

# Rappahannock Astronomy Club

## Minutes, February 15, 2014, Meeting

In attendance:

Ben Ashley  
Terry Barker  
Bart & Linda Billard  
Scott Busby  
Don Clark  
Jerry Hubbell

Scott Lansdale  
Dan Lien  
Lauren Nicholson  
Tim Plunkett  
Andrey Ruhkin\*

President Jerry Hubbell called the meeting to order shortly after 7 p.m. Ten members were present, along with 2 guests, 1 of whom joined during the meeting.

## Program

Jerry presented “Photometry and Astrometry for the Amateur Astronomer.” He said he had given this presentation 2 years ago and decided to update it a little and present it again. Both photometry and astrometry trace back to work of the ancient Greek astronomer Hipparchus. Hipparchus catalogued stars and assigned them rankings of apparent brightness from 1st to 6th magnitude. This system was later standardized with a logarithmic scale and extended to cover fainter stars only visible in telescopes. The development of filters with standardized pass bands in the 20th century improved the consistency of measurements and led to publication of a catalogue of stars by Arlo Landolt with measured brightness in each of the filter pass bands. With the development and increasing availability of charge-coupled device (CCD) cameras, more and more amateurs have been able to learn the process of photometric measurement. Jerry described the process of using astronomical software to measure the relative brightness of a target star compared with a catalog star in the image. After calibration by subtracting an average of dark frames (taken with all light blocked from the CCD) and using an average of flat frames (taken with light from a uniform background such as the sky shortly after sunset) to normalize the detector responses, the relative flux of the target and comparison star(s) are measured. The explanation of how the measurements account for the light from the sky that is picked up along with the light from the stars was interesting. The flux from the sky alone is estimated in an annular area centered on the star with the inside of the annulus large enough to avoid including flux from the star. Jerry showed an example where a background star was within that annulus and could corrupt the sky flux estimate and explained that the software uses the median value of the pixels in the annulus instead of the average to get a better estimate.

About 190 BC, Hipparchus used catalogs created by his predecessors Timocharis and Aristillus along with his own observations to discover the precession of the Earth’s axis. This precession is one reason catalogs of star positions are defined for a specific time period, or “Epoch,” of some 30 to 50 years. Before the era of astronomical photography, positions could be measured with telescopes fixed to move along the meridian—the imaginary line in the sky that an object crosses when it is due south of the observer and reaches its highest elevation in the sky. The moment an object crosses the center of the telescope’s field of view, marked by a reticle, it is measured with a precise clock. The object’s coordinates are found based on that time and the elevation angle of the telescope. With the introduction of astrophotography, measurements of relative positions of objects could be made by careful x-y measurements on photographic plates. These relative position measurements can now be made with CCD images. To calibrate positions, Jerry said amateurs now use professional-level catalogs, for example, the US Naval Observatory CCD Astrograph Catalog (UCAC) series. With the help of software, an amateur can digitally adjust the center position, scale, and orientation of a CCD image to match catalog stars seen in the image. He or she can do it manually by clicking controls for each adjustment and watching the matching of the indicated positions of catalog stars with the stars in the image or with the help of automated solving algorithms in some software versions that can do most, if not all of the work. Jerry showed the result of the last method, a “blind solve,” obtained using the website, [Astrometry.net](http://Astrometry.net). A copy of his presentation is available on the Club website on the [programs page](#).

## Old Business

Treasurer's Report—Tim Plunkett presented the January report. It recorded \$90 in dues collected and no expenses. He said he made an adjustment to the December report to reflect a member's payment of Astronomical League dues. Paid memberships are up to 12 for 2014.

Star Parties, Events, and Meetings—Our big outreach planned for the January 25 Caledon date had to be cancelled because of snow. Glenn Holliday told us two prospective takers of the offer of help with telescopes contacted us through the new club website and indicated they hoped we would reschedule. We discussed rescheduling in March or April, but these dates were set aside for the Messier Marathon and its backup. No date was chosen.

Communications Committee Report—Glenn said the website was up and getting notice, including some hacking attempts. He said Terry Barker and Don Clark had found some good plugins, mentioning in particular the spam filter that Terry included when setting up the site. To help protect against hacking, Glenn said we could require strong passwords and avoid obvious user names like administrator. He also suggested limiting the number of users having permission to publish the pages they generate, suggesting Linda Billard, as editor, could be the one who has privilege to publish the new content the others submit. Linda was concerned that might be too restrictive because at times her other work could delay her checking the new content and getting it published in a timely manner. Glenn commented that right now he was the bottleneck, so having Linda take a turn as bottleneck could be an improvement.

Don Clark mentioned a possibility for members who wanted pictures they post to be available to all instead of restricted to the club's Yahoo group members. He said Flickr, an online photo management and sharing application related to Yahoo, could be used.

Linda reported the new newsletter came out at the end of January. She was seeking volunteers for articles for the next newsletter and said Ben had already volunteered. Scott Lansdale reaffirmed he was planning to give her an observing report to use as a follow-up to his earlier article. Terry agreed to try to write something by the end of March, and Glenn agreed to write about Shakespeare's knowledge of astronomy.

Star Party Dates—The next regular Caledon date is March 1.

## News/New Business/Announcements

Star Parties, Outreach Events, and other new Business—Jerry said that this year, Astronomy Night at the National Mall was scheduled for mid-June. Last year, we were one of four clubs represented and had at least a quarter of the telescopes. Someone asked about parking, and Jerry said there was a garage available nearby. The main issue was dropping off equipment before parking. We concluded participants should exchange cell numbers so they could help each other with drop-offs.

Bart Billard was planning to assist David Abbou with an astronomy outreach associated with the science fair at Stafford Elementary School. The science fair was the day after the club meeting, and there would possibly be a daytime observing event later on. Glenn wondered whether there might be any reaction like he once got when he was talking about possible astronomy-related science fair projects and someone objected that astronomers can't do experiments.

Glenn talked about an offer for us to participate in the Renaissance Faire, which could be an opportunity to get publicity. It would involve coming up with a period-related astronomy exhibit (early Elizabethan is their period). He has been looking for astronomical references in Shakespeare and also suggested the supernova observed by Tycho Brahe was in the right period. Glenn said the Faire runs from mid-May into June and that we could choose a Saturday during that time to exhibit. He also said it involves wearing period clothing, but that they have costumes available.

Scott Lansdale said his photography club is having a program on night photography at its June meeting. The club meets at the Methodist Church on the second Tuesday of the month.

Jerry announced he would be attending the Winter Star Party for Explore Scientific.

## Next Meeting

The next meeting is on Wednesday, March 19, 2014, at the Heritage Center in Fredericksburg.