Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 18, No. 2 *Two-Time Winner of the Astronomical League's Mabel Sterns Award ¤ 2006 & 2009* *February 2010*

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	Imburgia
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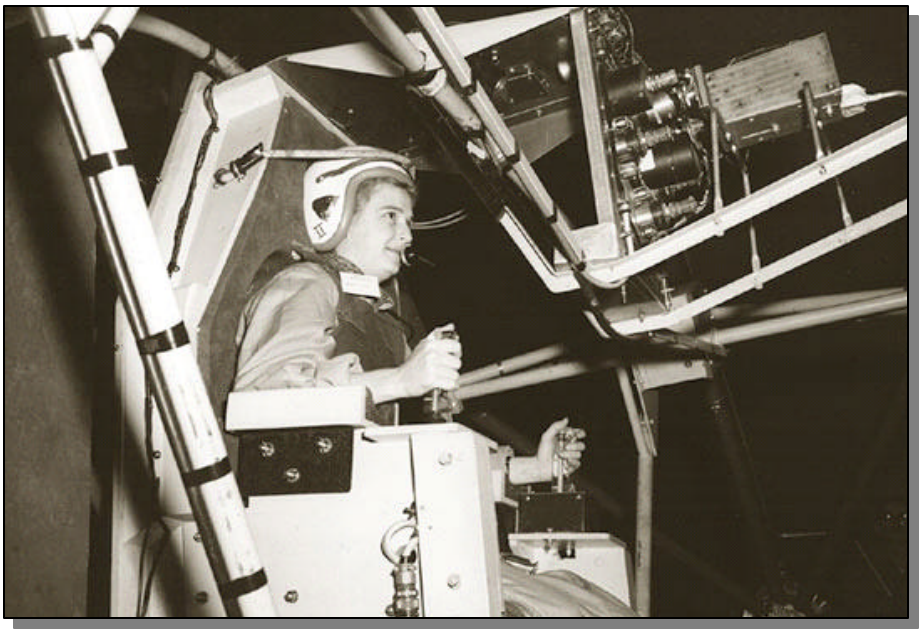
	Popovich
	Richter



Jerrie Cobb, one of the Mercury 13, tests the Gimbal Rig, a device used to train astronauts to control the spin of a tumbling spacecraft, in 1960.

Important February 2010 Dates

1st-15th • Look for the zodiacal light about an hour and a half after sunset

5th • Last Quarter Moon 6:48 p.m.

13th • New Moon 9:51 p.m.

14th • A very thin Moon is to the right of Venus and Jupiter

21st • First Quarter Moon 7:42 p.m.

28th • Full Moon 11:38 a.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.

¤ Wednesday, March 3, 2010 - Project Astro Night Out. Contact Kathy Buczynski for details.

¤ Saturday, April 17, 2010 - Night Out in Hoopes Park, West Chester. The event is cohosted with the West Chester Department of Recreation.

¤ Saturday, May 22, 2010 - Night Out in Anson Nixon Park, Kennett Square.

Winter 2010 Society Events

February 2010

3rd • PA Outdoor Lighting Council monthly meeting, Bucktown Branch of National Penn Bank, starting at 7:30 p.m. Meetings are open to the public. For more information and directions, visit the PA Outdoor Lighting Council website (http://www.polcouncil.org/).

9th • DVD Lecture Series: "Imagining the Journey to a Black Hole", half-hour video presentation of a lecture by Professor Alex Filippenko, UC Berkeley. Room 113, Merion Science Center (former Boucher Building), West Chester University. The presentation immediately precedes the monthly meeting and starts at 7:00 p.m.

9th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building). The meeting starts at 7:30 p.m. Guest Speaker: Mike Turco, "Solar Activity & Global Warming" Constellation of the Month: Dave Hockenberry, "Sextans".

12th • West Chester University Planetarium Show: "Other Earths", Schmucker Science Building, Show starts at 7 p.m. and is free of charge. For more information and reservations, please contact Dr. Karen Vanlandingham, Planetarium Director, via e-mail or visit the planetarium's webpage.

12th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA (inclement weather date February 13th). The observing session starts at sunset.

20th • Open call for articles and photographs for the March 2010 edition of Observations.

26th • Deadline for newsletter submissions for the March 2010 edition of Observations.

26th • Reservations start for the March 19th planetarium show at the WCU Planetarium. For more information, please contact Dr. Karen Vanlandingham, Planetarium Director, via e-mail or visit the planetarium's webpage.

March 2010

3rd • PA Outdoor Lighting Council monthly meeting, Bucktown Branch of National Penn Bank, starting at 7:30 p.m. Meetings are open to the public. For more information and directions, visit the PA Outdoor Lighting Council website (http://www.polcouncil.org/).

9th • DVD Lecture Series: "Wormholes, Gateways to the Other Universes?", half-hour video presentation of a lecture by Professor Alex Filippenko, UC Berkeley. Room 113, Merion Science Center (the former Boucher Building), WCU. The presentation immediately precedes the monthly meeting and starts at 7:00 p.m.

9th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: "Uncle" Rod Mollise: "The Past, Present, and Future of the Schmidt Cassegrain Telescope". Constellation of the Month: TBA.

12th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA (inclement weather date March 13th). The observing session starts at sunset.

19th • West Chester University Planetarium Show: "Walking on the Moon", Schmucker Science Building, Show starts at 7 p.m. and is free of charge. For more information and reservations, please contact Dr. Karen Vanlandingham, Planetarium Director, via e-mail or visit the planetarium's webpage.

19th • Reservations start for the April 9th planetarium show at the WCU Planetarium. For more information, please contact Dr. Karen Vanlandingham, Planetarium Director, via e-mail or visit the planetarium's webpage.

20th • Open call for articles and photographs for the April 2010 edition of Observations.

26th • Deadline for newsletter submissions for the April 2010 edition of Observations.

Minutes from the January 2010 Monthly CCAS Meeting

by Don Knabb, CCAS Secretary & Observing Chair

- Video presentation: *The Quest for Black Holes* DVD was shown.
- Program – WCU Professor Marc Gagne presented his talk on X-Ray Observations of Deep Space Galaxy Clusters.
- Constellation of the month – Aquarius by Dave Hockenberry. Photos will be posted in next months *Observations* due to technical problems with AV equipment. Kathy B. explained the Constellation of the Month program and the Astronomical League award system to new members.
- Roger Taylor – Roger extended greetings to one new member and three visitors. He also made an open call for any observers wanting to attend the monthly CCAS Observing session at BVA Friday with a rain/snow/cloud date of Saturday. Roger also provided an explanation to the visitors and new member about equipment and dressing warmly for the upcoming observing session.
- No committee reports presented at the meeting.

CCAS Original Astrophotography: NGC 7293

by Dave Hockenberry

The **Helix Nebula**, also known as **The Helix** or **NGC 7293**, is a large planetary nebula located in the constellation of Aquarius. The Helix Nebula lies about 700 light-years away, spanning about 0.8 parsec or 2.5 light-years. Shot 10-20-09, LX200R F/6.3, SXVF H9C, stack of 13 images 5 minutes each, processed with Maxim DL.

This Month's Guest Speaker

by John Hepler, CCAS Webmaster & Newsletter Editor

Mike Turco

This month former CCAS President Mike Turco will be at the podium to discuss solar activity and its effect on global warming. His presentation is entitled "Interpreting Environmental Information: The Global Warming Issue, An Engineer and Amateur Astronomer's Point of View."

The 60-minute presentation summarizes approximately two years of research into the topic of anthropogenic global warming (AGW). Coverage of the topic includes a definition of the issue; its place in context with other, recent doomsday scenarios; a list of basic scientific facts that underlie consideration of the pros and cons of the argument, and enables their interpretation; the United Nations' Intergovernmental Panel on Climate Change (IPCC); and an analysis of ten key contentions of former vice president Al Gore's movie documentary, "An Inconvenient Truth" (which carries forward and extrapolates upon the published documents of the IPCC), using detailed, mainly graphical presentations of data that explain the facts of each.

The lecturer postulates that a more likely cause of Earth's climate variability can be found in the Earth-Sun relationship, and reviews the key variables of the latter, including orbital eccentricities, solar irradiance and cosmic ray flux, a theory gaining acceptance in light of recent empirical evidence.

The lecture ends with a review of public statements by both proponents and skeptics of AGW, to provide insight into the mindset of each. A Q&A session can follow if time allows.

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Don't miss our upcoming meetings! In March we're in for a treat with a presentation on the future of the Schmidt Cassegrain telescope by well-known author and blogger "Uncle" Rod Mollise. He is also author of the online magazine *The Journal of Double Star Observations*, published by the University of Southern Alabama.

Dr. Dave Klassen, from Rowan University, is our guest speaker in April. He'll be talking about the discoveries of water on Mars, and how scientists made the discoveries.

Our final presentation for the 2009-2010 season is by Dr. Beth Willman, from Haverford College. She studies the least

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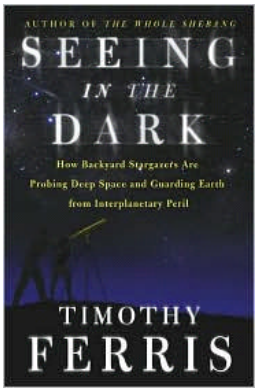
Review: Seeing in the Dark

by Nancy R. Curtis, Univ. of Maine

[Editor's Note: Here's another review of a book in the CCAS library. I thought this selection was particularly fitting.]

Science writer and stargazer Ferris (The Whole Shebang) elaborates on his 1998 New Yorker essay about the renaissance of amateur astronomy, describing how advances in telescope design, electronics, and telecommunications have made it possible for amateur observers to discover new celestial objects.



Improved technology and the sheer numbers of participants have also empowered amateurs to conduct round-the-clock or long-term research projects that complement the work of professional astronomers.

Yet these same advances also render human eyes, hands, and sometimes even minds increasingly irrelevant to the practice of both amateur and professional astronomy. Perhaps as a counterpoint to this dismaying trend, Ferris frequently interrupts his narrative to introduce readers to individual amateur astronomers, from the well known (David Levy and Patrick Moore) to the more obscure or even surprising (Brian May of the rock group Queen).

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The Sky Over Chester County

February15, 2010 at 9:00 p.m. EST

Note: the constellation stick figures used on the chart above were adapted from the book *The Stars: A New Way to See Them*, by H. A. Rey. This excellent guide to learning the constellations can be purchased at many area book stores, or from online booksellers.

This chart was produced using *Guide 8.0* skymapping software by Project Pluto, Bowdoinham, Maine

The faintest stars shown on this chart are fifth magnitude.

Date	Sunrise	Sunset	Moon Phases		
01/01/2010	7:09 a.m. EST	5:20 p.m. EST	First Quarter	02/21/2010	7:42 p.m. EST
01/15/2010	6:54 a.m. EST	5:36 p.m. EST	Full Moon	02/28/2010	11:38 a.m. EST
01/28/2010	6:35 a.m. EST	5:51 p.m. EST	Last Quarter	02/05/2010	6:48 p.m. EST
			New Moon	02/13/2010	9:51 p.m. EST

February 2010 Observing Highlights

by Don Knabb, CCAS Secretary & Observing Chair

February 1-15	Look for the zodiacal light about an hour and a half after sunset
February 3	The Moon, Saturn and Spica make a nice grouping around midnight
February 5	Last Quarter Moon, 6:48 p.m.
February 13	New Moon, 9:51 p.m.
February 14	A very thin Moon is to the right of Venus and Jupiter
February 15-18	Jupiter and Venus are very close but just above the horizon immediately after sunset
February 16	The asteroid Vesta can be found near Algieba in Leo the Lion
February 21	First quarter Moon, 7:42 p.m.
February 28	Full Moon, 11:38 a.m.

The Best Sights This Month: Mars is one of the best objects for telescopic viewing in February, as is the asteroid Vesta. On the evening of February 16/17 Vesta is the constellation Leo and threads its way between Gamma Leonis (also known as Algieba) and 40 Leonis. Vesta will be at 6th magnitude, so this is a great opportunity to see an asteroid. There are finder charts in both Astronomy and Sky & Telescope magazines.

Mercury: The planet closest to the Sun (but not the hottest planet) is in the dawn sky at the beginning of February, getting lower as the month passes. It eventually disappears into the glow of the dawn by mid-month.

Venus: Our sister planet is emerging from behind the Sun into the evening sky. I am looking forward to the spring and summer months to see the "Evening Star" shining brightly in the west, but during February you'll need to make a concerted effort to find Venus in the glow of the sunset. On February 16th Venus and Jupiter are very close in the evening sky just after sunset.

Mars: Observing the Red Planet is excellent during February and will only worsen as the months pass. Do not miss this opportunity to enjoy our neighbor planet. On February 4th Mars will pass 3° north of M44, the Beehive Cluster. Grab your binoculars and see the show!

Jupiter: As mentioned above, Jupiter and Venus put on a nice show for those who seek out a low western horizon. Their closest spacing is February 16th, but they present a nice show from the 15th to the 18th. You'll probably need binoculars to pick out these planets in the glow of the sunset.

Saturn: The ringed beauty is rising in the east around 9:30 at the start of the month and a couple of hours earlier at the end of February. Wait until late at night to catch Saturn at its best.

Uranus and Neptune: Uranus is very low in the sky and Neptune is behind the Sun. Save your gas giant hunting efforts for later in the year.

The Moon: The Moon is full this month on February 28th. According to Native Americans this is the Full Snow Moon since the heaviest snow usually falls during this month. Some tribes also referred to this Moon as the Full Hunger Moon, since harsh weather conditions in their areas made hunting very difficult.

Constellations: During February look to the west early to see the Great Square of Pegasus setting. Behind Pegasus and Andromeda the winter constellations take control of center stage for all of February. Stay up late and see bright Arcturus in Boötes rising in the east.

Messier/Deep Sky: Studying deep sky objects during the chill nights of February can be a challenge. But, there are many wonderful deep sky sights in these cold winter skies. Carry your summer lounge chair outside, lay a blanket on it and wrap yourself in a sleeping bag. Dress REAL warmly, grab your binoculars and just stare at the beautiful Pleiades. The star clusters in Auriga are almost directly overhead, well positioned for viewing through the minimum amount of atmosphere. M41, an open cluster of stars, is just below Sirius. Then look to the east and find the Beehive in Cancer before you freeze!

Comets: There are no reasonably bright comets to view during February, but if you want a challenge there is a chart in the February issue of Astronomy to help you find Comet 81P/Wild. Look for this 9h magnitude fuzz ball (hey, that's what I call my cat!) on February 13th when the Moon is new so the sky is dark.

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

Through the Eyepiece: NGC 2169, the "37" Cluster

by Don Knabb, CCAS Secretary & Observing Chair

The Astronomical League (http://www.astroleague.org) has many "observing clubs" that you can join. But the price of admission is that you must observe and record a number of objects in the sky with each club having a specific set of objects. A few years ago I saw Bob Popovich's collection of observing club pins and thought they were pretty cool, so I've been working to get a few pins of my own. One of the clubs that I am working on now, and have been for a few years as is often the case, is the Universal Sampler. This is a fun project and covers a wide range of objects in the sky. You need to purchase the booklet from the Astronomical League, but it is not expensive.

One of the objects in the list for this club is NGC 2169, an open cluster that is also known as The 37 Cluster. It received this nickname due to its striking resemblance to the numerals "37."

NGC 2169 is an open cluster in the Orion constellation. It was perhaps discovered by Giovanni Batista Hodierna before 1654 (but his description is not sufficient for a confirmed identification) and was independently discovered by William Herschel on October 15, 1784.

The 37 Cluster is near the elbow of the arm Orion is using to hold his club overhead and forms a triangle with Nu and Xi Orionis as seen in the diagram at the upper right.

At its distance of about 3600 light-years, open cluster NGC 2169 is a diameter of about 7 arc minutes and a total brightness of 5.9 magnitudes. The cluster is made up of approximately 30 stars.

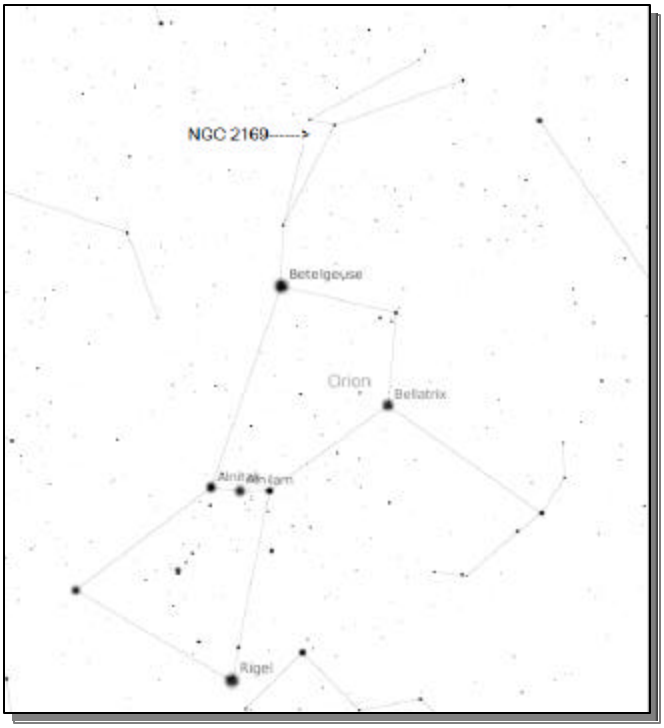

Chart credit: screen print from Stellarium planetarium software (Stellarium.org)

The brighter stars of open cluster NGC 2169 seem to form a cosmic 37. Of course, the improbable numerical asterism appears solely by chance and depending on the optics of your telescope it might be an upside down 37 or a backward 73. As far as galactic or open star clusters go, NGC 2169 is a small one, spanning about 7 light-years.

Below is a picture of the cluster:

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Photo credit: http://upload.wikimedia.org/wikipedia/commons/9/95/NGC_2169.jpg

Nicholas's Cartoon Corner

by Nicholas La Para

"I WISH WINTER WAS OVER!"

Through the Eyepiece (Cont'd)

(Continued from page 6)

Formed at the same time from the same cloud of dust and gas, the stars of NGC 2169 are only about 8 million years old. Such clusters are expected to disperse over time as they encounter other stars, interstellar clouds, and experience gravitational tides while traveling through the galaxy. Over four billion years ago, our own Sun was likely formed in a similar open cluster of stars.

Information credits:
http://www.seds.org/messier/xtra/ngc/n2169.html
http://en.wikipedia.org/wiki/NGC_2169
http://antwrp.gsfc.nasa.gov/apod/ap051118.html

Book Review (Cont'd)

(Continued from page 3)

Appendixes provide useful tips and seasonal star maps (Northern Hemisphere only) for the beginning observer, facts and figures about various celestial bodies, and recommendations for further reading. Lyrical and engrossing, this book is highly recommended for public and academic libraries.

Did You Know?

Many ancient astronomical texts describe the color of Sirius, the brightest star in the night sky, as red. These include works by Ptolemy and Seneca among others.

Source: Patrick Moore's Armchair Astronomy .

Spike-a Bahtinov Focusing Mask

by Dave Hockenberry

Getting good focus is one of those skills that most astronomy enthusiasts take almost for granted. When visually looking through an eyepiece at Saturn or the Great Orion Nebula we can fiddle and play with the focus all night, if need be, and our eye tells us instantly if the focus is amiss.

Astrophotography, however, has an added layer of complexity to achieving good focus - we can't usually use an eyepiece. We are almost completely reliant on what we observe on a computer screen. This is tricky at best, infuriating more often than not. It is very difficult to tell what the image will actually look like until after at least one or two exposures, and at five minutes or more this can wind up being an incredible waste of time.

So astrophotographers have tried many tricks and aids to achieve sharp focus through a camera. If you live in the clear, dry skies around Tucson, Arizona you can try using the maximum pixel value your camera software displays. Just keep slowly adjusting the focus until the max pixel value reads the highest number. This is great for those blessed with clear, even skies. The rest of us, unfortunately, have to put up with atmospheric turbulence, light pollution, smog, and other factors that make using maximum pixel values iffy, at best.

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Building a Case Against Ozone

by Patrick Barry

When it comes to notorious greenhouse gases, carbon dioxide is like Al Capone—always in the headlines. Meanwhile, ozone is more like Carlo Gambino—not as famous or as powerful, but still a big player.

After tracking this lesser-known climate culprit for years, NASA's Tropospheric Emission Spectrometer (TES) has found that ozone is indeed a shifty character. Data from TES show that the amount of ozone—and thus its contribution to the greenhouse effect—varies greatly from place to place and over time.

"Ozone tends to be localized near cities where ozone precursors, such as car exhaust and power plant exhaust, are emitted," says Kevin Bowman, a senior member of the TES technical staff at the Jet Propulsion Laboratory. But the ozone doesn't necessarily stay in one place. Winds can stretch the ozone into long plumes. "Looking out over the ocean we can see ozone being transported long distances over open water."

Unlike CO_2, ozone is highly reactive. It survives in the atmosphere for only a few hours or a few days before it degrades and effectively disappears. So ozone doesn't have time to spread out evenly in the atmosphere the way that CO_2 does. The amount of ozone in one place depends on where ozone-creating chemicals, such as the nitrogen oxides in car exhaust. are being released and which way the wind blows.

This short lifespan also means that ozone could be easier than CO_2 to knock off.

"If you reduce emissions of things that generate ozone, then you can have a quicker climate effect than you would with CO_2," Bowman says. "From a policy standpoint, there's been a lot of conversation lately about regulating short-lived species like ozone."

To be clear, Bowman isn't talk-

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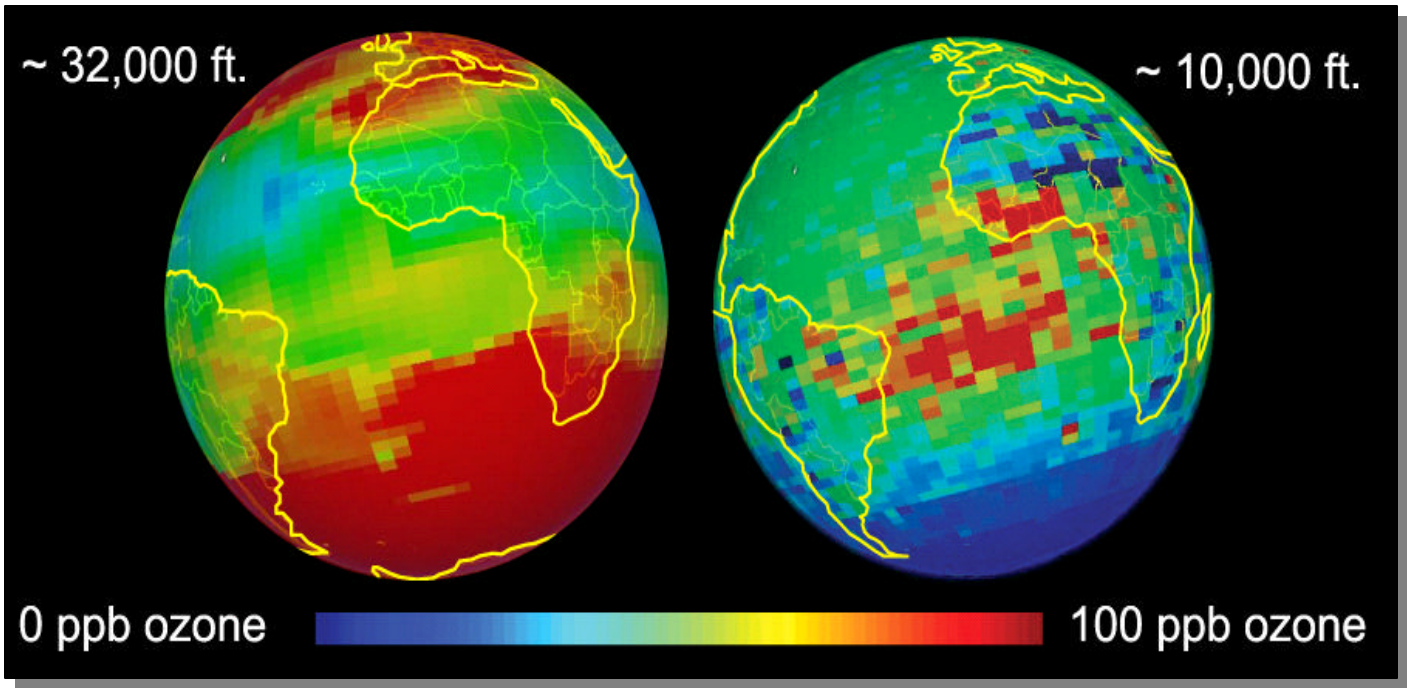

These images are TES ozone plots viewed with Google Earth. Colors map to tropospheric ozone concentrations. The image on the left shows ozone concentrations at an altitude of approximately 32,000 feet, while the one on the right shows ozone at approximately 10,000 feet. The measurements are monthly averages over each grid segment for December 2004.

CCAS Original Astrophotography: NGC 2264

by Dave Hockenberry

NGC 2264, the Christmas Tree Cluster and Nebulosity in Monoceros. Shot the night of 12/13/09, stack of 10 5-minute images with Starlight Xpress SXVF H9C camera through Televue NP101is, stacked, median processed and stretched in MaxIm DL5. No filters. Autoguided with Meade LX200R and SX Lodestar camera through MaxIm.. Occasional hot pixel removal with Photoshop CS3.

Ozone (cont'd)

(Continued from page 8)

ing about the famous "ozone layer." Ozone in this high-altitude layer shields us from harmful ultraviolet light, so protecting that layer is crucial. Bowman is talking about ozone closer to the ground, so-called tropospheric ozone. This "other" ozone at lower altitudes poses health risks for people and acts as a potent greenhouse gas.

TES is helping scientists track the creation and movement of low-altitude ozone over the whole planet each day. "We can see it clearly in our data," Bowman says. Countries will need this kind of data if they decide to go after the heat-trapping gas. Ozone has been caught red-handed, and TES is giving authorities the hard evidence they need to prosecute the case.

Learn more about TES and its atmospheric science mission at tes.jpl.nasa.gov. The Space Place has a fun "Gummy Greenhouse Gases" activity for kids that will introduce them to the idea of atoms and molecules. Check it out at spaceplace.nasa.gov/en/kids/tes/gumdrops.

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

Bahtinov Focusing Mask (Cont'd)

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Since most of us can't move to rural Arizona, other aids such as the Hartmann mask have been deployed. There are many variations of these, but most employ three evenly spaced triangles or three spaced holes on a mask that covers the objective. One then looks at the image displayed with the CCD camera and focus is adjusted until either the three images coalesce, or in the case of the triangle mask the diffraction spikes from all three images come together into a single thin spike.

This is a *big* improvement over guess and by gosh pixel values, but the star chosen as a target cannot be either too bright or too dim for a Hartmann mask to work. And even with magnifying the image, it can be quite difficult to tell when the spikes are truly at their thinnest appearance as atmospheric variance can change this as well.

The Bahtinov mask is an invention by an amateur Russian as-

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Spike-a Bahtinov mask next to the author's conventional three triangle Hartmann mask.

Starstuff: The Mercury Thirteen

by Roger Taylor, CCAS President

I was looking through some resources to find information on the NASA astronaut program when I came across a National Public Radio article written about the *Mercury Thirteen*. I knew about the men of the Mercury 7 team which included among others, John Glen. I was quite surprised to find out who the *Mercury Thirteen* were.

It seems that in 1960 and 1961, there was a top secret program to train women astronauts! This was before John Glen made his first orbital flight and before men walked on the Moon. The FLAT (Fellow Lady Astronaut Trainees) program had chosen 25 expert women pilots to be trained as Astronauts.

Women were physically smaller, lighter and would take up less oxygen than men. The question was: Could they withstand the psychological and physical stresses of space?

Nicknamed “FLATs”, these amazing women went through the same training program as their male counterparts. The training program included grueling tests which subjected the trainees to extremes of heat and cold, deprivation and endurance. After the program was finished thirteen of the original 25 women remained. They became known as the Mercury 13.

The 13 included Jerrie Cobb, Gene Nora Jessen, Wally Funk, Irene Leverton, Myrtle "K" Cagle, Jane Hart, Jerri Truhill, Rhea Hurrle Woltman, Sarah Ratley, Bernice "B" Steadman, Jean Hixson, and twins Jan and Marion Dietrich.

Seven of the "Mercury 13" gathered at the Kennedy Space Center in 1995. Gene Nora Jessen (from left), Wally Funk, Jerrie Cobb, Jerri Truhill, Sarah Rutley, Myrtle Cagle and Bernice Steadman came to watch Eileen Collins become the first woman to pilot a space shuttle.

Intriguingly, some of the women outperformed the men, particularly in the areas of disorientation recovery and pain tolerance. On completion of their qualification these thirteen women were then told to go home and put their affairs in order and to report for training at Naval Aviation Training Center in Pensacola Florida. While they were at home they received a telegram telling them that the program had been cancelled and thanked the women for their service. That, as they say, was that.

Jerri Truhill

When Dr. Randy Lovelace, director of astronaut training, sent the FLATs that fateful message, he paved the way for Russian Valentina Tereshkova to become the first woman in space. The Soviet Union was able to take the honor of sending the first “lady cosmonaut ” into space.

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Starstuff (Cont'd)

(Continued from page 10)

It was not until the Freedom of Information Act allowed documents to be declassified, that it was discovered that then Vice President of the United States Lyndon Johnson had signed the order that no women were to be allowed to become astronauts.

Apparently, there had been much resistance from the male astronauts, and this "good old boy" culture set the cause of U.S. women in space back twenty years. Also uncovered were records showing that there was a secret congressional testimony to the House Committee on Science and Astronautics on the subject of re-instating the women in the space program, but that too led to an unfavorable decision.

It was not until 1983 when astrophysicist Sally Ride became the first American women into space, that that prohibition was lifted. Ride served as a mission specialist or the seventh space shuttle mission.

It took thirty five years for the first woman to pilot and command a spacecraft mission. This achievement happened on July 26th, 2005, and belonged to Eileen Collins. She was the first to pilot the space shuttle after the Columbia accident.

Since Sally Ride's first flight, just over fifty women have been in space. It is interesting that some of those outmoded attitudes could still be with us this late in our history. It is now commonplace for almost every Shuttle mission to contain women crewmembers. We have come a long way. Sometimes when we think that things do not change, we get this reminder that we do have the capacity to grow and change.

Sally Ride

Eileen Collins

It is with sadness that I think about those twenty five women who tried, and the thirteen who succeeded, who had their dreams taken from them. Taken from them on a whim. I wonder about the stories they tell their grandchildren. Do they say that grandma was nearly an Astronaut, or do they say nothing at all?

[Editor's Note: To learn more about the leader of the Mercury 13, turn to page 12.]

As the first resident scientist aboard the International Space Station, biochemist Peggy Whitson spent six months in space in 2002.

Homemade Wooden Tripod for a Vintage Refractor

by Vic Long

I was a more than a little disappointed when I mounted my 1960's Sans & Streiffe 76mm refractor on a GSO equatorial mount. The mount head wasn't to blame - it is sturdy, smooth and tracks well. Its lightweight aluminum tripod was the culprit. Thin metal legs seemed to magnify every vibration of the long (f16.4) refractor tube. And the eyepiece was way too close to the ground when viewing objects overhead. The simplest solution was to make a properly sized wooden tripod. So off to Lowes!

What wood to use? Many folks like oak tripods- durable and attractive when finished. I seriously considered oak as its cost was not much more than poplar. I decided on a poplar, however, since the tripod would be lighter in weight and I knew that it could be made sufficiently rigid and stable.

Construction was straightforward, taking only a few days to complete. First, a tripod height was determined that allowed a comfortable viewing position for my height. Trial and error was used to determine an angle of the legs that would impart the desired stability but not interfere with observing. Next, I cut the two 1" x 2" boards comprising each upper leg section to length (in my case a bit less than 4 ft). I rounded the edges with sand paper. For the lower leg section, I used 2"x2" poplar cut to length and ripped to a width that provided a snug fit to the equatorial mount hub. Holes were drilled in the tripod legs for attachment to the equatorial mount hub and for attachment of the upper to lower leg sections. Use of a drill press and clamps ensured proper alignment of the holes. Three sets of 5/16" x 3.5" bolts, washers and wing nuts attach the tripod to the mount hub. Nine sets of 5/16" x 3.5" bolts, washers and nuts attach the upper leg to the lower leg sections. Extra holes drilled in the lower leg sections allow the tripod height to be adjusted in fixed increments. I tapered the bottom leg sections for aesthetic reasons. The Vixen-style spreader tray and hardware from the aluminum tripod worked well on the new tripod. Fine sanding, oil

(Continued on page 18)

The Finished Product

The First Lady Astronaut

submitted by Al Hallonquist

Jerrie Cobb

Born in Oklahoma in 1931, Jerrie Cobb took her first flight at the age of 12 in the backseat of an open-cockpit biplane flown by her father. That was all it took; she didn't want to come back to Earth. She gained her Private Pilot's license at age 17, her Commercial Pilot's license when she was 18 and a Flight Instructor's Rating soon thereafter.

She was determined to gain a career in aviation, and as a *pilot* rather than a flight attendant or other female occupation of that era. As this was the 1950's, it was nearly impossible for her to land a job as a pilot, so she settled for a job in Miami, Florida, at the Miami airport. It was there she met Jack Ford, a veteran pilot of WWII who had a service ferrying aircraft worldwide. She talked him into a job, and her first flight was to South America flying the advanced trainer of that era, the AT-6 Texan.

After many hours "behind the stick", she gained a wonderful reputation in the aviation community, and had to be the most experienced pilot in the high per-

(Continued on page 13)

Jerrie Cobb (Cont'd)

(Continued from page 12)

formance propeller aircraft of her day. This lead to her invitation to the Lovelace Clinic in Albuquerque, NM. This was the same clinic and doctors that selected the astronauts who later became the Mercury 7. When Cobb reported for astronaut training in 1960, she had logged over 10,000 flight hours, more than any male astronaut candidate, including John Glenn and Scott Carpenter.

Denied a chance to go into space due to "gender" and the "accepted social order of the time", according to Glenn (who at the time had testified before Congress against her), she became a consultant for NASA, but quit after several years due to not being able to make an impact on anything.

After this disappointment, Jerrie scrounged up an old twin engine Aero Commander, and embarked on a new career in the Amazon jungles as a missionary pilot. She holds world records for speed, altitude and distance that were set in the 1950's, and after she embarked on her career as a missionary pilot, was nominated for the Nobel Peace Prize (1981).

Over the years, Jerrie has been honored with many other awards:

- Amelia Earhart Gold Medal of Achievement (1949).
- Amelia Earhart Memorial Award (1957).
- Named *Woman of the Year in Aviation* (1958).
- Named *Pilot of the Year* by the National Pilots Association (1959).
- Fourth American to be awarded Gold Wings of the Fédération Aéronautique International, Paris, France.
- Named *Captain of Achievement* by International Academy of Achievement.
- Served 5 years as a Consultant to the Federal Aviation Administration.
- Selected by the Mercury Astronaut Selection Team to be the first, and only, woman to undergo and successfully. pass all 3 phases of Mercury astronaut tests (1960).
- Appointed consultant to NASA (1961).
- Honored by the federal government of Ecuador for pioneering new air routes over the Andes mountains and Amazon jungle (1965).
- Awarded the Harmon International Trophy for *The Worlds Best Woman Pilot* by President Nixon at a White House ceremony (1973).
- Inducted into the Oklahoma Hall of Fame as the "Most Outstanding Aviatrix in America."
- Received Pioneer Woman Award for her "courageous frontier spirit" flying all over the Amazon jungle serving primitive Indian tribes.
- Inducted into the Oklahoma Aviation and Space Hall of Fame (1990).
- Inducted into Women in Aviation International Pioneer Hall of Fame (2000).
- Received honorary Doctor of Science degree, *honoris causa*, from the University of Wisconsin Oshkosh "for significant contributions to the nation and to science" (May 2007).

Jerrie Cobb poses next to a Mercury spaceship capsule. Although she never flew in space, Cobb, along with 24 other women, underwent physical tests similar to those taken by the Mercury astronauts with the belief that she might become an astronaut trainee. Jerrie Cobb passed all the training exercises, and ranked in the top 2% of all astronaut candidates, male or female.

Jerrie attended all three launches of Eileen Collins's shuttle missions. At the last launch in 2005, Jerrie had the chance to meet with former First Lady Hillary Rodham Clinton and NASA Administrator Daniel Goldin. Thanks to John Glenn's successful return to space in 1998, discussions were held regarding a similar test using a female subject. Sadly, as of this writing, no such plans exist. To learn more, read her autobiographies:

Cobb, J. & Riecker, J. (1963). Woman Into Space: The Jerrie Cobb Story.

Cobb, J. (1997). Jerrie Cobb, Solo Pilot. J. Cobb Foundation.

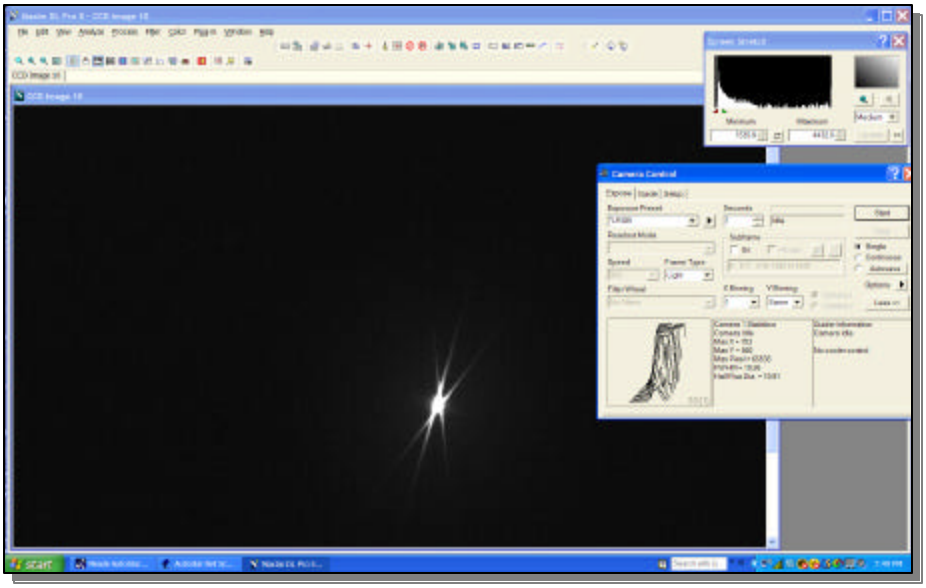
Bahtinov Focusing Mask (Cont'd)

(Continued from page 9)

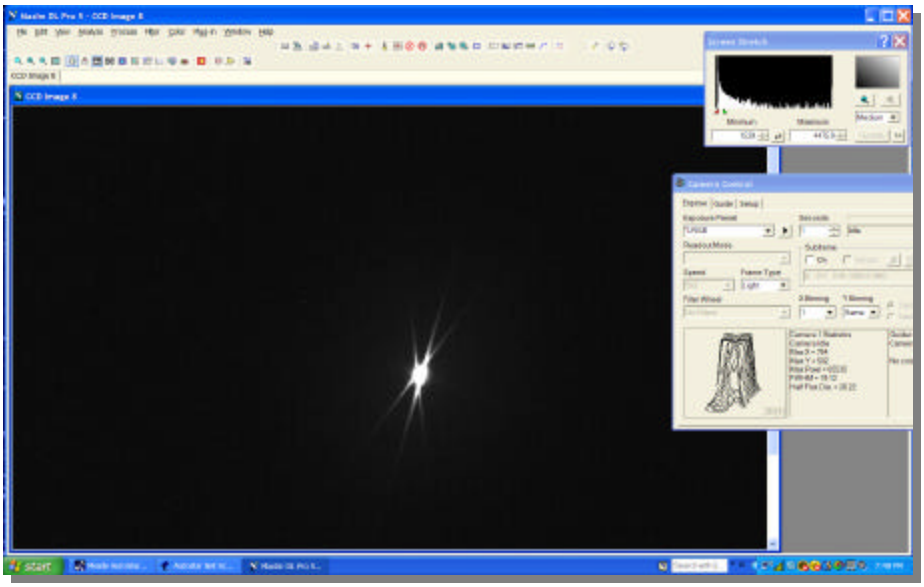
tronomer Pavel Bahtinov, and has created quite a bit of excitement in the Astrophotography community since its introduction 3 years ago in the West. The Bahtinov Mask uses a series of parallel and offset slit openings in the mask to create an elongated spike pattern. The outer spikes stay fixed, even as the focus of the telescope changes. But the middle spike moves as focus moves, and prime focus is achieved when the middle spike is exactly between the outer spikes.

The Bahtinov mask works with just about any magnitude of star unless it is very faint, and is almost unaffected by atmospheric turbulence and smog. Bahtinov masks are available commercially as patterns you can use to cut out a mask yourself, or as already finished units that are simply placed on the front of a telescope to work.

I purchased my Bahtinov masks from Spike-a. This is a finished mask, constructed out of sturdy, lightweight aluminum. It is painted flat black, and has three flanges that hold 1.5 inch screws used to center and hold the mask to the OTA. The oversized screws allow the mask to be fitted to another slightly smaller OTA if desired. I needed two masks because the difference between a 4" refractor objective and a 10" Schmidt-Cassegrain was too large for a single mask to gap. Spike-a also says they will build to custom sizes if needed.



Bahtinov mask showing star out of focus, central spike to left of outer spikes.



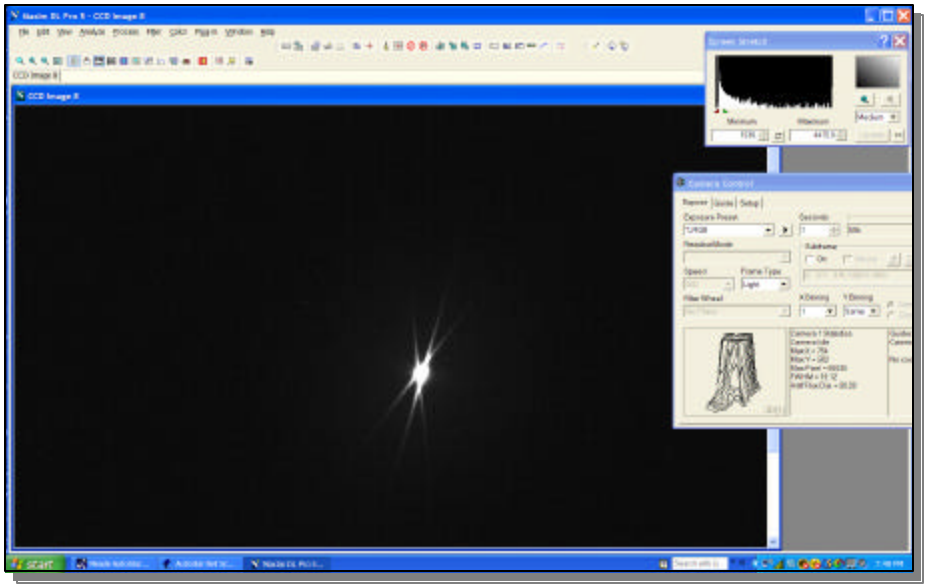
Bahtinov mask, still out of focus as central spike in to the right.

My masks happened to be in stock, and arrived in about 1 week from when I placed my order on-line. Each mask costs about $60.00. I was impressed by the fit and finish of these items, and they appear well constructed as to give a lifetime of use. Check out the website at spike-a@allprosoftware.com.

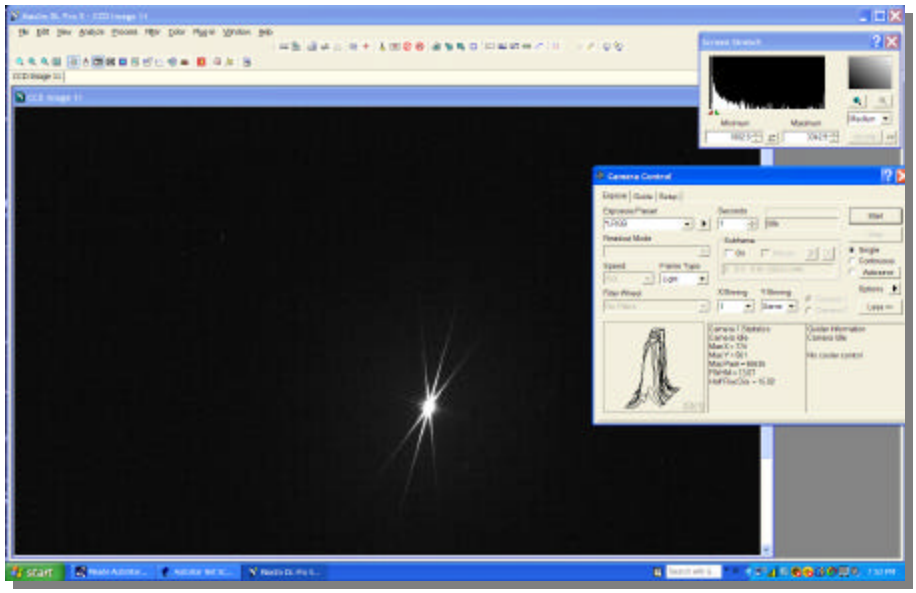
As could be expected, poor weather conditions prevailed for weeks after the masks arrived. When I finally did get to test these units, I found them to be a pleasure to use. I bounced back and forth between Sirius and Fomalhaut initially, then worked with some fainter stars in Andromeda. The test conditions were not ideal for viewing, with lots

(Continued on page 15)

Bahtinov Mask (Cont'd)



Bahtinov mask showing star out of focus, central spike to left of outer spikes.



Bahtinov mask, focus just right! Central spike in center of outer spikes.

(Continued from page 14)

of high thin clouds passing through, but it provided a good test for the manufacturer's claim that this focusing mask isn't affected by all but the worst of conditions. They are correct in their claim. Brighter stars like Sirius still give the desired spike pattern, even with pretty heavy clouds. As long as some light from the star can reach the objective this mask works!

At very long focal lengths and high magnification the ends of the spikes may not be picked up by the camera, but the center of the spikes was always visible and thus usable to focus. On these pages are some screen shots from my rig, demonstrating the Bahtinov and Hartmann masks for comparison.

For comparison, I have included some screen shots from my rig using my Hartmann mask (page 16). The clarity of the image mirrors the difficulty in achieving sharp focus.

So how well do they work? In a nutshell, they work superbly. It takes all of about 10-15 seconds to bring the central spike in the middle, then you pull off the mask, lock down your mirror or your refractor focus and get to work. After getting focus with the mask I ran a 20-second shot of the Great Orion Nebula, and you can see from the picture on page 17 that the focus is excellent, even in iffy conditions.

I found that the masks work well on stars down to about magnitude 6 to 6.5 in the 580 mm FL refractor, and down to about mag. 8 through the 10" Meade SCT. In fact, it was so easy to touch up focus with this tool I found myself fine tuning focus through an hour-long run much more often than I did with the Hartmann mask. It was so easy to do that I doubt I'll ever try focusing with the max pixel value again! I did try to test the focus on Mars and Saturn after using a star to focus. I found I still had to touch up with several tries of short-exposure pictures to get surface details "spot-on" for planetary work. But for deep sky objects once the focus is set, you can bet that the image will look good.

(Continued on page 16)

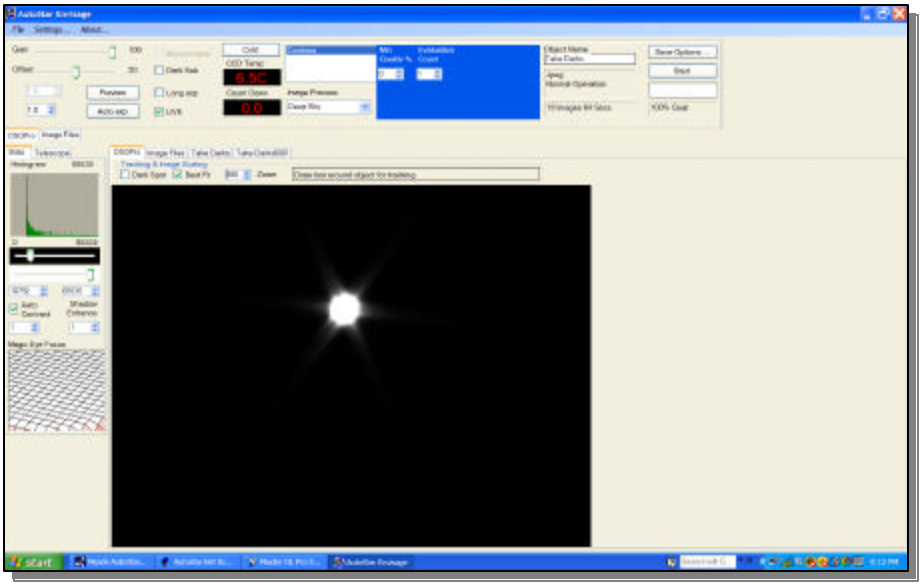
Bahtinov Focusing Mask (Cont'd)

(Continued from page 15)

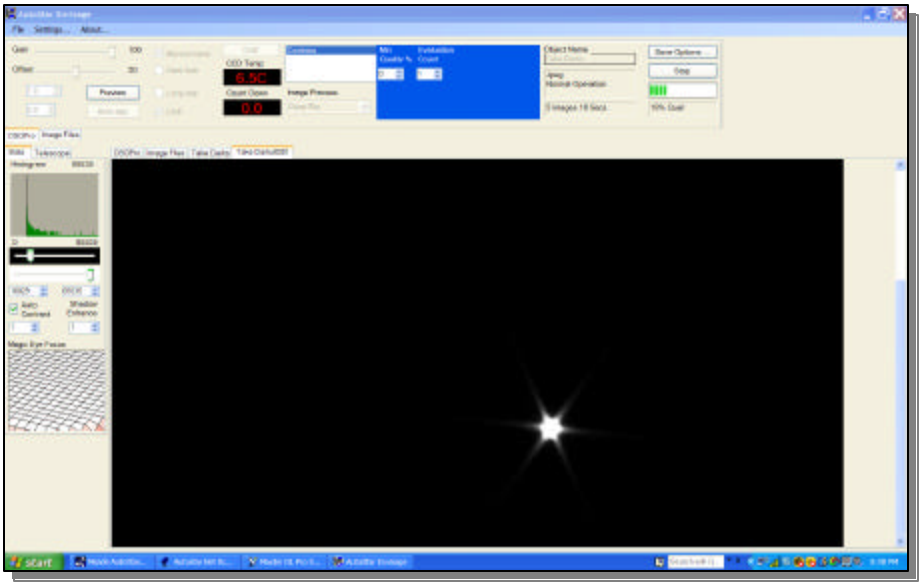
So does it work for visual focus? Well, for a quick rough prime focus it isn't too bad. The problem is that the spike pattern is quite solid on a CCD camera image, but to the naked eye the spikes are discontinuous and harder to center. I suppose it might help you choose a direction to focus a horribly out-of-focus rig, but I found that getting the mask off made fine focus much easier for visual observing. So I doubt that this focusing mask has any real application outside of photography.

So in conclusion, the Bahtinov mask from Spike-a is a very well-built unit that makes focusing an easy task for any shutterbug. It is not a good tool for visual work, and planetary imaging may not give the same tack-sharp results that it lends to deep sky objects.

But after using these focusing masks only a few times, I can't imagine setting up my cameras without them.



Hartmann mask, out of focus, triangles and spikes haven't coalesced into one image.



Hartmann mask, in focus, with triangles and spikes coalesced into one.

CCAS Speakers (cont'd)

(Continued from page 3)

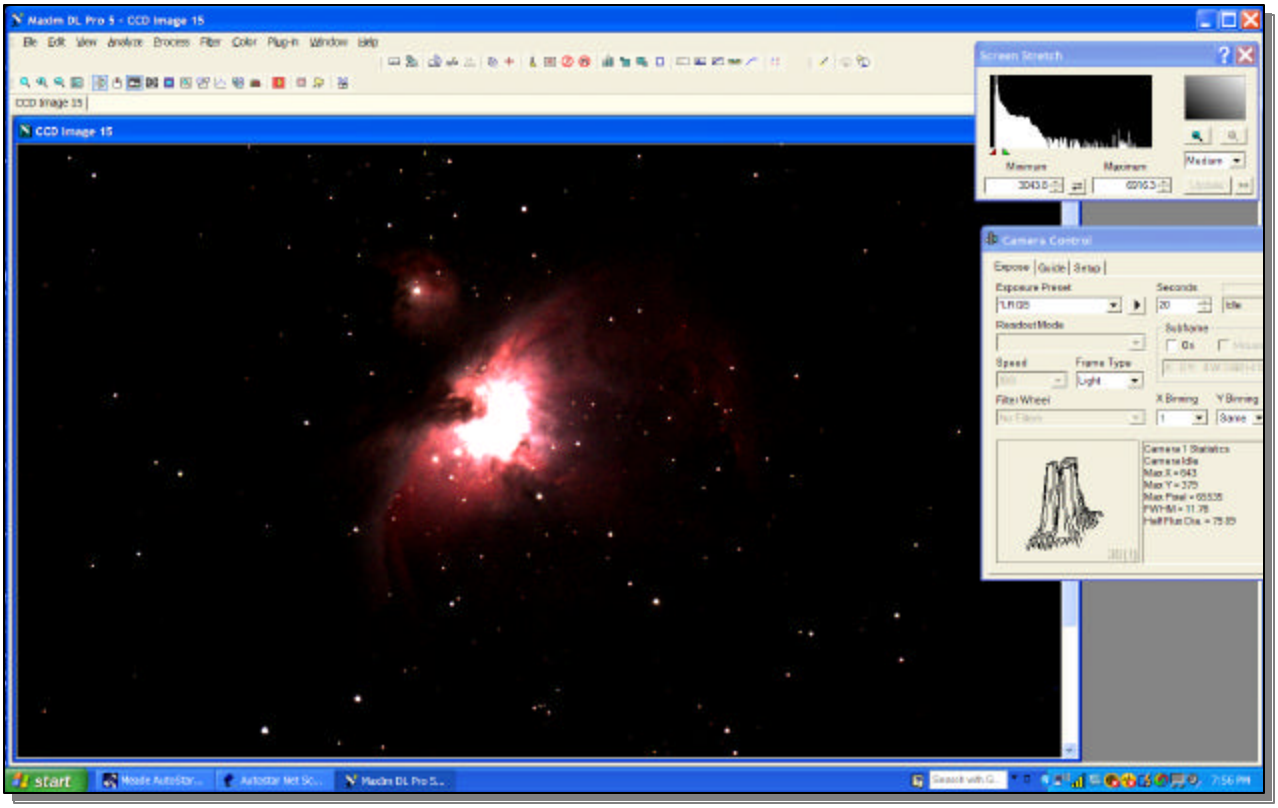
luminous galaxies in the Universe.

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

We are still looking for Constellation of the Month (COM) presenters for the months of March through May. COM is a great way to learn the night sky and a useful tool if you are pursuing one of the Astronomical League's observing club awards. Participating is easy! Contact Kathy Buczynski at vp@ccas.us for a COM template to fill out.

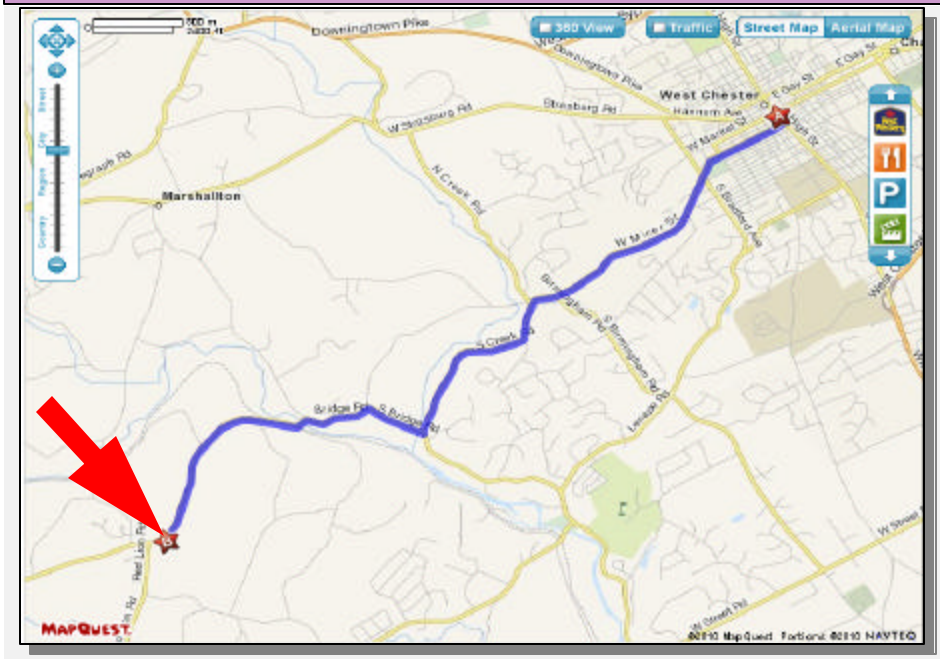
If you have any suggestions for future speakers, or are interested in being a speaker yourself, please contact Dave Hockenberry at programs@ccas.us.

Bahtinov Focusing Mask (Cont'd)



Single 20 second shot of Great Orion Nebula after focus with Bahtinov mask.

CCAS Directions



Brandywine Valley Association

The monthly observing sessions (held year-round) are held at the Myrick Conservation Center of the Brandywine Valley Association.

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

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

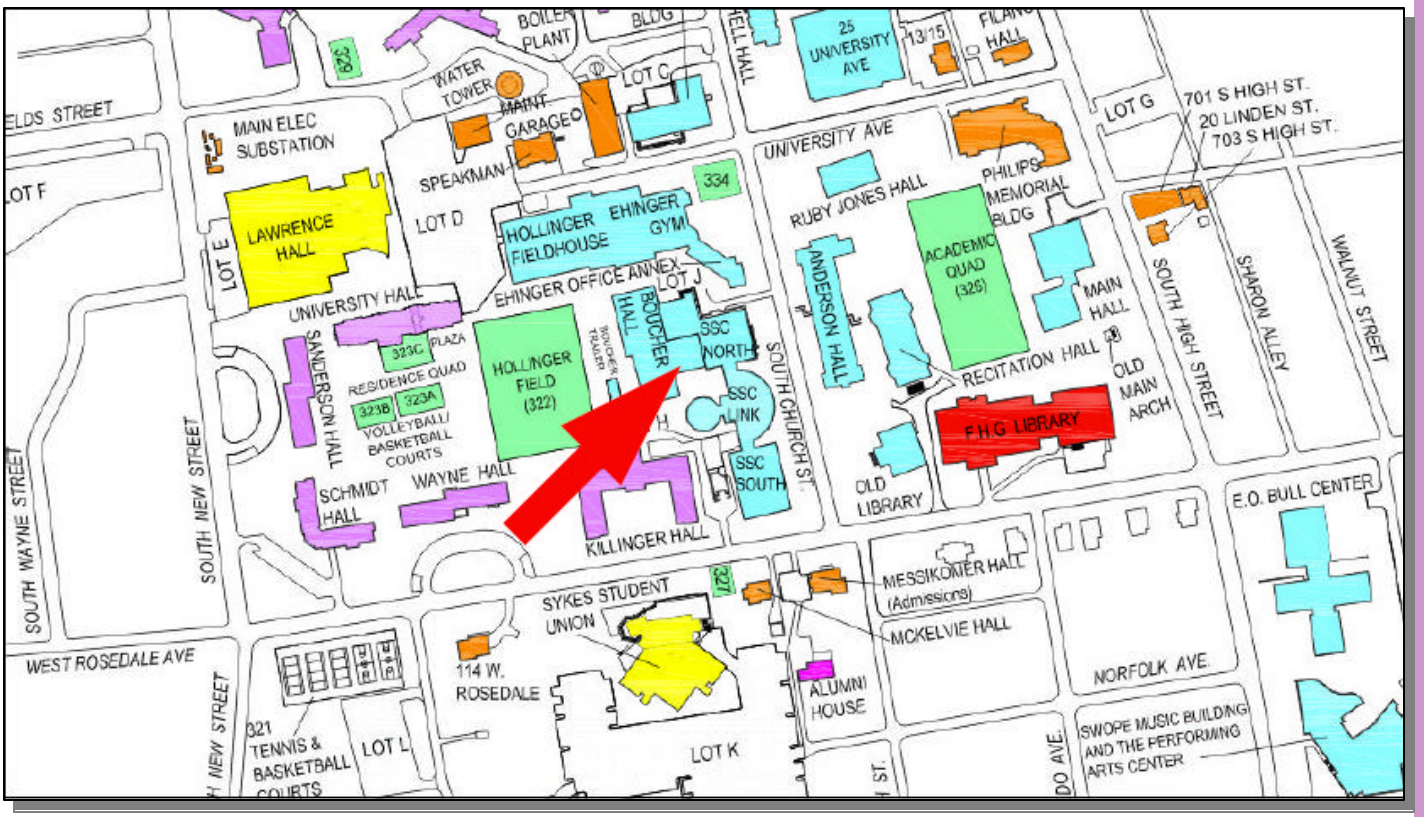
Brandywine Valley Association
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

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.

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).



Tripod (Cont'd)

(Continued from page 12)

stain and a few coats of polyurethane to protect against the elements completed the project.

The photo on page 12 shows the finished tripod, mount and refractor. I am quite pleased with the result. Vibration damping times have been reduced dramatically, the viewing position is more comfortable, and the wooden legs seem in tune with the character of the vintage refractor.

CCAS Membership Information and Society Financials

Treasurer's Report
by Bob Popovich

December 2009 Financial Summary

Beginning Balance	$1,704
Deposits	$473
Disbursements	$133
Ending Balance	$2,044

Welcome New Members!

This month we welcome Roy Kalinowski & Family, and Scott Lessley from West Chester, PA, and Lakshmi Thota from Chester Springs, PA.

We're glad you decided to join us again 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:

Bob Popovich
416 Fairfax Drive
Exton, PA 19341-1814

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 society. 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 Kathy Buczynski 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. Kathy's phone number is 610-436-0821.

CCAS Lending Library

Contact our Librarian, Linda Lurcott Fragale, 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. Linda's phone number is 610-269-1737.

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
500 W. Rosedale Ave.
Apt. A-3 Trinity Bldg.
West Chester, PA 19382

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 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 (484-266-0699) 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 "star nights" 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 Pres:	Kathy Buczynski 610-436-0821
ALCor and Treasurer:	Bob Popovich 484-467-5562
Secretary and Observing:	Don Knabb 610-436-5702
Librarian:	OPEN POSITION
Program:	Dave Hockenberry 610-558-4248
Education:	Kathy Buczynski 610-436-0821
Webmaster and Newsletter:	John Hepler 484-266-0699
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 Treasurer's Report in 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:

Bob Popovich
416 Fairfax Drive
Exton, PA 19341-1814

Phone: 484-467-5562
e-mail: B2N2@verizon.net

*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 Bob Popovich.

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 Bob first at **610-363-8242.**

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 Bob Popovich.**