

Rappahannock Astronomy Club

Minutes, February 11 2009 Meeting

In attendance:

- Brian & Pam Bailey
- Barton Billard
- Don Clark
- Brian Coltrane
- Brenda Conway
- Josephine Dodt
- Joe & Sherry Francis
- Leigh Gettier
- Glenn Holiday
- Tom Harmon
- Chris Law
- Daniel Lien
- Michael Masters
- Kathleen Murray
- Tim Plunkett
- Bernie Tretick
- Javier & Ruby Valverde
- Myron Wasiuta

Vice President Michael Masters opened the meeting at 7 p.m. after introductions around the room. Eleven visitors joined us: Brian & Pam Bailey, Don Clark, Brian Coltrane, Brenda Conway, Josephine Dodt, Chris Law, Kathleen Murray, Bernie Tretick, and Javier & Ruby Valverde.

Program

Myron presented the program on the twinkling of stars. For a science project, he and his daughter looked for a way to measure twinkling to find out what weather phenomena determine how much twinkling occurs. At some times, the stars can look bright and clear but in the telescope, they are hard to focus. At other times they can look dimmer but come into focus sharply in the telescope. Astronomers use the terms "poor seeing" and "good seeing" to describe this variation. The challenge for the project was to find an objective way to measure twinkling, so that it could be correlated with weather phenomena.

Myron illustrated twinkling with videos of Sirius made through a telescope. Instead of being a round point, the image shimmered irregularly, sometimes shooting out flares of light. Someone likened it to looking at something on the bottom of a rippling body of water. Sometimes the blob of light patches was dimmer and sometimes brighter. Sirius is wonderful to watch while twinkling. The flares of light can be different colors, although the video was monochrome and could not show that. Some times twinkling can be faster or slower.

Twinkling is known to be related to refraction (bending of light) by the air and turbulence. Cooler air is denser than warmer air, and because of density, the cooler air can bend the light path. Turbulence mixes patches of cooler and warmer air that cause various changes in the path of the light from a star. In a small telescope, the effect tends to move the image of the star around. In a large telescope, the effect tends to be just blurring because different patches of warm or cold air affect the light arriving at different parts of the telescope's large aperture. Consequently, different parts of the star's image are moved around in different ways, combining to form the blurred image.

Air near the ground or high above can be responsible for twinkling. Observatories on mountains avoid some of the atmospheric turbulence by being above as much of the atmosphere as possible. Amateurs can try to avoid looking over the top of roofs or other heat sources. Once Myron experienced turbulence from a neighbor's barbecue. The mediating effect of oceans can also reduce turbulence, which is one of the advantages for observatories on the mountains of Hawaii and the west coasts of continents.

On average, the air is more transparent in winter but the seeing is poorer, and the reverse is true in summer; however, turbulence and transparency otherwise tend to be unrelated. To measure twinkling, Myron and his daughter used a CCD camera (like a digital camera for telescopes) and turned off telescope tracking. They recorded over a period of time, 10 seconds for example, and obtained a track of

the star as Earth's rotation moved the telescope across it. Twinkling (turbulence) made the trails fuzzy and irregular. Myron and his daughter found they could break the track into line segments of various lengths, where the trail was relatively straight, and they could relate the amount of turbulence to the number of segments. They also tried measuring the width of the trails but found that method was not as sensitive.

Myron and his daughter found they could make colored trails. These consisted of three successive trails made with red, green, and blue filters, which the computer software could treat as an RGB image. The results were very colorful and interesting. Stars have different temperatures, leading to different colors, from reddish or yellowish cooler stars, to bluish hotter stars. Myron showed many beautiful examples of how the stars' colors come out in the trails they made.

The conclusion of their experiments is that the position of the jet stream showed the most correlation with twinkling. When the jet stream is overhead, turbulence is worse. Myron told us that we could find out about the location of the jet stream on the website <http://www.wunderground.com/>.

Star Party Reports

The January star party planned for Caledon was cancelled because of bad weather. The backup the following Saturday was not used because it coincided with the event at Motts Run. Myron provided a program for the Park Service at Motts Run, and several club members brought telescopes. Because of confusion about the gate, some members left without getting in. Mike explained the way the Park Service handles the gate to try to avoid future problems.

One member did not get the word about the Caledon backup date. Mike has discussed the procedure for communicating about star party cancellations on the Club e-mail forums. He provided his telephone number for people to call and check on schedule changes. It will provide an alternative in case the Club website cannot be updated in time to get the word out, or some people do not have Internet access on the day of the event.

February 21 is the next primary Rappahannock Astronomy Club star party date at Caledon. February 21 is also the next Fredericksburg Parks & Recreation astronomy event at Motts Run. Myron said that he has committed only himself for the Motts Run event programs. Club members are welcome to come if they want, but are not required to forgo Caledon to be there and participate in putting on the program.

Treasurer's Report

Treasurer Tim Plunkett presented his report. Eleven members have paid dues for 2009 so far. Members should pay their dues by the end of March each year. Tim last sent an update of Club membership to the Astronomical League. He said it was time for him to send another, and undertook to do so.

Old Business

DVD series from Astronomy magazine—Glenn was unable to supply the information on ordering the series, but will try to get it.

Help session—Mike showed the Club star party and event calendar and suggested possible star party dates to hold a telescope help session. Tim moved and Tom seconded the choice of May 23 and June 27 for the help session and backup, and the motion passed.

Galileoscope purchase pre-registration—discussion was deferred.

Borders events—Myron contacted the Borders manager and arranged the proposed dates. He said the Club is welcome to do more events; we just a need to call a few days ahead.

Pinnacle Research Station and Shenandoah NPS ecologist contacts—After contacting the National Park Service ecologist for Shenandoah, Mike learned that the dark sky study planned involves automated sky brightness monitoring. Club participation by scheduling an observing session at Pinnacle Research Station is not a possibility.

Discussion of alternative dark sky sites—Glenn is still looking into the possibilities. One location in a valley seems to be a good possibility, but he has not had a chance to check the sky overnight. Wintergreen is a resort with a suitable field for observing, but the only accommodations nearby are at resort rates.

Development of Boy Scout merit badge course—Glenn has a sketchy write-up with suggestions to accompany the merit badge requirements; he hopes to add details. He is looking into possibilities for supporting some events where scouts could work on the requirements.

Meeting format change: program order & help for beginners—Mike reported that Scott is agreeable to the program order change. Dan moved, and was seconded, that the program should be changed to the beginning when we have visitors.

Beginner's book list—Leigh is still working on the list. He left behind some books that he had used for his program in January. Mike brought them to this meeting for Leigh retrieve, and they were made available for visitors to look at during the meeting. Mike suggested members should volunteer to take sample books to future meetings to show visitors what is available for getting started in astronomy.

Change from Yahoo to Google for RAC_GROUP?—Scott and Mark were absent and the topic is deferred.

Social gatherings before meetings & in lieu of cancelled star parties—Mike suggested that we can continue to have ad hoc gatherings with members welcome to join if they can make it.

Plan for field trip to Green Bank in WV—Mark DeVito deferred.

Plan for RAC attendance at regional star parties—Joe Francis described some national and local star parties that could be possibilities. Among the top 10 national star parties are the Winter Star Party in February in the Florida Keys, offering good seeing and warm weather; the Grand Canyon Star Party in June; the Texas Star Party (April 19–26) with low humidity, which can make it dusty; and Star Fest in Canada in August. Nearby star parties include Green Bank Star Quest (24–27 June) near the National Radio Astronomy Observatory, camping only; Almost Heaven Star Party at Spruce Knob, West Virginia (22–25 August, usually earlier) tends to have 2 storms a week (this and the Texas star party can get scary storms); and Cherry Spring Star Party in Pennsylvania (18–21 June).

New Business

Mike acknowledged the appearance of an announcement of the meeting and program in the Weekender section of the Free Lance—Star thanks to the effort of Linda and Bart Billard. A show of hands during the meeting indicated about half of the visitors saw the announcement.

Next Meeting

The next meeting is scheduled for March 11, 2009, 7:00 p.m., at Central Rappahannock Regional Library Headquarters, Fredericksburg, Virginia.

Submitted by Bart Billard, Secretary