

Rappahannock Astronomy Club

Minutes, July 17, 2013, Meeting

In attendance:

- Benjamin Ashley
- Terry Barker
- Bart & Linda Billard
- John Gray
- Jerry Hubbell
- Melvin McDaniel
- John Ulrich

President Jerry Hubbell began the meeting shortly after 7:00 p.m. Seven members and a visitor were present.

Program

Jerry Hubbell presented “Engineering a Scientific Observing Program: Getting the Best from Yourself and Your Equipment.” He started with a few example images of things you can accomplish with a 5-inch refractor. In an image of the Moon, Jerry pointed out some smaller features and said craters of 1–2 miles diameter could be detected and craters more than 3 miles diameter could be measured. He related how he was impatient to get started when he first tried astronomical imaging, and the disappointing results taught him the key is having the patience to “[t]ake the time to learn your equipment and practice the skills to operate it before trying them out under the stars.”

Jerry said that one should think of the investment in astronomical imaging as including the investment one makes in developing the skills and knowledge needed to operate it in addition to the cost of the hardware. It is best to strive for a balance of these investments, so that one does not use up resources on one component that would just end up being limited by the other components. He also suggested buying equipment you can afford might be rephrased “buying equipment you can afford to break.” I could interpret that as pointing out that buying something expensive that one winds up breaking while learning to use it is not a good balance between the investment in time and the investment in equipment.

To provide a systematic approach to choosing the right balance and learning the necessary skills, Jerry advocated thinking about the astronomical imaging system (AIS) as encompassing all the standards, operating and maintenance procedures, and the documentation, as well as the equipment itself and the software and databases, needed for your particular observing program (OP) (for example, measuring minor planets and calculating their orbits). The way he does this is by developing an observing program design basis (OPDB) that describes the goals, requirements, and specifications to design and build the AIS and also meet the requirements and performance of the OP. Jerry said his initial OPDB was to build a program that let him learn about scientific astrophotography and how to develop his own specific science goals once he reached a minimum level of knowledge and skill. Terry Barker asked about focusing aids that go on a telescope. Jerry said they are helpful. He mentioned one type, a Bahtinov mask, that produces diffraction spikes that cross the star in the image. As the telescope approaches best focus, one spike moves opposite the other two. At best focus, the odd spike passes through the center of the “X” made by the other two. Ben Ashley said that alternatively, computer programs can measure the full width at half maximum (FWHM) of a star as a function of focus position on either side of best focus, and then analyze the results to find where the trends meet as an indication of the best focus position.

Jerry’s final topic was the citizen scientist phenomenon and opportunities for the amateur astronomer. For example, the American Association of Variable Star Observers (AAVSO) provides opportunities for any amateur to contribute to the science of variable stars. It also has training programs and other educational opportunities for amateurs to learn and help build interest in doing science. Jerry also gave information about the Minor Planet Center of the International Astronomical Union, the Association of Lunar and Planetary Observers (ALPO), and the British Astronomical Association. He showed an asteroid light curve

he measured using an online remote telescope and submitted to ALPO. He had a list of other opportunities for professional–amateur collaboration, including the Lowell Amateur Research Initiative (LARI). LARI has a number of projects to which amateurs can contribute. Jerry had joined one involving observation of asteroids, and he asked Bart to describe one he joined. It involves examining light curves of stars obtained in the Trans-Atlantic Exoplanet Survey (TrES). Participants potentially could discover new variable stars, and there are indications the original TrES data analysis might have missed some transits that individuals examining the data might be able to pick up.

Melvin McDaniel asked about how the Moon feature heights in the examples Jerry showed are measured. Jerry said the heights are derived from the angle of the Sun and the shadow lengths. The Lunar Terminator Visualization Tool (LTVT) software (freeware) helps with the measurement by mapping the image onto a sphere and then adjusting for orientation so the feature appears as if viewed from above. John Ulrich asked about using a visual digital SLR camera with a telescope and what kind of quality to expect from a 5-inch Schmitt-Cassegrain. Jerry recommended using the camera video mode and processing the result with software that automatically finds the best-quality frames and “stacks” them to form a single image. He said, “You’ll be surprised what you can get.” He mentioned Registax and AVIstack as good software choices that are also freeware.

Old Business

- Treasurer’s Report—The Treasurer’s report was skipped because Tim Plunkett was absent and had not sent an electronic copy.
- Star Parties, Events, and Meetings—The star parties at Caledon on June 29 and Belmont Observatory on July 6 were both successful. Linda Billard and Melvin McDaniel noted that dew was not a problem at the Belmont event.
- Status of Club Loaner Equipment—Melvin returned the 6-inch equatorial Orion scope to Tim, meeting him at work within a few days after the June club meeting.
- Scheduled Star Parties and Club Meeting—The next Caledon star party date is August 10. The next Belmont date is August 17. It is also the date for the Club picnic (with a short meeting) at Belmont.
- Communications Committee Report—Terry reported that development of the new club website has reached the point where a communications committee meeting should be sufficient to work out the rest of the content. Glenn Holliday was unable to attend the club meeting but Linda noted his email message indicated that he was now ready to get involved again in the work on the website. Terry said that Don would be back next week, making that time frame suitable for a meeting of the committee members. Linda reported that Rachel Konopa was now at this end of the country and would like to try to come. Turning to the next newsletter, Linda said it would be volume 2, number 1, and it was almost ready. The lead article would be the Astronomy Night at the National Mall event, which she and Terry wrote. It would also include an article on binoculars resulting from her interview of Joe Fordham, a couple of reviews of books related to astronomy by Bart, and an article on mentoring people about astronomy by Jerry. Ben’s crescent nebula picture would be the image of the quarter.

News/New Business/Announcements

- Upcoming Star Parties and Outreach Requests—We discussed prospects for Comet ISON. Ben said it was complicated. It would be moving into Cancer first, and then into Leo in October, and then it would become visible for about 1-1/2 hours in Virgo in November, possibly around visual magnitude 6. Then it would get close to the Sun where it would be brighter but difficult to see. Ben said that maybe we could set up around 2 a.m. one night to be ready to show ISON to anyone crazy enough to show up around 4 a.m. In December, it would be above the horizon both morning and evening, but always in twilight. Later there would be a better opportunity to see it near Polaris, but it looks more interesting as an object for us to observe. Linda said she wrote an article for the upcoming newsletter about the expectations for ISON. She mentioned that the head of the comet might not survive the close approach to the Sun, but a large tail should remain afterward. The bottom line was that it did not appear to be easy to plan for showing ISON to the public.

Next Meeting

The next meeting is the club picnic on Saturday, August 17, 2013, at Belmont Observatory.