

# Rappahannock Astronomy Club

## Minutes, June 10, 2009, Meeting

In attendance:

- Barton Billard
- Scott Busby
- Don Clark
- Brenda Conway
- Victor Fisher
- Joe & Sherry Francis
- Rob Friedel
- Leigh Gettier
- Tom Harmon
- Glenn Holliday
- Dan Lien
- Michael Masters
- Debbie Sandler
- Tim Plunkett
- Javier & Ruby Valverde
- Myron Wasiuta

President Scott Busby opened the meeting at 7:30 p.m. with brief announcements about our meeting format and upcoming star parties, followed by introductions around the room. We had two returning visitors and one new visitor who looked for and found out about us on the web. Fifteen members were present.

## Program

Myron Wasiuta presented a program on the story of “Holton C. Arp and His Unusual Galaxies.” He had a copy of the *Arp Atlas of Peculiar Galaxies* by Jeff Kanipe and Dennis Webb, containing pictures of 338 unusual galaxies, most imaged by the Palomar 200-inch telescope. The second half of the book has an observing guide, with modern images and sketches. He said it is interesting to compare modern images with the old photos. Myron is working on a project to make images of as many as possible of the Arp galaxies.

Arp went to Caltech for his professional training, where he worked under Hubble. Arp was charged with photographing as many types of galaxies as possible and getting their spectra. Hubble and Arp found red shifts that increased with distance of the galaxies. It became important to pursue this phenomenon with larger telescopes. Trying to push the limits of distance with the 200-inch telescope revealed unusual galaxies. Arp decided to concentrate on finding such galaxies and making an atlas of them photographed in detail. They represent perhaps 2 to 3% of all galaxies.

At first, the reasons for their unusual appearance were not apparent but over time, researchers began to suspect interactions between galaxies could be responsible, and computer models were tried. Eventually models began to suggest the unusual galaxies could be the results of gravitational distortions. Myron showed a simulation available on YouTube, “Hubble Captures Colliding Galaxies,” in which Hubble photographs of similar galaxies are interspersed for comparison at various stages.

Later, in the 1960s, Arp learned of radio sources that seemed to associate with peculiar galaxies in the Southern Hemisphere. He began comparing radio source catalogs with his objects and finding similar associations. In particular, he began to see associations with quasars. Quasars, for quasi-stellar radio sources, are intense sources of radio signals too small to be distinguished from stars. At the time, they could not be explained. They were studied spectrographically, and for 3 years, the spectra did not make sense. Finally, one astronomer recognized the pattern of hydrogen lines in the infrared instead of the blue region where they appear in the hydrogen spectrum on Earth. Then astronomers recognized that the spectra were strongly red-shifted, indicating distances of billions of light years.

Red shifts of the unusual galaxies associated with the quasars indicate much smaller distances—on the order of hundreds of millions of light years. Over time, the majority of astronomers concluded associations between quasars and unusual galaxies are coincidental. Fluctuations in the emissions of

quasars show that they are light-months in diameter, very small compared with galaxies. These sizes, along with the billion-light-year distances, suggested their emissions are incredibly intense. The explanation now accepted by mainstream astronomy is that they are powered by black holes: energy comes out in beams like searchlights, making them appear intense when they happen to be pointed in our direction. This explanation is now supported by Hubble photographs in which the glare of the Quasar is blocked to reveal the faint surrounding galaxy.

However, Arp continues to believe the associations are not coincidental. He came to think that his galaxies appear to be ejecting matter, and that associated quasars are products of that ejection process. He contends his observations support this view. Although he cannot provide a physical explanation of what is happening, he believes the result is a non-cosmological red shift of the quasars.

Arp looked for and photographed galaxy and Quasar associations to try to show quasars are objects ejected from galaxies. Myron showed an example from the cover of Arp's book, *Quasars, Redshifts and Controversies*: a galaxy with a small red shift next to a Quasar with a large red shift—yet there appears to be a bridge of matter between them! It now appears, with the help of Hubble Space Telescope photographs, that the apparent connection is not real, just one of "Nature's dirty tricks."

Myron showed more intriguing examples, including NGC7603, the Leo Trio, and M82. M82 had an encounter with M81 in the past. Astronomers agree it is ejecting material because of a large number of O-type stars' stellar wind. There are a large number of quasars in the vicinity. The O-type stars appear to be a result of star formation triggered by the interaction with M81. Another "starburst galaxy" is M5, a galaxy interacting with the galaxy NGC5195.

Arp has paid a price for continuing to maintain that his observations show quasars' connection with the peculiar galaxies. He lost the use of the 200-inch telescope in 1980 when the directors decided his work was not an effective use of telescope time. Two years later, he lost his position in a power struggle between the Carnegie institute and Caltech over control of the observatories.

Myron finished with a brief slide show of images he has made with his telescope so far in his Arp galaxy photography project.

## Treasurer's Report

Tim presented the report for May. As of May 31, the Club has 17 paid members.

## Old Business

The star parties scheduled for May were the Westmoreland State Park backup, which was not needed, and a Caledon primary date that was cancelled due to weather. The Star Party events coming up are Skyline on June 20 and a Caledon Primary on June 27. On July 18, the Caledon date is also a merit badge clinic that Glenn Holliday is working on for Boy Scouts.

Gallileoscope purchase—Tim said that he has ordered the Gallileoscopes.

Club mailbox—Tim moved not to continue paying for a Club mailbox. The motion was seconded, and the Club voted in favor.

Universe DVD series—The Club agreed to go with a new package deal, the "collector's megaset" for \$59.99 with free shipping. It includes *The Planets* but not season 3, which did not look that worthwhile from the list of episodes.

Plan for RAC attendance at regional star parties—Scott said that the recommended event for this year, Star Quest, was already booked up. It was decided to combine the idea of a club trip to Star Quest with the Green Bank event Mark de Vito proposed, and begin planning for next year.

Future programs—Mark's friend Amber is only available for a Saturday presentation. It would have to be a special meeting, perhaps combined with a star party date.

Change from Yahoo to Google for RAC\_GROUP—The Club tabled this topic because we have not had anyone at the meetings to discuss the pros and cons.

Status of Club loaner assets—James has the Club CCD camera, picked up from Bart at the April star party. Bart has a software CD for it supplied by Tom and is taking CD to Club meetings to try to pass on to the current user of the CCD. Brenda has the Club Dob. Myron is still offering some of his telescopes as loaners.

## **New Business**

Mike had a program request for September 25–26 for Westmoreland State Park from the State Park service.

Myron said he is doing programs in June, July, and August at Motts Run.

## **Astronomy News**

Scott read a story on a Japanese spacecraft impact on the Moon, scheduled for June 10, the date of this Club meeting. Closer reading revealed that the timing was not favorable for viewing it from the U.S. east coast. He also read an account of recent measurements of the radius of the star Beetlegeuse that reveal it has shrunk by 15% since 1993. Beetlegeuse has not dimmed significantly in that time. According to the article, "the star is considered a red supergiant. Such massive stars are nearing the ends of their lives and can swell to 100 times their original size before exploding as supernovae, or possibly just collapsing to form black holes without violent explosions (as one study suggested)."

## **Next Meeting**

The next meeting is scheduled for July 8, 2009, 7:30 p.m., at the Pizza Hut, 1224 Powhatan St., Fredericksburg.

Submitted by Bart Billard, Secretary