

Rappahannock Astronomy Club

Minutes, September 18, 2013, Meeting

In attendance:

- Benjamin Ashley
- Terry Barker
- Bart & Linda Billard
- Scott Busby
- Joe Fordham
- Ranny Heflin
- Glenn Holliday
- Jerry Hubbell
- Scott Lansdale
- David Lien
- Tim Plunkett
- John Ulrich

President Jerry Hubbell began the meeting a few minutes after 7:00 p.m. Thirteen members and a visitor were present.

Program

Ranny Heflin presented “DSLR Imaging Using Narrowband Filters and the Hubble Palette.” In his title slide, he showed us his inspiration, “Pillars of Creation” (April 1, 1995), “the first super-wow image” from the Hubble space telescope. In normal color imagery, the filters approximate the three bands of sensitivity of the eye, giving “true color” images. Digital single-lens reflex (DSLR) cameras use four detectors for each pixel, one with a red filter, one with a blue filter, and two with green filters because the eye is more sensitive to green. These normal color filters cover the whole visible band with slight overlap, providing about 100 nanometers (nm) of band pass (range of wavelengths) for each. In contrast, narrowband filters range from about 3 to 15 nm in band pass, and they detect emissions of specific neutral or ionized atoms. The narrow-band filters Ranny is using detect doubly-ionized oxygen (OIII) near the overlap region of normal blue and green filters, hydrogen alpha (H-alpha) near the middle of the normal red filters, and singly-ionized sulfur (SII) near the long-wavelength edge of the normal red filters. Ranny said his filters are not the narrowest band pass, and his SII filter could pick up a little of the H-alpha emission. It also picks up nitrogen emissions because it overlaps with the NII filters designed for that element.

Narrowband filters are useful in observing clouds of gas that are emitting light, which are therefore called emission nebulae. The emission occurs when the atoms or ions in the gas that have electrons with extra energy (“excited electrons”) give up some of that energy as they return to lower-energy states, releasing the energy difference in the form of light of a corresponding color. Each species has a unique set of discrete energy states, resulting in characteristic energy and thus color of the emitted light. The energy that excites the electrons comes from the light of nearby stars when it is absorbed by the atoms or ions. We see emission nebulae by new light emitted by the gas, in contrast with reflection nebulae, which we see by the starlight itself reflected by dust particles. The narrowband filters show the presence of the particular types of atoms or ions, so images with narrowband filters can provide scientific information. They can also inspire creativity, as Ranny illustrated in his presentation.

The OIII wavelength is 500.7 nm, and the dark-adapted human eye happens to be most sensitive to this wavelength, which makes OIII filters useful for visual observing as well as imaging. In addition to the H-alpha filter at 656.3 nm and the SII filter at 672.4 nm, other common narrowband filters are NII at 658.4 nm and H-beta at 486.1 nm. H-beta is another characteristic energy or color emitted by hydrogen. Ranny told us H-beta filters are also useful for visual observing of some nebulae because of the eye’s sensitivity.

Ranny said the Hubble palette makes the SII images red, the H-alpha images green, and the OIII images blue. After calibrating and stacking image sequences taken with each filter, he uses Maxim DL and Photoshop for his processing, and he demonstrated how it works for us. Ranny exercises his esthetic creativity by choosing weights for the color assigned to each filter. In addition to his modified Canon 60D

DSLR, his imaging equipment includes an 8-inch Celestron, an Orion Atlas mount, an Orion Short-Tube 80 refractor for guiding, and a Celestron 0.7x focal reducer, which is necessary to get more light for narrowband imaging.

Ranny summarized advantages and disadvantages of using narrowband filters with a DSLR for imaging. You can image in light-polluted areas and get images of deep-sky objects in moonlight. You can get greater contrast. However, it takes more time because of longer exposures needed, and lack of sensor temperature control in DSLRs adds to this problem. The narrowband filters are more costly. Ranny is looking forward to cold weather to help him overcome some of these limitations. When asked about cost of filters, he said the three he uses are the most common type and are two to three times as expensive as RGB filters. Others, such as NII, are more specialized and consequently more expensive. Scott Busby said his 50 mm filter is around \$499. Ranny's filters are a special shape made for his camera model. He closed his presentation with a series of spectacular images taken with his setup.

Old Business

- **Treasurer's Report**—Tim presented the Treasurer's report for August. One new member joined this month, and Tim made a payment of Astronomical League dues for those members who had included the optional fee for being in the Astronomical League with their dues this year. The current paid membership count stands at 25. Jerry reminded members of the need for ideas for club purchases. Scott Lansdale suggested the club could purchase one of the inexpensive radio astronomy kits he described in his earlier presentation to the March club meeting. Linda and Jerry mentioned the club was thinking of a donation to the Heritage Center in appreciation for the use of the meeting room.
- **Star Parties, Events, and Meetings**—The Caledon star party on August 10 was successful. The club picnic at Belmont August 17 was also successful, although the weather did not permit a star party that evening. Joe Fordham wound up with the "mystery gift" in the gift exchange. It was a 4-inch achromatic refractor OTA. He said he has not gotten it mounted yet. The forecast early on August 31 for the next Caledon star party was marginally favorable, but the weather deteriorated in the afternoon after the event was scheduled. Weather for the September 7 Belmont star party was better. Melvin McDaniel was the only one to take advantage of it.
- **Status of Club Loaner Equipment**—John Ulrich checked out the club webcam at the meeting. Scott Busby suggested that visitors to our meetings may not be aware of the loaner equipment available for members because they tend to remain only for the presentation and do not here the discussion during the business meeting. He suggested we should try to mention something about such membership benefits during the introductions at the start of the evening.
- **Scheduled Star Parties and Club Meeting**—The next Caledon star party date is September 28. In addition, Ben has been in contact with Linda White of Wilderness Elementary about supporting "Observe the Moon Night" there October 15 (a Tuesday). She has obtained a grant for equipment for the school, and is interested in any form of support, even the presence of people interested in astronomy. The event is rain or shine: they will meet in the gym if the weather is bad. Ben said he had promised to go and would display a telescope in the gym if the weather does not cooperate. Linda and Bart Billard and Jerry Hubbell said they would try to make it too. The return to Northumberland is planned for November 9.
- **Communications Committee Report**—Glenn discussed the development of the new club website. The old site has been moved to the new server where the development is taking place using WordPress. Members can now look at the prototype and comment. The committee would like feedback on how close the new site is to being sufficiently populated with content for it to be ready to go live. Jerry said that we need to consider what content is necessary for the public to see. Also, a current issue is the problem with accurate display on all devices. Terry Barker was pursuing a solution The URL will be posted to the Yahoo group to allow members to access it. Meanwhile, the Raclub.org site is being minimally maintained.
- **Yahoo Group Status**—Scott Busby reported that Yahoo has changed the format for all of the Yahoo groups. Yahoo did not show much interest in feedback on the changes. Scott said people would have to make adjustments to be able to find where things are now, and it is not so intuitive. We were able to see the new format projected on the wall as he noted where some things could be found. The email to the group is now under the heading "Conversations." The calendar is now under "Events."

The website poll taken earlier now falls under "Polls." Ben said he had not been able to find a way to start a new email topic under "Conversations."

- Club Newsletter Status—Linda said she was expecting several contributions for the issue to appear in October, and she was writing a couple of articles herself. She asked members to send her something about their activities or experiences. She could also help members write submissions by asking them questions about the topic by telephone and email and writing the information up for them to look at and comment on.

News/New Business/Announcements

- Upcoming Star Parties and Outreach Requests—We discussed the possibility of an outreach at Barnes & Noble for Astronomy Day. Scott Busby noted that we had enthusiastic response at previous Borders outreach events, but they did not generate any new members. Jerry said he had had an offer for support for the club for a raffle prize to offer in conjunction with a membership drive. Scott Busby suggested members should look for schools or other possible locations to post some flyers for distribution. Jerry said he thought his community had a suitable location. The flyer file is also available from the Yahoo Group site.
- Other New Business Items—Jerry asked members thinking about potential equipment purchases to consider whether what we have fulfills needs of members who already have some basic equipment. He suggested the Personal Solar Telescope gets checked out more because it fits this criterion, which is one reason for suggesting we consider purchasing another. Ben suggested a more advanced imager could also interest members with their own equipment. Linda made a motion to donate \$100 to the Heritage Center, saying it would not be necessary to make it a regular donation. Scott Busby seconded the motion. All voted in favor in a voice vote. Scott Lansdale said he had a presentation coming up and asked for a link to the flyer file. Jerry said he would send out a link. Jerry said he is writing a series of articles for *Sky's Up* magazine. The first featured Ranny's PANSTARRS image. Jerry announced that our next meeting is the time designated for nominations for the club officer election to be held in November.

Next Meeting

The next meeting is on Wednesday, October 16, 2013, at the Heritage Center in Fredericksburg. On the agenda are nominations for club officers for the coming year.