Rappahannock Astronomy Club

Minutes, April 11, 2012, Meeting

In attendance:

- Barton & Linda Billard
- David Buckwalter
- Scott Busby
- Dan Casciaro
- Don Clark
- Joe Fordham
- Rob Friedel
- Glenn Holliday
- Jerry Hubbell
- Gene Jeffery
- Mike Masters
- Wayne Shields

President Jerry Hubbell began the meeting at 7 p.m. after introductions. Eleven members, including 1 who joined at the meeting, and 2 visitors were present.

Program

Mike Masters presented "Filters and Coatings for Visual Astronomy." He told us the Club purchase of a Personal Solar Telescope was so successful that it inspired him to get himself a Lunt solar scope. He then became interested in understanding how it worked and wound up learning about more than the specialized equipment for solar viewing. It all starts with coatings, first mirror coatings. The first reflector telescopes used an alloy called speculum metal. It tarnished quickly and had to be refigured and polished regularly. Glass replaced speculum metal when a method for coating a polished glass surface with silver was developed. It improved reflectivity, did not tarnish as quickly, and did not require refiguring when the silver had to be removed for recoating. Mirror coatings were later improved with evaporated aluminum instead of silver, then protected aluminum, and more recently, enhanced aluminum. The progression provided better reflectivity, improving from 66 percent for speculum metal to a range of 94 percent to 97 percent for enhanced aluminum, and more durability.

Lenses were also improved over time. Bare glass reflects about 4 percent of the incident light per surface, leaving about 92 percent transmission for a single element and less for an achromat with four surfaces. The lost light can further degrade images because of scattering that reduces the contrast of the transmitted light. In 1886, Lord Rayleigh discovered that tarnished glass was less reflective than new glass. Fresnel had developed a theory of reflection that showed that strength is a function of the difference in refractive indices of the two media, and this led to the realization that a layer with lower refractive index between the air and glass improves transmission. The first commercial antireflective coating process was patented about 50 years later. It was kept as a military secret at first, and allied soldiers prized captured Carl Zeiss binoculars during World War II for their anti-reflection characteristics. Anti-reflective coating improvements that followed included exploiting interference between reflections from the two surfaces of the right thickness of coating and designs with multiple layers to further reduce reflectivity. Modern multilayer coatings are available with transmission of better than 99.9%. This performance can make the difference between a transmission of about 60 percent (uncoated) and 98% (fully multicoated) for a simple fixed focal length photographic lens or 30 percent and 97 percent for a complex zoom lens.

Mike's last topic was filters, some of which use layers like antireflection coatings. He said that color filters, including neutral density and polarizing filters, are used for lunar and planetary observing. They can improve contrast of some features and also reduce glare and prevent fatigue from excessive light. He noted contrast effects are subtle. His presentation provides tables with suggested uses of different color filters for different planets. One table is also available online (Sirius-Optics.com.au/filters.htm). Nebula filters are used on diffuse and planetary nebulae not stars. They improve contrast, although they make the image dimmer overall. Mike discussed a comparison UHC, OIII, H-alpha, and deep-sky filters by Dave Knicely that is available on cloudynights.com. It has information on the uses best suited for each type and which types were the most useful overall. Mike said, "The best view I've ever had of the Veil Nebula was at Caledon, seen through my 16-inch Starmaster Dob with TeleVue 31mm Nagler and 2-inch

Lumicon OIII filter," even though neither the seeing nor the transparency that evening seemed exceptional to him.

Mike's last topic was specialized filters and telescopes for viewing the Sun, and how the Sun can be viewed safely. One type of filter for this application is the Fabry-Perot interferometer, or etalon. The hydrogen-alpha etalon allows very narrow bandwidth views that select this single emission line. Some can be tuned and will select features with a particular range of motion toward or away from the observer. His presentation is posted on the Club website documents page at Filters and Coatings for Visual Astronomy.

Old Business

- Treasurer's Report—The report for March showed no expenditures and receipt of dues from one member. Paid membership for 2012 has reached 23, and 3 members have paid dues for next year or beyond. Don Clark said that he had paid dues for 2 years in February, but it was recorded only as a single year's dues in the treasurer's report.
- Star Parties, Events, and Meetings—Mike Masters gave a star party report for the successful 17 March event at Caledon. Members present with Mike included Dan, Joe, Bart and Linda, and Leigh. We had a good turnout of visitors, including a guest astronomer and his wife from Manassas, and decent, if a little windy conditions.
- Status of Club Loaner Equipment—Two telescopes remained out on loan, and Joe Fordham arranged to check out the NexStar5 at the meeting. Mike said he was preparing to pass the webcam to Dave Bentz. Glenn said he still needs to make up a checklist form for loaner equipment.
- 5 June 2012 Transit of Venus—Glenn contacted Mr. Hoppe, a Stafford Parks representative who forwarded his request to Sheila Newton. They were happy to have us use Pratt Park and will put a description of the event in their summer brochure. Glenn said he asked about use of the gravel road with our vehicles for equipment setup, and he also asked about possible baseball or soccer games scheduled for that afternoon. In a discussion of possible locations, Mike said the hill is best, but down in the depression only gives up 5 degrees more near the horizon. Glenn said he had intended to bring in a book he has on transits, but unfortunately left it at home that evening. We discussed the possibility of having some inexpensive goggles made for viewing the Sun that could be used by those waiting for a chance to view through the telescopes. Glenn moved, with a second by Scott for the Club to buy 20 of the goggles. The vote was in favor.
- Star Party and Outreach Requests—Myron Wasiuta is working with Ann McDuffie of the Fauquier County Library system to arrange star parties for the County's three libraries. The dates planned are in the last week of July and first week of August. David Abbou has scheduled 28 April (Astronomy Day) for the event at Stafford Elementary School. Glenn is doing a Girl Scout event on that same date. Scott and Dan asked that information on these events be forwarded to them for listing on the Club Yahoo group (rac_group) and on the Night Sky Network, respectively. Mike Masters is working with Richard Kahler on an event for St. Margaret's School in Tappahannock with a planned date of 21 April or 28 April backup. Jerry said he would be able to go.
- RAClub.org Website and Rac_group Status—Mike had nothing to report on the Club website. Scott said there were only the photos and status reports on the observatory construction to mention for the rac_group Yahoo group.

News/New Business

- Star Party Requests—Mike Masters provided an update on the Northumberland Preservation, Inc. star party request. They chose the 10 November date offered. He will need volunteers, but did not think it was necessary to ask for commitments right away. They have preserved two schools that date to 1884 and 1906.
- Glenn said he went to Company 7 recently and while there was asked if he had any updates for the information about the Club that Company 7 has on its website. Glenn suggested Bart should look at it because he might not be able to do anything for a while.

Next Meeting

The next meeting is Wednesday, May 9, 2012, at the Central Rappahannock Regional Library Headquarters, 1201 Caroline St., in Fredericksburg. Introductions will begin at 6:45 p.m.

Submitted by Bart Billard, Secretary