



OBSERVATIONS

A MONTHLY PUBLICATION OF THE
CHESTER COUNTY ASTRONOMICAL SOCIETY



★President: Mike Turco
★Treasurer: Pete LaFrance

AUGUST 1998
(VOLUME 6, NO. 8)

★Vice President: Kathy Buczynski
★Secretary: Frank Angelini

CCAS August Meeting

DATE: **Friday August 28, 1998**
RAIN DATE: Saturday August 29, 1998
(regardless of weather)
TIME: 8:15 p.m. EDST
PLACE: **Flower & Cook Observatory**
University of Pennsylvania
LOCATION: 753 Providence Rd.
near Warren Ave.; just to the west
Malvern, PA (map is included)

Special Note: Our meeting place for the August meeting has changed! We will **not** be meeting at the BVA as originally scheduled.

In August, the monthly meeting will be combined with the Observing Session. That means that if the Friday Observing Session evening is clouded out, we will hold the meeting on Saturday evening, even if that night is also clouded out. Summer meetings start at about 8:15 p.m.

At the observing sessions, there will be help available to set up and use your telescopes. All members are invited whether they have a telescope or not. Telescope owners are always glad to share the view through their `scope. CCAS Observing Sessions are free of charge. Children are always welcome as long as an adult accompanies them.

★ ★ ★ ★ ★

Open House at F & C Observatory

There will be a public open house on Wednesday August 19, 1998 from 8:00 p.m. to 11:00 p.m. at the Flower & Cook Observatory. All CCAS members, as well as their families and friends, are invited to attend. Please spread the word to as many people as you can. CCAS members are encouraged to bring their telescopes along to help with giving attendees a view of the heavens (weather permitting, of course) This facility of the University of Pennsylvania is located just a few miles south of Malvern. See the

attached map for directions. You are welcome to make as many copies of the map as may be needed.

★ ★ ★ ★ ★

CCAS Website is Live!!

Pete LaFrance has set up a Web page for the Society, and it is now available on the World Wide Web (Internet). He has included some pictures taken by CCAS members. Check it out at:

http://members.tripod.com/~ccas_2/ccas.html

Pete 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 Pete LaFrance (268-2616).

★ ★ ★ ★ ★

August's Skies

Moon Phases

Full Moon	08/07
Last Quarter	08/14
New Moon	08/21
First Quarter	08/29

The Planets

Mercury is visible in the morning sky during the last 2 weeks of August, near Venus.

Venus is low in the east before sunrise in August.

Mars is rising in the morning sky, near Venus. On the mornings of August 31 and September 1 Mars will be in the midst of the Beehive Cluster (M44).

Jupiter is rising in the east around twilight in early August; by month's end it is rising around 8:00 p.m. EDT. It's the brightest "star" in the east in the early evening, climbing higher as the night progresses. Jupiter is a fine sight in any size telescope (binoculars too!)

Saturn is to the east of Jupiter, rising about an hour and a half later. The rings are tilted at an angle of 17° from edge on.

Uranus and Neptune are in Capricornus, reaching opposition this month. That means they will be rising as the Sun sets. The May 1997 issue of *Sky & Telescope* has a finder chart for these two planets.

Pluto is in Ophiuchus, just north of the head of Scorpius. It is high in the southern sky as twilight fades. It requires at least an 8" - 10" telescope, dark skies, and lots of patience to bag Pluto. Members of the CCAS now have an edge, however: at the Flower & Cook Observatory they can slew the big telescope right to the coordinates of Pluto, so you can then say that you have definitely seen Pluto.

Double Shadow Transit: Saturday August 22

On Saturday August 22, between 10:20 p.m. and 11:44 p.m. EDT (Eastern Daylight Time, which is of course our local time) you will be able to see the shadows of two of Jupiter's moons on the face of Jupiter at the same time! Sharp-eyed observers can see the shadows with telescopes as small as 60mm aperture. The moons casting the shadows will be Io and Ganymede. Double shadow transits are not all that rare, but we don't often have it occurring so well placed for us, and on a Saturday night to boot, so don't miss it. Hope we have clear skies that night!



Editorial

No Pain, No Gain

I just finished logging the one hundredth double star of the Astronomical League's Double Star Club. I logged them all without the aid of setting circles or a computerized (GoTo) mount. I began in October of last year. That's ten months worth of waiting for the right sky conditions, the off-day from work when you can stay up late, no familial interference, waiting for the season when the star is above the horizon, etc. It was a lot of work and a lot of cursing the light pollution, the oncoming clouds, the rainy weather, and my own lack of knowing where to look. Many a time I wished I had a GoTo mount for my scope. But after all is said and done, I am glad I did it this way.

I had read the opinions of those much more experienced at the avocation of astronomy than I. Most recommend that a novice astronomer forego the use of automatic aids to find celestial objects. These aids include digital setting circles where you enter the coordinates of an object into a hand-held computer pad, or the more recent computer-based systems where one can point-and-click at an object

on a star chart on a computer screen, and the motorized mount automatically slews the telescope (turns it on its axes) to that location in the sky. These experts argue that the only real way to learn the sky and your way around it is to "manually" find your way around, sometimes called "star hopping", and that if you just buy and use an automatic system, you essentially cheat yourself of that knowledge and much of the joy and satisfaction of this hobby.

If for instance you want to observe M31, the Andromeda Galaxy, you can do so in various ways:

1) "Manually" find the Big Dipper (part of the constellation Ursa Major), locate the North Star (Polaris) from the Big Dipper by running a line through its two end (easternmost) stars, go to the opposite side of Polaris about the same distance as Polaris is from the Big Dipper to the constellation Cassiopeia which is shaped like a "W", then go in the direction that the westernmost "V" of the "W" is pointing by approximately three times the distance between the bright stars of Cassiopeia's "W" and you'll be close enough to find that 2.2 million-light-year-distant object that is the Andromeda Galaxy in your telescope.

2) Or, if you have digital setting circles: Enter R.A. (Right Ascension) 00400, DEC (Declination) +4100 into your keypad and press go.

3) Or, with a computer hook-up: Using a sky chart software program, point to M31 on your laptop computer screen and click your mouse.

4) Or, if you have the latest voice-actuated system, Say "Go to M31" into your computer's microphone.

Each of the above methods gets you to your objective. They of course get progressively more expensive as you go from 1 to 4. A computerized mount costs hundreds if not thousands of dollars more than a star chart, but you save a heck of a lot of time. It gets back to the old adage, "time is money." But I must say that I know a heck of a lot more about the sky now than I did last October and had I logged all those stars "automatically", I would not be able to make that statement.

Star hopping as described in Method 1 above enables you to learn, among other things:

- The positions and configuration of "guidepost" constellations (e.g., Ursa Major and Cassiopeia). These then become the way to find other objects, in some cases without even needing charts.

- Which way is east vs. west when looking up at the sky (opposite compared to looking down at a map on the ground).
- The “celestial sphere”, the convenient device used to understand the position and movement of the stars. You learn how to relate to right ascension and declination, the longitude and latitude of the sky.
- How to judge direction, distances and magnitude differences among stars.
- For double stars, how to use position angle and separation to help identify the star.
- How to read a planisphere and a star chart, and relate the constellation shapes in the sky with the chart.
- Learn the field of view of your binoculars and/or finder scope, and how to relate it to your charts, which makes finding objects progressively easier.

You also get to observe the sky all around the area you are trying to find as you get familiar with the methodology itself. You find other objects, learn more of the constellations, and gain a much better sense of accomplishment from your observing.

I am still going to purchase a computerized mount. I'll use it for astrophotography and for viewing at high powers, neither of which you can do with a manual mount. It's also helpful for finding dim objects. Trying to locate an emission nebula in light-polluted skies with a narrow-band filter is almost impossible. For a novice, however, learning the sky by star hopping, though much more time consuming than using computerized equipment, yields far greater rewards.

Time might be money, but like with everything else, no pain, no gain. The learning experience of searching out all those doubles, using charts, judging distances, and learning the sky has truly been a most rewarding one for this novice.

M. A. Turco
8/3/98



CCD for \$100 by Frank Angelini

Those of you who have been interested in CCD astronomy, but have been held back by the high cost of commercial cameras, may be in luck. If you have access to a laptop computer and have \$100 to invest, read on. A couple of avid amateur astronomers in Portugal have devised a way to convert a common computer accessory, known as a “QuickCam”, for use with amateur telescopes. The QuickCam, made

by **Connectix**, is a black & white camera unit equipped with a **Texas Instruments** 255 CCD, a frame transfer chip with a 320 x 240, 10 micron-square pixel array. This is the same chip used by **Santa Barbara Instruments Group** in their **ST-5** camera. The QuickCam was designed to be used by computer enthusiasts for video conferencing over the Web. In this form, it is not suitable for use by astronomers. However, by taking the unit apart, removing the lens and IR filter, and mounting the chip in a standard 1 ¼ inch eyepiece adapter, you have a very nice entry level CCD unit. Of course, it is still necessary to connect the camera to a laptop computer and run the software that comes with the camera. Let me know if there is further interest and I can provide detailed plans. Perhaps the Society can get together and construct one for use by the members.

[Frank's phone number is listed at the end of the newsletter, with the other officers of the Society]



Moonshots, Part 2 by Frank Angelini

If you'd like to take pictures of the moon through your telescope, the first or more basic method is called “prime-focus” photography. Here the camera (with its lens removed) replaces the eyepiece. Your telescope's lens or mirror is the only optics in the system. To do this you need a prime focus camera adapter along with a T-ring to mate your particular camera to the adapter's universal threads. As an option, you can also use a Barlow lens to multiply the focal length of your `scope by a factor of 2 or 3 giving you a larger lunar disk on your film frame.

The third lunar photo technique can also be used for shots of the planets: eyepiece projection. With it you can use your telescope to close in on selective areas of the Moon. To achieve this degree of magnification you need a camera adapter that allows you to place an eyepiece in the telescope-to-camera coupler. The eyepiece projects a highly magnified image of the Moon onto the film frame. This technique multiplies the effective focal length of your telescope by a factor of 10 to 20 to 20,000mm or more. For this last type of high-power lunar

photography, you must have a telescope equipped with an equatorial mount and electric clock drive. For prime focus shots of the whole disk of the Moon, if you have an equatorial mount and clock drive, by all means use them: you won't have to keep centering the Moon for each exposure and you'll get the sharpest possible shots. However, you can still get decent shots of the Moon using an altazimuth-mounted telescope (one that cannot track the stars), such as a small refractor or a Dobsonian-mounted telescope. Lunar exposures are short enough, especially if you use fast film (ISO 400 or so) and focal lengths under 1000mm, that the movement of the Moon during the exposure shouldn't impart objectionable blurring.

To record just a few craters or other lunar features up close you need the added magnification of eyepiece projection photography, a technique that places additional demands on your equipment and skills. For example, in addition to the mount and clock drive mentioned earlier, it's best to have a drive corrector that allows you to vary the speed of your `scope's drive motor. A slightly slower drive speed, sometimes called the "lunar rate", tracks the Moon with a finer precision than a drive operating at the normal sidereal rate. You should also consider counterweights to balance your telescope. Eyepiece projection adapters can extend quite a distance from the telescope, throwing the `scope off balance, producing inaccurate tracking. And with eyepiece projection, you need to be more concerned about polar alignment. Simply aiming the polar axis roughly at the pole, as can be done for prime focus shots, is not good enough for eyepiece projection. Also, calculating the exposure for eyepiece projection shots requires a little math. The eyepiece increases the effective f/ratio of the `scope – you need to calculate this value before determining your exposure. Use this formula to determine the effective f/ratio of your telescope during eyepiece projection:

$$\text{New f/ratio} = \text{Telescope's normal f/ratio} \times [(D - F) / F]$$

The telescope's normal **f/ratio** is its f/ratio at the prime focus. This is simply the `scope's focal length divided by the aperture. **D** is the distance between the eyepiece and the film plane at the back of the

camera. **F** is the focal length of the eyepiece. For example, say you have a 5-inch (127mm) f/9 refractor with a focal length of 1,140mm used with a 25mm eyepiece. First, you will need to determine the distance from the eyepiece to the film plane – this will vary depending on the length of the camera adapter. For this example we'll use a commercially made adapter that separates the eyepiece and film by 165mm. Subtract from this the focal length of the eyepiece, in this case 25mm. This yields 140mm. Now divide this number (140) by the focal length of the eyepiece (25) to get 5.6. Finally, multiply this by the f/ratio of the telescope, which is f/9. This yields an f/ratio of 50 for this telescope/eyepiece combination. Use this f/ratio when looking up recommended exposures.

HELPFUL HINTS

With both prime focus and eyepiece projection techniques, the trickiest part is focusing. A telescope, unlike a telephoto lens, does not have a pre-set infinity focus – you must look through the camera and turn the telescope's focus knob until the image is sharp. If your camera has a central split-screen focuser, this circle may black out due to the long focal length of your telescope. If this happens, focus off center on the ground glass portion of your focusing screen. To help you see the exact point of best focus, use a focusing magnifier. These devices clip onto a camera's viewfinder and make it much easier to tell when the image is in focus. To reduce vibration use a cable release when tripping the shutter. Better yet, use the self-timer on your camera. Center the Moon and focus as usual. Once you are ready, cock the shutter, set the timer and release it, then stand back. The few seconds wait before the shutter fires will allow vibration to die down.

If the exposures called for are longer than ½ second, then cover the front of the telescope with a dark card, lock the shutter open on B, wait a few seconds for the vibration to die down, then make the exposure by flipping the card away and then back. Then close the shutter. This "hat trick" method is by far the best way to get Moon shots free of vibration-induced blurring. When using long focal lengths,

nights of steady air, or “good seeing” as it’s called, will give best results. Turbulence in the upper atmosphere can degrade fine detail and take the edge off what would otherwise be a sharp photo. Slight wind can also cause enough vibration to smear your photos. Always wait for the wind to die down before tripping the shutter. When starting out always keep accurate records for each roll of film. Record the date, telescope, exposures, eyepiece, f/ratio, film, and some comments on the seeing conditions. Those notes will be your best teaching tool. A final tip: start with tripod and prime-focus shots of the Moon. These simple methods will get you good results in your first rolls of film that will inspire you to try more advanced techniques like eyepiece projection. Before long you’ll be a master at staging Moon shots.

MAXIMUM EXPOSURE

If you are using a tripod-mounted telephoto lens or a telescope without a clock drive these are the maximum exposures you should use at each focal length. Go longer and the apparent motion of the sky will trail the Moon’s image. (Determine the maximum exposure by dividing 250 by the focal length of your telescope.)

Focal Length	Max. Exposure
500mm	½ second
1000mm	¼ second
1500mm	1/8 second
2000mm	1/8 second
3000mm	1/15 second

Depending on the f/ratio of your telescope, keeping exposures below these limits may require you to use fast films.

[Editor’s Note: This concludes Frank’s article on lunar photography. Copies of the original article in its entirety will be available at CCAS meetings, or by mail by calling the editor, Jim Anderson, at 380-4512]



CCAS Lending Library

Our Librarian, Bill O'Hara, has the books in our library all ready for members to borrow. You can drop by Bill's place (call first, of course) to borrow a book. Or you can call Bill before a meeting and ask him to bring a book to the meeting for you. The complete list of books is too big to include in the newsletter; there will be copies available at CCAS meetings. Bill's phone number is 696-1422.



AL Observing Programs

One of the benefits of joining the CCAS is that you also become a member of the Astronomical League, a national federation of astronomy clubs. The AL has a series of Observing Awards, and 4 observing clubs based on these awards have been started in the CCAS. These are the Messier Club, the Binocular Messier Club, the Lunar Club, and the Double Star Club. Working on these awards also gives you a plan of observing: "What will I look at tonight?" becomes "Which Messier objects are visible tonight that I haven't seen yet?" Each club has a volunteer coordinator:

- Messier Clubs (both): Bob Hartje (610-325-7285)
- Lunar Club: Ed Lurcott (610-436-0387)
- Double Star Club: Jim Anderson (610-380-4512)



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 email message and send it to the editor at SNY114@aol.com

Or mail the contribution, typed or handwritten, to:

Jim Anderson
 19 Bluff Road
 Thorndale, PA 19372-1104



CCAS Lending Telescope

You can make arrangements to borrow the telescope for a month by contacting Steve Leiden (296-3793). The 6” f/8 reflector can be borrowed by club members for a month at a time.



Membership Renewals

Check the date printed on the address label of this issue of *Observations*; "exp." appears in front of it, just after your name. If you are due to renew, you may send your renewal check made out to our Treasurer, Pete LaFrance. Mail to:

Pete LaFrance
413 Church Rd.
Avondale, PA 19311



Sky & Telescope Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price, which is about half the newsstand price, and also cheaper than individual subscriptions! Make out a check to the Chester County Astronomical Society, note that it's for *Sky & Telescope*, and mail to Pete LaFrance. Or you can bring it to the next Society meeting and give it to Pete there. Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.



CCAS Membership Information

The present membership rates are as follows:

- REGULAR MEMBER**.....\$20/year
- SENIOR MEMBER**.....\$10/year
- STUDENT MEMBER**..... \$ 5/year
- JUNIOR MEMBER**.....\$ 5/year
- FAMILY MEMBER**.....\$ 30/year

For further information on membership or society activities you may call:

- President:** Mike Turco (610) 399-3423
- Vice Pres:** Kathy Buczynski (610) 436-0821
- Treasurer:** Pete LaFrance (610) 268-2616
- Secretary:** Frank Angelini (610) 873-7929
- ALCor and**
- Newsletter:** Jim Anderson (610) 380-4512
- Librarian:** William O'Hara (610) 696-1422
- Observing:** Ed Lurcott (610) 436-0387

