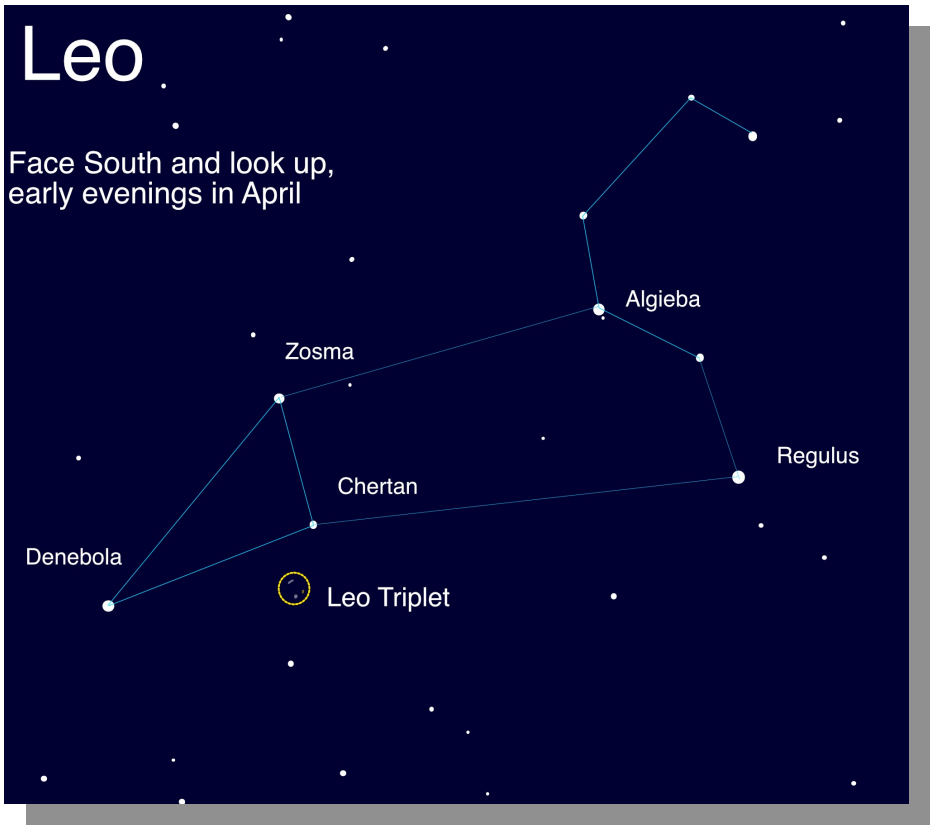
Leo's distinctive forward sickle, or "reverse question mark," is easy to spot as it climbs the skies in the southeast after sunset. If you are having a difficult time spotting the sickle, look for bright Sirius and Procyon - featured in last month's article – and complete a triangle by drawing two lines to the east, joining at the bright star Regulus, the "period" in the reverse question mark. Trailing them is a trio of bright stars forming an isosceles triangle, the brightest star in that formation named Denebola. Connecting these two patterns together forms the constellation of Leo the Lion, with the forward-facing sickle being the lion's head and mane, and the rear triangle its hindquarters. Can you see this mighty feline? It might help to imagine Leo proudly sitting up and staring straight ahead, like a celestial Sphinx.

If you peer deeper into Leo with a small telescope or binoculars, you'll find a notable double star! Look in the sickle of Leo for its second-brightest star, *Algieba* - also called Gamma Leonis. This star splits into two bright yellow stars with even a

small magnification - you can make this "split" with binoculars, but it's more apparent with a telescope. Compare the color and intensity of these two stars - do you notice any differences? There are other multiple star systems in Leo – spend a few minutes scanning with your instrument of choice, and see what you discover.

One of the most famous sights in Leo is the "Leo Triplet": three galaxies that appear to be close together. They are indeed gravitationally bound to one another, around 30 million light years away! You'll need a telescope to spot them, and use an eyepiece with a wide field of view to see all three galaxies at once! Look below the star Chertan to find these galaxies. Compare and contrast the appearance of each galaxy – while they are all spiral galaxies, each one is tilted at different angles to our point of view! Do they all look like spiral galaxies to you?

(Continued on page 11)



The stars of Leo: note that you may see more or less stars, depending on your sky quality. The brightness of the Leo Triplet has been exaggerated for the purposes of the illustration - you can't see them with your unaided eye.

Night Sky Notes (Cont'd)

Your view of the three galaxies in the Leo Triplet won't look as amazing as this image taken by the VLT Survey Telescope, unless you have a telescope with a mirror 8 feet or more in diameter! Still, even a small telescope will help your eyes pick up these three galaxies as "faint fuzzies": objects that seem blurry against a background of pinpoint stars. Let your eyes relax and experiment with observing these galaxies by looking slightly away from them, instead of looking directly at them; this is called averted vision, a handy technique that can help you see details in fainter, more nebulous objects. Image Credit: ESO, INAF-VST, OmegaCAM; Acknowledgement: OmegaCen, Astro-WISE, Kapteyn I.

(Continued from page 10)

April is Citizen Science Month, and there are some fun Leo-related activities you can participate in! If you enjoy comparing the Triplets, the "Galaxy Zoo" project (galaxyzoo.org) could use your eyes to help classify different galaxies from sky survey data! Looking at Leo itself can even help measure light pollution: the Globe at Night project (globeatnight.org) uses Leo as their target constellation for sky quality observations from the Northern Hemisphere for their April campaign, running from April 3 to April 12, 2021.

Find and participate in many more NASA community science programs at science.nasa.gov/citizenscience.

Happy observing!

Lost Moon (Cont'd)

(Continued from page 7)

issues that he and his Apollo 13 crew mates Fred Haise and Jack Swigert were facing.

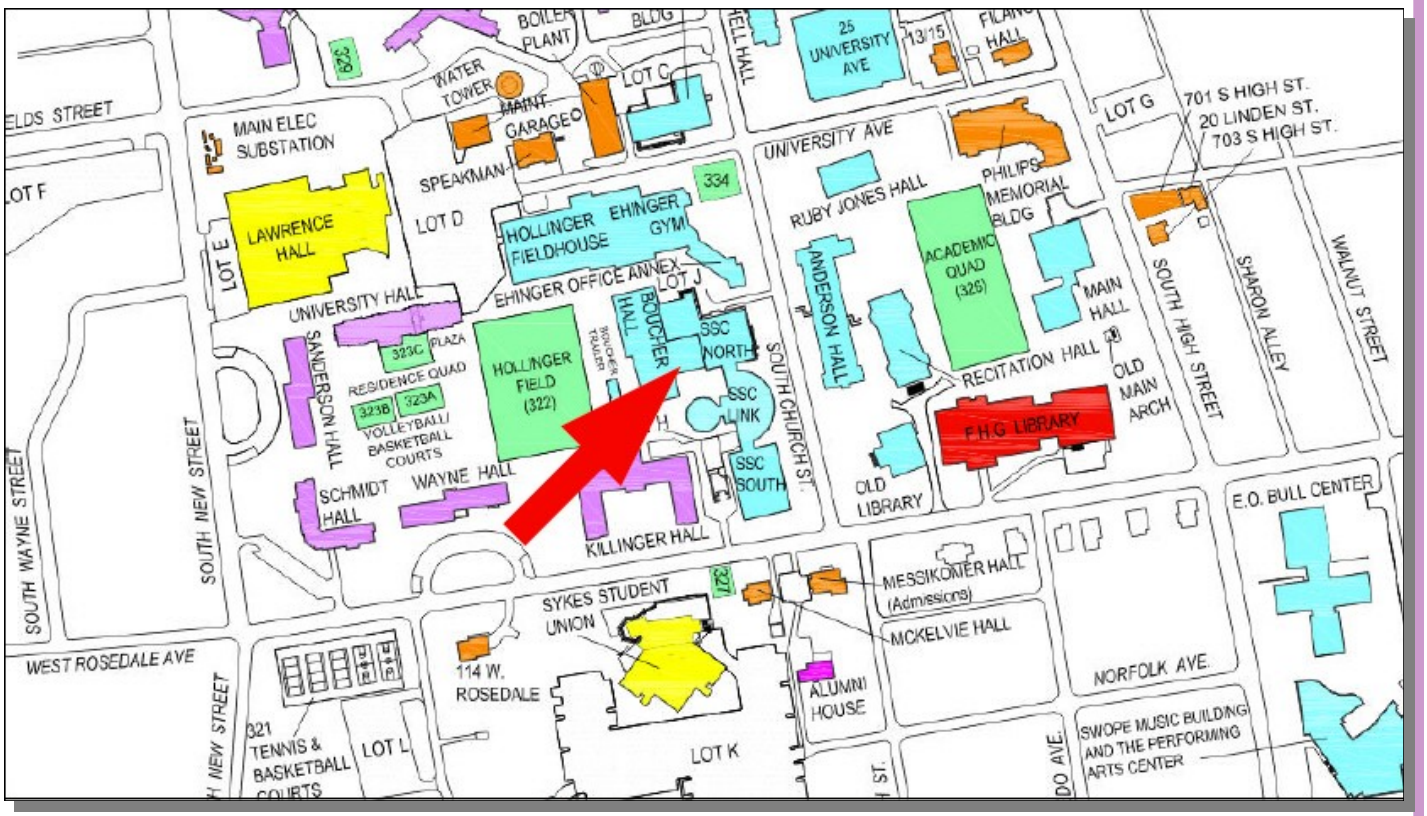
Lost Moon: The Perilous Voyage of Apollo 13 can be found at the Chester County Library or can be purchased in paperback form.

~Happy reading, Chris

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 9)

So the next night that the Moon is not obscuring the view of deep sky objects, seek out M3. It is a nice way to put 500,000 stars in your eyepiece!

Information credits:

- http://www.seds.org/messier/m/m003.html
- http://en.wikipedia.org/wiki/Messier_3
- https://www.nasa.gov/feature/goddard/2017/messier-3

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

March 2021 Financial Summary

Beginning Balance	$1410
Deposits	$150
Disbursements	-$536
Ending Balance	$1024

New Member Welcome!

Welcome new CCAS members David Rosenstein, Landenberg, PA, Shivanand Sah, West Chester, PA, and Paul Smaglik, Hazle Township, 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

Dark-Sky Website for PA

PENNSYLVANIA OUTDOOR LIGHTING COUNCIL

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

http://www.POLCouncil.org

Find out about Lyme Disease!

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

http://www.LymePA.org

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

Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

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

★ ★ ★ ★ ★

LIGHTHOUSE OUTDOOR LIGHTING

Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. Lighthouse's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Phone: **484-291-1084**

https://www.lighthouse-lights.com/landscape-lighting-design/pa-west-chester/

Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided only as a service to our members and the general public.

Skies UNLIMITED

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:

Dr. John C. Hepler
501 Main St.
Ashland, PA 17921

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 Dr. John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

CCAS Website

Dr. John Hepler is the Society's Webmaster. You can check out our Website at:

http://www.ccas.us

Dr. Hepler 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 Dr. Hepler at (410) 639-4329 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:	Dave Hockenberry 610-558-4248
Vice President:	Pete Kellerman 610-873-0162
ALCor, Observing, & Treasurer:	Don Knabb 610-436-5702
Secretary:	Beatrice Mazziotta 610-933-2128
Librarian:	Barb Knabb 610-436-5702
Program:	Bruce Ruggeri 484-883-5092
Education:	Don Knabb 610-436-5702 Dennis O'Leary 610-701-8042
Webmaster & Newsletter:	John Hepler 484-883-0533
Public Relations:	Ann Miller 610-558-4248

CCAS Membership Information

The 2021 membership rates are as follows:

REGULAR MEMBER……$30/year
SENIOR MEMBER…….$15/year
STUDENT MEMBER……..$ 5/year
JUNIOR MEMBER……..$ 5/year
FAMILY MEMBER…….$40/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 & Tel*escope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **$43.95**. This is still a good saving from the regular rate of **$54.95**.

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just go to the Sky and Telescope website and select "Magazine", then under the FAQs you can subscribe at the club rate.

https://skyandtelescope.org/subscribe/

If you have **any** questions call Don Knabb 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).

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just call customer service at 877-246-4835 and request the club rate for your new subscription or renewal.