



Observations

A Monthly Publication Of The

CHESTER COUNTY ASTRONOMICAL SOCIETY

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Visit our website at www.ccas.us

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Important February 2006 Dates

- 5** First Quarter Moon.
- 7** **Introductory Astronomy class** meets at West Goshen Township Building. Class starts at 7:00 p.m. EDT. Topic: *Spaceship Earth*.

Also: Hercules Observing Cluster meets **at the West Goshen Township building**. See page 3 for details.
- 12** Full Moon, the Snow Moon.
- 14** **CCAS Meeting** 7:30 p.m. EST

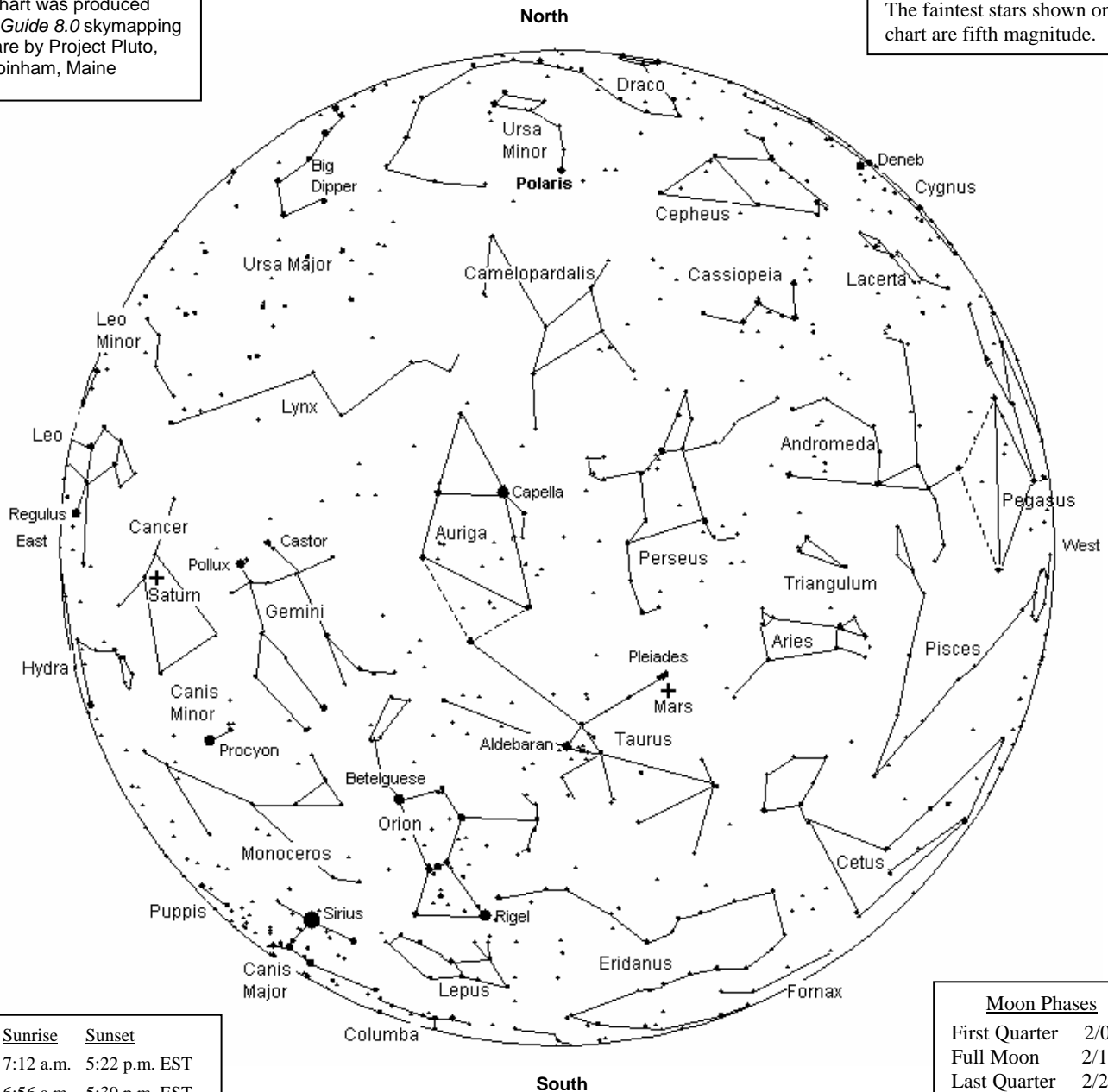
Location: Room 113, Boucher Building, West Chester University
COM: Lepus
Presentation: Amateur Astronomers & Lyme Disease (see page 3)
- 14** Hercules Observing Cluster meets.
Call Kathy Buczynski at 610-436-0821 for details.
- 21** **Introductory Astronomy class** meets at West Goshen Township Building. Class starts at 7:00 p.m. EDT. Topic: *The Moon*.

Also: Hercules Observing Cluster meets **at the West Goshen Township building**. See page 3 for details.
- 21** Last Quarter Moon.
- 24** Mercury appears farthest from the Sun (18°) low in the west after sunset. This is the best evening apparition of the year for northern observers.
- 24/** **CCAS Observing Session**
- 25** Location: Brandywine Valley Association
Time: sunset, or earlier (see page 3)
- 27** New Moon
- 28** Hercules Observing Cluster meets.
Call Kathy Buczynski at 610-436-0821 for details.



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
2/1	7:12 a.m.	5:22 p.m. EST
2/15	6:56 a.m.	5:39 p.m. EST
2/28	6:38 a.m.	5:54 p.m. EST

Moon Phases	
First Quarter	2/05
Full Moon	2/12
Last Quarter	2/21
New Moon	2/27

The sky over Chester County February 15, 2006 at 7:00 p.m. EST

The Planets, by Don Knabb

Mercury: on February 24, Mercury appears farthest from the Sun (18°) low in the west after sunset. This is the best evening apparition of the year for northern observers.

Venus: is at greatest brilliancy on Feb. 17 in the morning sky. It blazes at its awesome peak brightness of magnitude -4.6.

Mars: stands more than 60° high in the southwest at the end of evening twilight.

Jupiter: February is not a great month to see Jupiter, except for during your pre-dawn walk to get the morning newspaper.

Saturn: February is an excellent opportunity to see Saturn and its incredible rings. It stands nearly 40° high in the east at the end of evening twilight and on Feb. 1 is 0.9° south of the Beehive star cluster (M44). This is a must see for binoculars.

Uranus: Telescope users have a good chance to see 6th magnitude Uranus close to Mercury on Feb. 14. The two are $1/2^\circ$ apart that evening. This is the closest conjunction of any two planets between 2000 and 2013!

Neptune: During February Neptune is too close to the sun for observation.

Pluto: Pluto is up before dawn but is not well placed for a few more months.

February Observing Highlights

by Don Knabb, CCAS Observing Chair

- Feb. 5** First Quarter Moon. Mars is 2° south of the Moon, the Pleiades is above the Moon.
- Feb. 6** The Moon is 0.1° north of the Pleiades (M45), Aldebaran shines to the Moon's lower left.
- Feb. 11** Saturn is 4° south of the Moon.
- Feb. 12** Full Moon, the Snow Moon.
- Feb. 14** Telescope users have a good chance to see 6th magnitude Uranus close to Mercury on. The two are 1/2° apart this evening. This is the closest conjunction of any two planets between 2000 and 2013! Astro-geek note: fly to western Asia to see Mercury pass just 1.4' northwest of Uranus at 15:31 UT.
- Feb. 16** Mars is 2° south of the Pleiades (M45), hardly more than a finger's width at arm's length.
- Feb, 17** After the waning Moon rises in the east around 10 or 11, look with binoculars for Spica close by. You may catch Spica emerging from an occultation, popping out from behind the Moon's dark edge.
- Feb. 21** Last Quarter Moon
- Feb. 24** Mercury appears farthest from the Sun (18°) low in the west after sunset. This is the best evening apparition of the year for northern observers.
- Feb. 27** New Moon

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CCAS February Meeting

DATE: **Tuesday February 14, 2006**
TIME: 7:30 p.m. EST
PLACE: Room 113 – Boucher Building
West Chester University
LOCATION: South Church Street
West Chester, PA

A map of the campus showing the location is on page 15.

This month's Constellation of the Month (COM) will be Lepus, presented by Jim Anderson.

As amateur astronomers we spend a great deal of time outside, and are thus exposed to tick bites, perhaps more so than is the "average person." This year our February meeting falls on Valentine's Day, so bring your loved ones and learn how to protect both them and yourselves from the insidious and preventable disease known as Lyme Disease. Our guest speakers for the evening will be Harvey L. Kliman and Douglas Fearn, from the Lyme Disease Association of Southeastern PA (LDASEPA). They will be discussing the nature of the disease, symptoms and prevention measures. They will also take questions from the audience. Our president, Kathy Buczynski, who was recently diagnosed with Lyme Disease, will introduce the speakers and give a brief history of her diagnosis and treatment experiences so far.

Harvey L. Kliman, Ph.D. is President of the LDASEPA, an all volunteer, non-profit organization dedicated to helping people with Lyme disease through education, support and research.

He retired as a Senior Research Associate after thirty years with DuPont and has devoted the last five years to studying Lyme and other tick-borne diseases. Both he and his wife have had both Lyme and co-infections and both are currently under treatment. He is a member of ILADS and has attended the international LDA and ILADS conferences for the last five years to learn the latest in Lyme disease treatment and diagnosis. He gives several presentations every year to various civic and industry organizations.

Douglas W. Fearn is Vice President of LDASEPA. He is an active electrical engineer who manages his own business and spends significant time writing about Lyme disease and other tick-borne diseases. He is the author of the LDASEPA booklet "Lyme Disease and Associated Diseases, The Basics" which has been distributed free of charge all over the world. Over 80,000 copies have gone to doctors, support groups and individuals. He and his family are currently battling Lyme disease. He is also a member of ILADS and attends the annual LDA and ILADS conferences.

CCAS meetings are free and open to the public. Feel free to invite friends and family members to attend the meeting and learn the latest on this dangerous disease, and what can be done to prevent it. Anyone who spends time outdoors can contract it. Even spending all your time indoors is no guarantee. A handicapped friend of mine who spends almost all her time indoors was also recently diagnosed with Lyme Disease. Her family has a couple of cats that are allowed out and one of the cats routinely sleeps on Cheryl's bed. It seems that is how Cheryl got the tick bite and contracted Lyme Disease: via a family pet. And her family lives in a "typical suburban neighborhood" in the Thorndale area. You don't have to go out into the woods to encounter ticks. This is an excellent opportunity to learn, for free, from knowledgeable experts what you can do to better protect yourself and loved ones from a serious health threat. Don't miss it.

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CCAS February Observing Session

The next CCAS Observing Session will be at the Brandywine Valley Association's Myrick Conservancy Center (see map on page 14) on Friday February 24, 2006 starting at sunset; or earlier, if you can get there earlier. If it's too cloudy on Friday, then the Observing Session will be on Saturday February 25, 2006. At the observing sessions, there will be help available to set up and use your telescopes. If you're having trouble using your telescope, or finding your way around the sky, come on out and get some assistance. All members are invited whether they have a telescope or not. Telescope owners are always glad to share the view through their telescope. CCAS Observing Sessions are free of charge and open to the public.

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Report on CCAS January Observing Session

by Don Knabb, CCAS Observing Chair

On Friday January 27 the weather cooperated and six Society members and at least that many guests came to the BVA for night sky observing. The sky was extremely clear at our arrival, but after a few hours some scattered clouds and the deepening cold chased us home. There were three telescopes

and one set of tripod-mounted binoculars set up for viewing Saturn, Mars and many deep sky objects. This was THE night for Saturn since it was at opposition and the closest it will be to Earth in all of 2006. Of the deep sky objects, the Great Orion Nebula was a sight to behold. But we also gazed at the Double Cluster in Perseus and the three clusters in Auriga. At various times in the different scopes you could also see the Beehive Cluster just above Saturn, M41, M34, M35 and the galaxy M82 (the Cigar Galaxy). Speaking of galaxies, one scope with a low power eyepiece had a great look at the Andromeda galaxy (M31) and its smaller elliptical companion galaxy M32 in one field of view. That view was a first for a few attendees. We also looked at several double stars and an asterism called "Kathy's Triangle" (you'll need to ask our President to explain that one.....).

The next observing session at BVA is scheduled for February 24 at 7:00 pm. Hope to see you there!

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Hercules Observing Cluster Update

by Kathy Buczynski

On Tuesday, February 7, 7:00 to 8:00, we are starting the Introductory Astronomy Classes at the West Goshen Township Building, located at the intersection of Paoli Pike and Five Points Road. They will be held on the first and third Tuesdays through May and on those dates the Hercules Cluster will move to the ball field next to the parking lot. This will encourage the participants from the class to come out and observe after the class. We have not been able to do this since we left the Flower and Cook Observatory and I think it will be very encouraging. But we need your help. Please come out, bring your telescope, binoculars and your enthusiasm to help these students enjoy the sky. Also, if anyone is interested in helping out with the classes (moving chairs, passing out handouts, etc.), just let me know.

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CCAS Introductory Astronomy Class

The Education Committee of the CCAS is offering a class intended to introduce people to basic astronomy. This series of eight classes will be held on the first and third Tuesdays of each month, starting at 7:00 p.m. and ending at 8:00 p.m. These are the dates on which classes will be held:

- February 7 Spaceship Earth
- February 21 The Moon
- March 7 The Other Kids on the Block
- March 21 Planispheres/Star Charts
- April 4 Stars by Design: Constellations
- April 18 The Secret Life of Stars
- May 2 Planetarium Field Trip (WCU)
- May 16 Beyond Naked Eye

The classes will be held in the West Goshen Township Building at the intersection of Paoli Pike and Five Points Road. This is just a short distance from the Paoli Pike exit off U.S Route 202 outside West Chester.

The cost for non-members is \$20.00 per person, and \$30.00 per family (with the same address). **For current CCAS members, the classes are free!** Space is limited to just 40 people,

however, so call Kathy Buczynski to reserve your space **now** (610-436-0821). Also, please call Kathy if you'd like to help at the classes. We have all the instructors lined up, but we can always use help with registration and setup/takedown.

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Treasurer's Report by Bob Popovich

November 2005 Financial Summary

Beginning Balance	\$1,536
Deposits	63
Disbursements	<u>33</u>
Ending Balance	\$1,566

Membership Renewals Due

- 02/2006: La Para
Reimer
Renshaw
Wilcox
- 03/2006: Lyons
Nelson
- 04/2006: Goldader
Imburgia
Kerson
Popovich

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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* on a later page in this newsletter.

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Welcome!

We welcome our newest members to the Society: Robert Fellwock of Newtown Square, Steve Leiden of Malvern, and Stanley Dascaloff of Downingtown. We're glad you decided to join us! Clear skies to all!

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A Note from John Hepler

Dear CCAS members,

As you may have heard by now, I have accepted a job in Miami and have to move rather quickly. In doing so, I need to "shed" some excess items, one of which is my telescope.

If anyone is interested in purchasing it from me, I'll settle for \$125 (half the original price). Here are the model and specifications:

Meade Infinity 4.5" (114mm) f/8 Equatorial Reflecting Telescope. 5x24 mm viewfinder and 3 eyepieces: 5x24mm, H12.5mm, and H25mm (.0965"). Plus one 3x Barlow lens.

The telescope comes complete with a sturdy adjustable tripod and the StarFinder GO TO computerized locating system complete with hand-held controls. I also have the original user/assembly manual, a training video and the StarNavigator computer software accessories.

If you're interested, please contact me no later than February 8th. My cell phone number is 484-883-0533.

While I will be quite a distance away, I hope to remain active with the CCAS and to maintain the website for the foreseeable future.

Sincerely,

John C. Hepler

Webmaster, Chester County Astronomical Society



Call for Photos for CCAS Web Site

John Hepler, our Society's best-in-nation Webmaster, has asked for photographs/images of Society events to use in making a "photo album" page of what the Society does. If you have images that you can let us use for this album, please contact John at webmaster@ccas.us to arrange the transfer. Don't send any attached files with the email, because that address won't accept it. Just send a note telling John what you have, and he will get in touch to arrange the transfer.

John is also willing to accept astro-images taken by Society members for display on the Website. Contact John if you have images we can use, any pictures similar to the images by members we have shared with you in the newsletter in the past year or so.

Thanks!



CCAS Program Updates

by Jim Anderson, acting Program Chair

In March, there is a penumbral lunar eclipse the same night as our meeting. We have made arrangements with the Department of Geology & Astronomy at West Chester University to have a joint observing session that night. We will therefore meet at the soccer fields on South Campus that night. Please bring your telescopes or binoculars. You can arrive before 7:30 if you want to. The eclipse will be in progress when the Moon rises, so if you can arrive before sunset to get set up then do so. We will then continue observing, even after the eclipse is over, for as long as people want to stay. Invite family and friends, it's free.

IF the weather on March 14 does not cooperate, if it's cloudy, then we will meet at the usual time of 7:30 in Room 113 in the Boucher Building. There Dr. Marc Gagne of WCU will present a talk on exoplanets (planets outside our own solar system).

In May, Dr. Harry Augensen from Widener University will speak to us on "Observation and Analysis of Suspected Variable Stars Listed in the NSV Catalogues." Variable stars are one area in which Dr. Augensen conducts his professional research work, and is at the same time an area of astronomy in which amateur astronomers can participate and contribute observations. This is a good opportunity to hear some of the

conclusions professional astronomers are making from the vast body of variable star data collected over the years by both amateur and professional astronomers.



Calendar Notes

February 7, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EST
February 14, 2006 (Tuesday)	CCAS Meeting Location: West Chester University 7:30 p.m. EST
February 21, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EST
February 24/25, 2006 (Friday/Saturday)	CCAS Observing Session Location: BVA sunset
March 7, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EST
March 14, 2006 (Tuesday)	CCAS Lunar Eclipse Observing Location: TBA Sunset (or Moonrise, if you prefer)
March 21, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EST
March 24/25, 2006 (Friday/Saturday)	CCAS Observing Session Location: BVA sunset
April 4, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EDT
April 11, 2006 (Tuesday)	CCAS Meeting Location: West Chester University 7:30 p.m. EDT
April 18, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EDT
April 21/22, 2006 (Friday/Saturday)	CCAS Observing Session Location: BVA sunset
May 2, 2006 (Tuesday)	Introductory Astronomy class Location: West Chester University 7:00 p.m. EDT
May 9, 2006 (Tuesday)	CCAS Meeting Location: West Chester University 7:30 p.m. EDT
March 16, 2006 (Tuesday)	Introductory Astronomy class Location: West Goshen Twp. Building 7:00 p.m. EDT
May 19/20, 2006 (Friday/Saturday)	CCAS Observing Session Location: BVA sunset



Needed: Bookshelves for Library

We need some bookshelves to hold the CCAS Library. If you would like to donate some bookshelves (in good, clean, usable shape) please contact our Librarian Linda Lurcott Fragale at 610-269-1737 to arrange a transfer of the shelves. Thanks!



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

Telephone: 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:

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 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://home.epix.net/~ghonis/index.htm>



Our Local Astronomy Store: *Skies Unlimited*

In case you didn't know it, there is an astronomy equipment store called *Skies Unlimited* in our area, in Glenmoore to be specific. Their phone number is (610) 321-9881, and their Website URL is www.skiesunlimited.net.

Directions: Go four miles north of the Downingtown exit of the PA Turnpike on PA-100; turn left onto PA-401, then immediately turn left again into Ludwig's Village. The new store is next to Ludwig's Village Market.

<http://www.skiesunlimited.net/>



Good Outdoor Lighting Website

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? Now there is a web site and business intended to address that very problem. At this site you can find information on all kinds of well-designed (that is, star-friendly) outdoor lighting fixtures. This company, Starry Night Lights, intends to make available all star-friendly fixtures they can find, and information on them, in one place. Check it out, and pass this information on to others. Help reclaim the stars!

<http://www.starrynightlights.com/>



Klaatu, the Stargazing Cat

by Jim Anderson



Photo by Klaatu's Chief of Staff, Don Knabb

Q: What's the difference between dogs and cats?

A: Dogs have owners, cats have staff.



Astronomus

“Time—Constant and Variable”

By Bob Popovich

If you’ve ever sat and observed a timepiece dutifully doing what it does, do you not conclude that time is constant? Or is it merely that your timepiece is constant? Have people always had 60-minute hours? Is knowing the precise (relative) time all that important?

If you are willing to entertain these questions, try this: On the next sunny day choose a suitable spot and devote some time to observing the movement of a shadow against the surrounding ground—a tree’s shadow works very well. (I’ve done this. My kids think I’m weird. I don’t care.)

As you observe the long, winter shadow, its movement is rather quick, isn’t it? Now repeat this experiment in June (if you’re too excited to wait, then just imagine a June day). How will the summer shadow behave? The diminutive shadow takes a distinctly different tack, but does it not appear to move more slowly as well?

Owing primarily to the fact that the sun takes a higher apparent path across a June sky than a March sky, a summer day is longer than a winter day. Yet people have looked to that same sun as their timekeeping source for ages. Likewise, people have been dividing the daylight into 12 units (hours), though not uniform 60-minute hours. (Thanks to the Egyptians for the fact that it’s 12 and not 10. Revolutionary France tried a 10-hour day but it was resoundingly rejected).

So then, what were people thinking before the age of reliable timepieces, when they chose to tell time by relying on the shadow cast by the sun? How could something so variable be the basis for tracking something so constant? Was it a case of “good enough” or did they truly understand time better than we might think?

As an aside, while sitting and pondering during a recent “shadow watch,” I noted two stunning realities—(1) I am watching a clear sign we are hurtling through space while spinning on our axis and (2) I came to a better understanding of the notion of unequal hours; i.e. hours that are less than 60 minutes in winter and more than 60 minutes in summer. But this is a topic for another day...

Back to the matter at hand—let’s take a look at an ingenious device—the sundial. Once a proud symbol of science that advanced from a simple stick in the ground to a myriad of complex and beautiful instruments, it’s now relegated to a being a lawn ornament/target for birds. But if properly aligned, it still does a noble job of telling the time of day. “What about on cloudy days? Or how about nighttime?” you ask. Well, I said a noble job. If you want perfect, buy a cesium clock.

This is my pocket sundial, Galileo version:



The bottom inside surface contains a compass and Roman numerals to mark the hours. The top inside surface displays the hours using Arabic numerals. The gnomon on my sundial is a thread attached to both these surfaces.

Prior to reading the time we have to set the sundial on a level surface and then make two adjustments. The first entails pointing the gnomon to geographic north. The compass on my sundial gives me magnetic north, so it's an easy adjustment to move it to 13° west of north. [Editor: *The difference between magnetic north and geographic north varies with your location on Earth. Within Chester County magnetic north is 13° west of geographic north, as Bob describes. This difference is called "magnetic declination."*]

The second adjustment involves raising the gnomon to an angle equal the latitude of its location. In the case of my sundial, the gnomon is set to an angle of 42° (I purchased it at the Adler Planetarium in Chicago, which sits at 42° north latitude. We're sitting on the 40th parallel. The difference is measurable but not overwhelming.)

Once the time is read from either dial, there is one last minor adjustment that acknowledges the difference between apparent solar time and mean solar time. Sundials operate on the former, modern timepieces on the latter. During the course of a year, the sundial (apparent solar time) differs from a clock (mean solar time) in minutes as follows:

January 1	-4	July 1	-3
February 1	-14	August 1	-6
March 1	-12	September 1	0
April 1	-4	October 1	+10
May 1	+2	November 1	+16
June 1	+2	December 1	+12

Try graphing this table with time on the y-axis and the months on the x-axis. Then sit and stare at the graph for a while, pondering its implications. All things considered, pretty darn accurate for a device whose prototype was a *stick*.

Next Time: Beware the Ides of March—Not.



What's Your Pleasure?

By Nicholas La Para

Amateur astronomers, that's what we are. We read astronomy magazines and books, listen to talks, haunt astronomy websites, but mostly—when the \$^@!* weather cooperates—we observe the sky. Or rather, we observe what's out in the universe, from the earth's surface up. That makes astronomy the world's biggest science*. Not physics, which attempts to *apply* to everything, but doesn't attend to every aspect of everything, for example the chemistry of stars, exobiology, the geology of planets and moons, the histories of planetary systems, star systems, and even the universe itself. All these and more are part of astronomy.

So we're amateurs of the world's biggest science, but at heart, we're observers. For the most part we're not producing the science, but we're out there, setting up equipment, getting cold, or hot, or bug-bitten, or frustrated—and finding it all worth it, just to see things. Why do we do it?

Many things impel us to observe, and I think it's worthwhile to think about what they might be, and what your particular mix of astronomical motives is. If you know why you're so drawn to this somewhat maniacal pursuit, you can increase your pleasure by focusing (not even a smarty-pants footnote this time) on what in the sky really satisfies your observing hunger.

So let's take a survey of what might light your, um, red flashlight.

Visual Beauty. Isn't this where almost all of us start? Saturn is breathtaking, the moon has a cold, alien beauty. There are magnificent star fields, colored stars, matched doubles looking back at you, open clusters, some with colored stars among the diamonds chips, some like scatters of glowing dust. For medium or larger scopes, globular clusters are fairyland spheres of ice chips, swimming through the night, spraying strings and festoons. The interesting thing here is that you don't need really big instruments to see most of this wonderful beauty. In fact, sometimes binoculars or small wide-field telescopes are better! And if you can get to a dark site, all you need are your eyes...

Wonder. This must be about as basic as beauty. If at one time a dark night sky didn't leave you stunned, would you have ever become attached to amateur astronomy? Think of what you can see! My first identified deep sky object was the Andromeda galaxy through binoculars. It was just a faint smudge, but I gasped, because I was seeing 2½ million light years away, and with the slightest of instruments. I mean, think of it, a whole galaxy of hundreds of billions of stars, planets, gigantic gas clouds, who knows what else, and I'm standing on a speck orbiting a spark, *looking at it*.

Again, you don't need really big instruments to experience this wonder, though big scopes can extend the reach of your awe. What you do need is some knowledge of what you are looking at. And this leads to the next kind of astronomical pleasure...

* I have refrained from saying that astronomy is the science with the biggest scope.

Knowing Eyes. Betelgeuse, the orange beauty in Orion’s shoulder, is gorgeous however you look at it, by eye, binoculars, or small scope. But when you have some scientific knowledge of it, how more stunning it is to see. A massive red supergiant, some 730 times the diameter of the sun, and 15 to 20 times the sun’s mass, that’s impressive enough. But that color and size also tells us that we enter late in Betelgeuse’s life. To produce its energy it has left off the standard conversion of hydrogen to helium because the hydrogen is used up, and now it is furiously turning helium into oxygen and carbon. That won’t last long, as star lifetimes go, and Betelgeuse is headed for a huge supernova explosion some day—maybe tomorrow night? Probably not, but we know where it is going, and the remnant will almost certainly be a black hole. *Now* how does Betelgeuse look to you when you view it?

Add to this that Betelgeuse is the first star ever to be imaged as a *disk*, rather than just a point, and you’ve got something. Go on the web and search for images of this backyard monster, and find the Hubble telescope image of Betelgeuse. Notice that it is *lopsided*, not spherical. Now what does that mean? I leave the hunt up to you.

Another personal note: I never had a lot of interest in observing the moon (just one crater after another) until I read Charles Wood’s book “Modern Moon.” There he tells you about the geological (lunalogical?) and impact processes that formed the face of the moon. The features became not just bumps and pits, but evidence in a grand detective hunt. *Now*, it’s interesting to find those examples of lunar development—and some mysterious formations, too, where in contrast to the understood features, we haven’t yet figured out what they are or how they came to be.

Our eyes are not just cameras, because cameras don’t have brains and hearts. We see not just with lenses, rods, and cones, but with our accumulated knowledge and our emotions. Go, read, learn, and your observing becomes more exciting by far.

Thrill of the Hunt. This is very important for some, not so important for others, but everyone seems to share at least a little of this feeling. How many times have I said “Gotcha!” at the eyepiece, when I knew for sure I had found the object I was looking for? And how much more satisfying when the object was attractive (Beauty) and interesting (Knowing Eyes)?

There can be frustration here, too, of course. Scooping up sky objects is not like scooping up apples in the supermarket. You have to have some knowledge, some maps, and some experience. And it still can be hard. But maybe you like this kind of hard. Maybe you like the planning, the tracking down, the final pounce.

Or maybe you’d rather have a go-to scope serve your targets up for dinner. Even then, there’s still satisfaction in “acquiring the target”. It’s your choice. Where’s the balance for you?

For this pleasure, you can choose the level of equipment you like, small or large. The targets may change according to the equipment, but the challenge remains.

Life Lists. This is allied to, but not the same as the Thrill of the Hunt. This is what the Astronomical League’s Observing Certificates are all about. How many constellations can you identify, season after season? How many Messier objects have you found in your life? (Is life complete without 70 to 100 of these? Hmm.)

There’s something satisfying about this. When you can say (even just to yourself), “Here’s all the Messier objects I have actually seen, all the double stars, here’s all the Herschel objects, all the galaxies, all the features of the moon,” that has a feeling of fulfillment. And when you can say, “And there’s still more to find,” that has a feeling of promise. On the other hand, some people say, “I just poke around here and there and find interesting and attractive things, I don’t need to keep score. Each experience is sufficient by itself.” Where do you stand on this?

Warning: The Thrill of the Hunt for fainter and fainter galaxies has driven some to serious aperture fever, filling their lives (and garages, or even specially built observatories) with larger and larger (and more expensive) telescopes.

Old Friends. In a way, this is the opposite of Life Lists, though they can certainly co-exist. This is one of my most satisfying pleasures. As the seasons wheel and the skies change, I revisit objects I have seen many times and know (though not necessarily perfectly). Often it’s through binoculars, because these are the true “snap decision grab and go for a half hour or so” instruments. So as the double cluster shows up again, or my favorite matched pairs of doubles in Draco (one of which I call “blue eyes”), or the Pleiades, it is satisfying to say, “Ah, there you are again, and you’re looking as marvelous as ever. I’m glad you’re here—and I’m glad I’m here, too.”

By the Numbers. Amateur astronomers look, professional astronomers measure. They do more than that, of course, but it all starts with measuring. But some amateurs feel the lure of putting numbers on the sky. It’s another way of knowing the universe. The American Association of Variable Star Observers has many amateur astronomers who are dedicated to taking data valuable to the professionals. In fact, the pros request certain observing campaigns to assist projects of their own. Here are a couple, just to give you a taste:

BP Hyi	July 14 - unknown	CCD observations in V for as long as possible and for as many contiguous days as possible until we get enough data to determine its light curve.
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N Pup 04	Nov. 22, 2004 - As long as possible	Visually monitor nova through decline (Completed)
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You need the right equipment, knowledge, planning, persistence, dedication, and technique to do this sort of observing. This is the opposite of grab-and-go. But you'll be inside the house of science, right on the ground floor!

Or, you may want to do measuring just for your own satisfaction. For example, the light curve of the pulsing variable Mira is well-known, but have *you* ever measured it? Maybe you want to follow it, see the curve build up, see how good your results are against the official curve. Or follow the movement of a "fast" moving star across the sky, like 61 Cyg, or Barnard's star, plotting its path as precisely as you can on a chart—these are long-term projects to fill out years of observing. You need to find out *how* to measure, of course, but that's part of the pleasure.

Measuring the sky is another way—dare I say it—of making love to the universe.

Discovery. I can see the screamer headlines: "Kids! Find something new, something no one has ever seen before! Be the first on your block—er, planet to..." Some amateurs chase this dream. Comet hunters are a well-known variety. David Levy comes to mind, that fellow Hyukatake, and, oh yes, Monsieur Messier. This pursuit requires *really* intimate knowledge of the sky, not just constellation identification, but visual memory of star patterns as seen through your particular instrument. Then one night (one of ma-a-a-ny nights), you may say, "Wait, what's that little bit of light? I don't remember it there before. Could it be a comet? Are any already expected here at this time? Maybe..."

Or maybe it's a supernova. Some amateurs look for these (using automated equipment mostly; if you want a way to spend more money on astronomy, look into this), and sometimes they are successful (see *Sky & Telescope*, November 2005, p. 101).

Yes, if you can discover something never seen before, there is a unique satisfaction, a feeling that you have counted for something important, that you have become a member of a unique list.

How's Your Image? Look into the back pages of *Sky & Telescope* and see the stunning astroimages. These are not by professionals, who run more to charts, tables, and huge assemblages of data; these are by amateurs who are an amazing combination of technical wizard and visual artist. Yes, artist. It takes a controlled telescope, film or digital imager, technique, computer software, and all-around techiness to pull this pursuit off—and an artist's eye. And the results! Oh, the results! It is obvious—and I'm an artist saying this—that astroimagers are after the most gorgeous, eye-seducing representation of the sky, artistic presentations of what lies hidden to visual observers. And they often succeed. Do you have this combination of talents, do you have the urge to use them this way? And the budget?

So there they are, these are ways amateur astronomy provides satisfaction, many ways. What's your pleasure?



Snowstorm on Pluto

By Dr. Tony Phillips

There's a nip in the air. Outside it's beginning to snow, the first fall of winter. A few delicate flakes tumble from the sky, innocently enough, but this is no mere flurry.

Soon the air is choked with snow, falling so fast and hard it seems to pull the sky down with it. Indeed, that's what happens. Weeks later when the storm finally ends the entire atmosphere is gone. Every molecule of air on your planet has frozen and fallen to the ground.

That was a snowstorm—on Pluto.

Once every year on Pluto (1 Pluto-year = 248 Earth-years), around the beginning of winter, it gets so cold that the atmosphere freezes. Air on Pluto is made mainly of nitrogen with a smattering of methane and other compounds. When the temperature dips to about 32° K (-240° C), these molecules crystallize and the atmosphere comes down.

"The collapse can happen quite suddenly," says Alan Stern of the Southwest Research Institute. "Snow begins to fall, the surface reflects more sunlight, forcing quicker cooling, accelerating the snowfall. It can all be over in a few weeks or months."

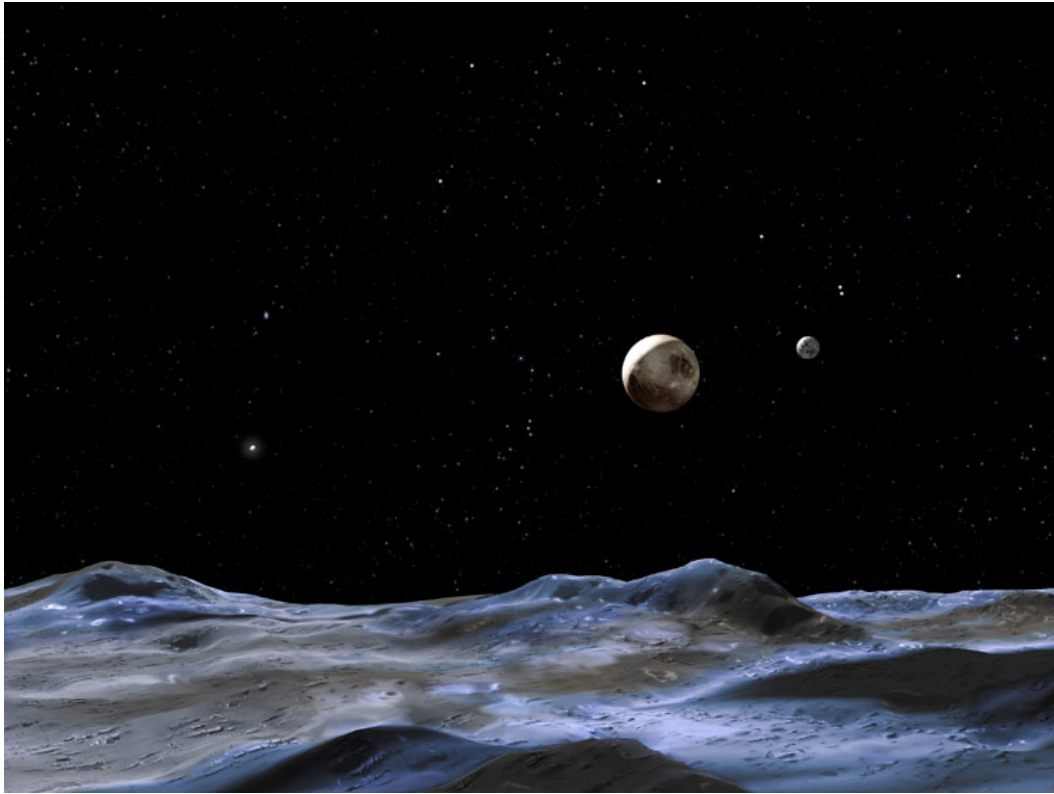
Researchers believe this will happen sometime during the next 10 to 20 years. Pluto is receding from the warmth of the Sun, carried outward by its 25% elliptical orbit. Winter is coming.

So is *New Horizons*. Stern is lead scientist for the robotic probe, which left Earth in January bound for Pluto. In 2015 *New Horizons* will become the first spacecraft to visit that distant planet. The question is, will it arrive before the snowstorm?

"We hope so," says Stern. The spacecraft is bristling with instruments designed to study Pluto's atmosphere and surface. "But we can't study the atmosphere if it's not there." Furthermore, a layer of snow on the ground ("probably a few centimeters deep," estimates Stern) could hide the underlying surface from *New Horizon's* remote sensors.

Stern isn't too concerned: "Pluto's atmosphere was discovered in 1988 when astronomers watched the planet pass in front of a distant star—a stellar occultation." The star, instead of vanishing abruptly at Pluto's solid edge, faded slowly. Pluto was "fuzzy;" it had air. "Similar occultations observed since then (most recently in 2002) reveal no sign of [impending] collapse," says Stern. On the contrary, the atmosphere appears to be expanding, puffed up by lingering heat from Pluto's waning summer.

Nevertheless, it's a good thing *New Horizons* is fast, hurtling toward Pluto at 30,000 mph. Winter. *New Horizons*. Only one can be first. The race is on....



This artist's rendering shows how Pluto and two of its possible three moons might look from the surface of the third moon. Credit: NASA/ESA and G. Bacon (STSci)

Find out more about the *New Horizons* mission at <http://pluto.jhuapl.edu> .

Kids can learn amazing facts about Pluto at spaceplace.nasa.gov/en/kids/pluto.

The preceding article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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January 19, 2006: KENNEDY SPACE CENTER, FLA. — From between lightning masts surrounding the launch pad, NASA's *New Horizons* spacecraft roars into the blue sky aboard an Atlas V rocket spewing flames and smoke. Liftoff was on time at 2 p.m. EST from Complex 41 on Cape Canaveral Air Force Station in Florida. This was the third launch attempt in as many days after scrubs due to weather concerns. The compact, 1,050-pound piano-sized probe will get a boost from a kick-stage solid propellant motor for its journey to Pluto. *New Horizons* will be the fastest spacecraft ever launched, reaching lunar orbit distance in just nine hours and passing Jupiter 13 months later. The *New Horizons* science payload, developed under direction of Southwest Research Institute, includes imaging infrared and ultraviolet spectrometers, a multi-color camera, a long-range telescopic camera, two particle spectrometers, a space-dust detector and a radio science experiment. The dust counter was designed and built by students at the University of Colorado, Boulder. The launch at this time allows *New Horizons* to fly past Jupiter in early 2007 and use the planet's gravity as a slingshot toward Pluto. The Jupiter flyby trims the trip to Pluto by as many as five years and provides opportunities to test the spacecraft's instruments and flyby capabilities on the Jupiter system. *New Horizons* could reach the Pluto system as early as mid-2015, conducting a five-month-long study possible only from the close-up vantage point of a spacecraft.

PHOTO & TEXT CREDIT: National Aeronautics and Space Administration

STAR PARTY NIGHTS



"FIRST LOOK AT SATURN SOMETIMES DOES THAT."

Cartoon by Nicholas La Para



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 stargazer1956@comcast.net

Or mail the contribution, typed or handwritten, to:

Jim Anderson
1249 West Kings Highway
Coatesville, PA 19320-1133

Get 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 Jim Anderson, the newsletter editor, at:

stargazer1956@comcast.net

CCAS A.L. Award Coordinators

These are the members to contact when you have completed your observing log for the Messier, Binocular Messier, Lunar, or Double Star Awards:

Messier (both): Jim Anderson
(610-857-4751)

Lunar: Ed Lurcott
(610-436-0387)

Double Star: Jim Anderson
(610-857-4751)

Constellation Hunters: Jim Anderson
(610-857-4751)

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: Kathy Buczynski
610-436-0821

Vice Pres: Jim Anderson
610-857-4751

ALCor and Treasurer: Bob Popovich
610-363-8242

Secretary: Vic Long
610-399-0149

Newsletter: Jim Anderson
610-857-4751

Librarian: Linda Lurcott Fragale

Observing: Don Knabb
610-436-5702

Education: Kathy Buczynski
610-436-0821

Webmaster: John Hepler
610-363-0811

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 your membership. If you are due to renew, you can mail in your renewal check made out to "Chester County Astronomical Society." Mail to:

Bob Popovich
416 Fairfax Drive
Exton, PA 19341-1814

Sky & Telescope Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **\$32.95** which is much less than the newsstand price of \$66.00, and also cheaper than individual subscriptions (\$42.95)! Make **sure** you make out the check to the **Chester County Astronomical Society** (do **not** make the check out to Sky Publishing, this messes things all up big time), note that it's for *Sky & Telescope*, and mail to Bob Popovich. Or you can bring it to the next Society meeting and give it to Bob there. **If you have any questions by all means call Bob first (610-363-8242).** Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

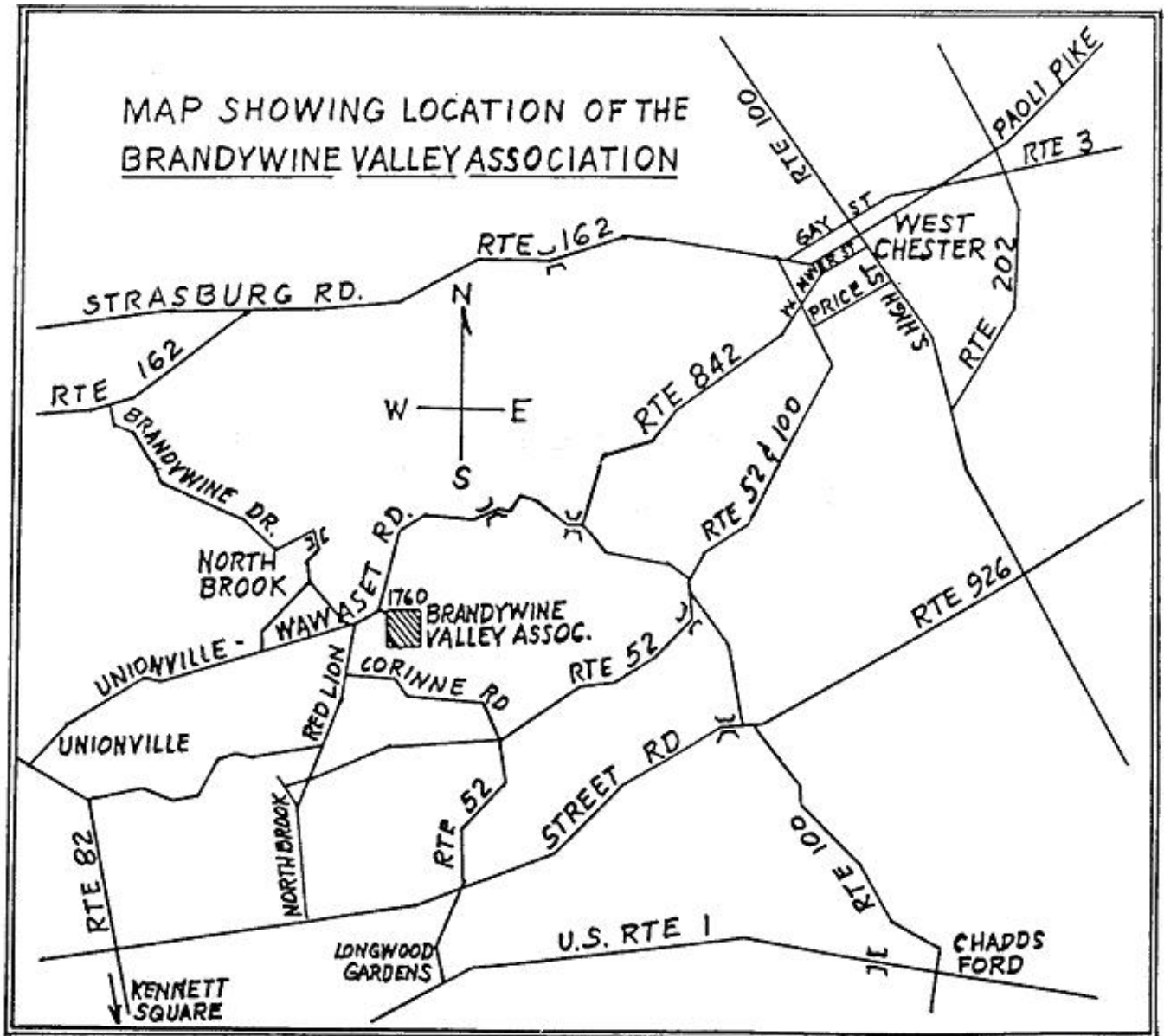
CCAS Website

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

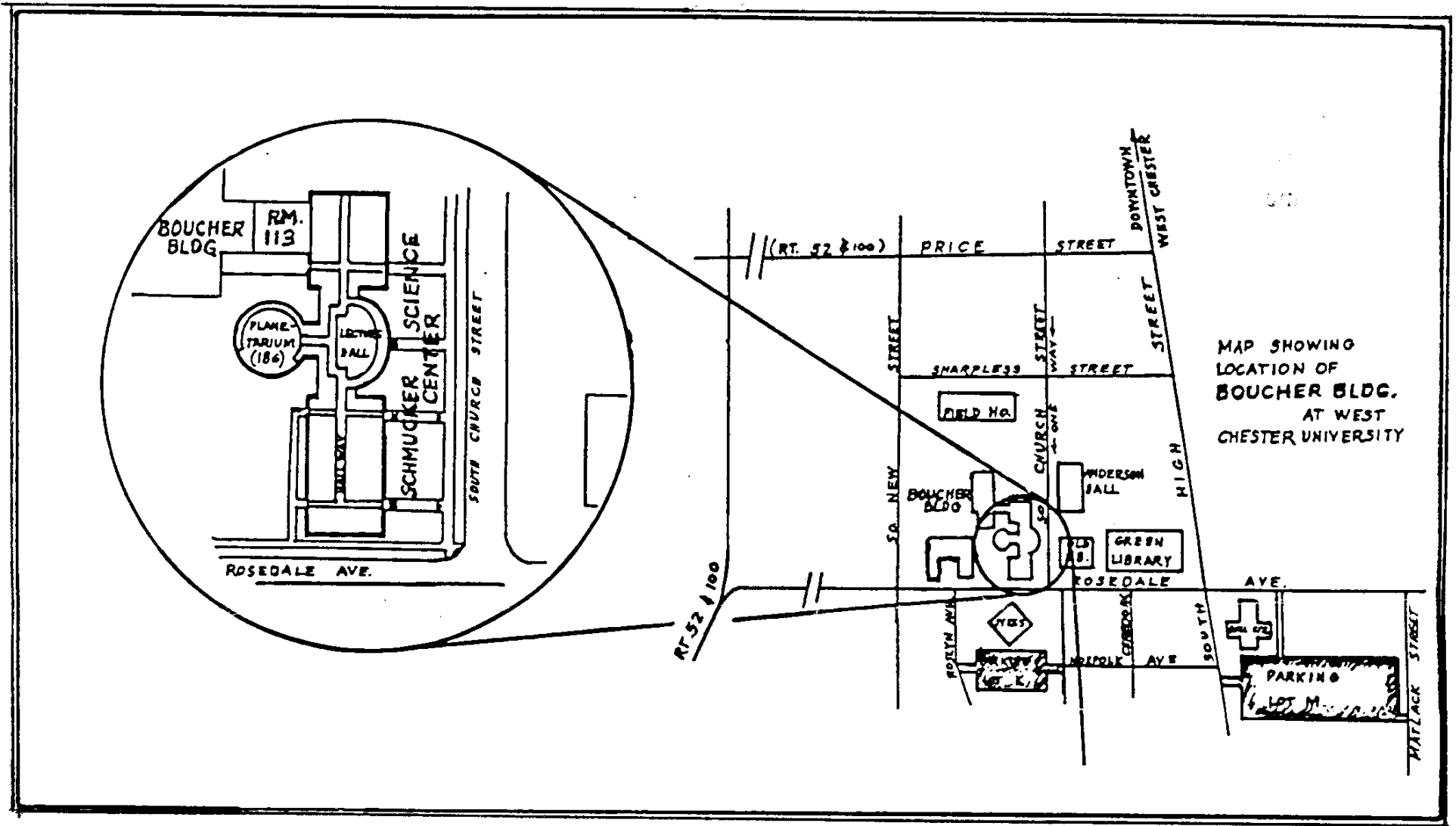
<http://www.ccas.us/>

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 copying copyrighted material! Give your contributions to John Hepler (610-363-0811) or e-mail to webmaster@ccas.us

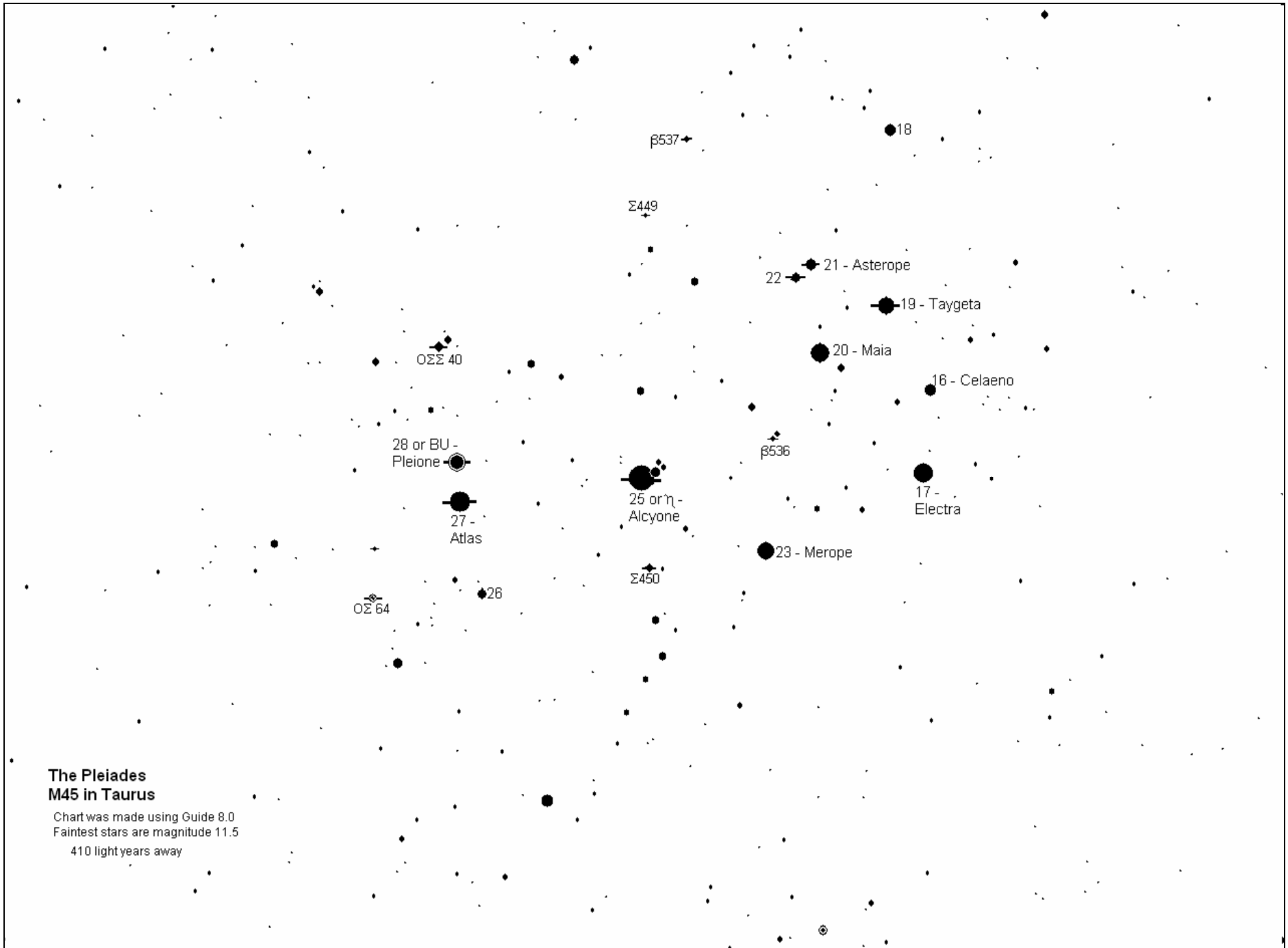




To get to the Myrick Conservation Center of the Brandywine Valley Association from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn 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 up the farm lane to the left; it's about 800 feet or so to the top of the hill. 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).



Parking is available behind Sykes Student Center on the south side of Rosedale Avenue (Parking Lot K), and behind the Bull Center at the corner of Rosedale Avenue and South High Street (Parking Lot M). If you arrive early enough, you may be able to get an on-street parking space along South Church Street, or along Rosedale Avenue. You can take the Matlack Street exit from Rt. 202 South; Matlack Street is shown on the map at the lower right corner with Rt. 202 off the map. If approaching West Chester from the south, using Rt. 202 North, you would continue straight on South High Street where Rt. 202 branches off to the right. This would bring you onto the map on South High Street near Parking Lot M, also in the lower right corner.



**The Pleiades
M45 in Taurus**

Chart was made using Guide 8.0
Faintest stars are magnitude 11.5
410 light years away