Rappahannock Astronomy Club

Minutes, September 17, 2014, Meeting

In attendance:

- Dawn Bateman
- Bart & Linda Billard
- Don Clark
- George & Monica Fresq
- Scott Gingrich
- Ron Henke
- Glenn Holliday
- Jerry Hubbell
- Scott Lansdale
- Tim Plunkett
- Adam Zwierko and 3 sons

President Jerry Hubbell called the meeting to order at 7 p.m. Nine members and seven visitors were present.

Program

Glenn Holliday presented “Prehistory and Cryptozoology of the Telescope.” He participated in a club outreach at this year’s Renaissance Faire and became interested in the state of astronomy in Elizabethan (1540s) England while doing research for the event. The Elizabethan period represented at the Faire was about 60 years before the invention of the telescope, but Glenn found several people were aware of the possibility and actively trying to develop one. People had been making lenses for many years. The earliest lens that has been found is the Nimrud lens from Assyria, about 2,700 years old. Eyeglasses were being used from the 1280s. In addition, hints of the possibility of the telescope include Roger Bacon writing in the1200s that a magnifying lens makes new stars appear where the sky appears empty to the naked eye, and Leonardo writing in the 1400s that a lens makes features on the Moon appear larger. Glenn said both were probably using a convex lens in a way that is now used in high school science experiments and noted that young eyes are needed to focus this kind of image.

Another development contributing to the eventual invention of the telescope was the camera obscura, in which a pinhole or lens in an opening to a room projects an image onto the opposite wall. One was first built by al-Haytham circa 1000. It was widely adapted by artists in the Renaissance for assisted drawing in the new perspective style.

Under the topic of “cryptozoology,” Glenn discussed references he found to “mystery beasts that never were (or were they?).” For example, European writers in the Middle Ages claimed a giant mirror in the harbor of Alexandria magnified distant ships and enabled the inspector to examine them as they approached the port. There were also claims of such mirrors at other harbors. Glenn said that the people who built the mirror at Alexandria never claimed it had such powers. Accurate curvature on such a scale was beyond the capabilities of the time. (It would have to have a center of curvature more distant than the ships, requiring a mirror many meters tall.) The mirror behind the myth was added by Romans to the Lighthouse at Alexandria to reflect the sunlight by day and firelight at night. The lighthouse was one of the seven wonders of the ancient world.

Leonard Digges, a prominent architect, surveyor, and landed gentleman of the reign of Henry VIII, built a portable camera obscura, a “perspective trunk,” for surveying use. It projected an image onto a parchment screen so that the image could be observed from outside the trunk. In 1571, Leonard’s son, Thomas Digges, wrote that he could magnify that image and read a broadside posted 2 miles away, saying he would write a paper on this subject. Glenn said that “Thomas Digges became England's first modern astronomer, the first to promote the Copernican model in England, and tried to develop a telescope.” Later in the 1570s, Thomas Digges sent his patron, Lord Burghley, a telescope design using an objective lens and mirror focuser. Glenn learned that Burghley sent this design to Royal Navy cannon inventor William Bourne. Bourne then proposed switching the elements to have a primary mirror and a lens for magnifying and focusing, and in 1580 he proposed a new design with two lenses. Glenn said that after the defeat of the Spanish Armada, Queen Elizabeth awarded Thomas Digges land and money for unspecified services to the Crown, suggesting a possibility the Royal Navy had a Digges telescope that helped in that defeat. However, although researchers have built the Digges design with modern

technology, the technology of the day was not sufficient to do so. Digges calculated that he needed a 12- to 16-inch lens and mirror, and the largest usable lens at the time was 2 inches. Glenn concludes Digges probably demonstrated the perspective trunk at a Royal Navy lookout post.

The period preceding and during the early development of the astronomical telescope saw a great deal of activity, as Glenn illustrated in his talk. Among the events he talked about were Fracastoro's 1538 account written in Italy of using two lenses to make objects appear larger and closer, John Dee in England writing about the military uses of the perspective glass in 1570, Italian Della Porto placing a mirror and lens in a camera obscura to enlarge the image, and Kepler's publication of *Optics* in 1604. When Hans Lipperhey demonstrated the first telescope in Holland in 1608, the result of all this activity was very rapid development. In the same year, a telescope was offered for sale at the Frankfurt Book Fair, and in 1609, telescopes were on sale in Paris. On August 2, 1609, Thomas Harriott in England observed the Moon through a Dutch telescope, publishing sketches of the Moon before Galileo. He also developed the first theory of refraction, which was lacking in both Bacon's and Kepler's *Optics*. In July to August 1609, Galileo made a copy of a Dutch telescope. He quickly improved the design, and in March 1610, he published his first observations. In his second telescope, he used the aperture stop that Lipperhey had introduced to use the central part of the lens where lens-making techniques of the time produced the best optical quality. By the end of his career, Galileo had advanced his telescope-making skills from 10 mm to 60 mm apertures, and his lenses were the best available at the time.

Scott Gingrich noted that the Frankfurt Book Fair mentioned in Glenn's talk apparently is a longstanding tradition still going on today. Adam Zwierko wondered about the selection of 2009 for the 400th anniversary of the telescope with all that Glenn related to us going on before and after 1609. Glenn thought it could be attributed to Galileo's name and all that he accomplished. A copy of Glenn's presentation is posted on the club website at the monthly programs page.

Old Business

- Treasurer's Report—Tim Plunkett sent July and August reports because he missed the club picnic in August. He reported paying Astronomical League dues in August and receiving a club dues payment in each month, bringing paid memberships to 27 for the year. There was a discussion of new members joining after the picnic and whether to apply their dues for the current year, the coming year or both. The general sentiment was that they should be considered members for both the remainder of the current year and the following year, but that the club bylaws should be consulted to be sure they allow that interpretation.
- Star Parties, Events, and Meetings—There were no star party reports for July because the weather was unfavorable on the day of the picnic and no event was scheduled for Caledon.

  Glenn reported on the status of plans for another Northumberland outreach in November. He said he sent an email in July but was slow in following up on the reply that came at the end of that month because of distractions from travel he had to do. The two best possibilities he was considering were the 1st or 15th, but the 1st turns out to be a conflict with other events for Northumberland Preservation. That leaves the 15th, with a dark evening sky and the Moon rising late, a good date but one Glenn already had another commitment for. Glenn did a poll and got five volunteers from those present interested in supporting the outreach, so we confirmed the plan to go on the 15th of November. Our next Caledon event was the 27th of September. The November Caledon date is the week after Northumberland.

  A request from Christie Denham of Wilderness Elementary for support of their "Observe the Moon" night on September 30 was brought up. She had tried to contact us before the last meeting, but various difficulties got in the way. Weather forecasts were somewhat unfavorable, but Ron Hencke was willing to support it if weather permits.
- Communications Committee Report—Terry reported the committee met a couple of weeks earlier and made some modifications to the home page of the website. The calendar was moved to the left column, and the widgets in the right column were updated with pictures that look less like drawings and more image-like. The ISS widget has been updated to use a plug-in that pulls current data to display in the text below the widget image. The archives by month near the bottom of the page were condensed to show the links as a single letter for each month with the year at the beginning. The page hierarchy was also simplified.

  Glenn said our site was the victim of a hack attack in August. It was fixed by the host site, and all our administrators changed their passwords. The spam filter continues working, but he found the

"SNR," the number of actual comments to spam comments, is about 1/1000, which suggests the comment feature is not useful enough. A motion was made to consider ceasing to allow comments, and it passed with no objection.

Bart Billard remarked that the outreach contact information link seemed hard to find, and Linda Billard added that the contact links pop up Outlook email, which is not what she uses.

- Newsletter—Linda said she was looking for contributors she has lined up for the next issue to try to send material before mid-October (in the next 2–3 weeks) to give her time to put the next issue together. When asked about a Northumberland report, she said it would have to go in the following issue.

New Business and Astronomy News

- Possible field trips—Jerry suggested members consider possibilities for a field trip. He mentioned Fan Mountain and the 30-inch Dobsonian observatory Myron told us about recently.
- Astronomy news—Bart gave a report on the Kepler Mission status. The repurposed mission called K2 was approved and has completed its first observation campaign. The K2 mission will observe about five target fields a year to maintain an orientation with balanced sunlight pressure on the solar panels while observing fields near the ecliptic plane away from the Sun's glare. Targets for each of these observation campaigns are selected from those proposed by the scientific community through the mission's Guest Observer program. Campaign 2 targets include globular clusters M4 and M80.

  Someone mentioned an app called Satellite AR that can identify satellites if you hold your phone up to them. Jerry told us a fixed telescope is all that is needed to use a camera to photograph geosynchronous satellites.

Next Meeting

The next meeting is on Wednesday, October 15, 2014, at the Central Rappahannock Heritage Center.