The Meteor is the official publication of the Greenbelt Astronomy Club, Greenbelt, Md. and is distributed monthly as a privilege of membership. Articles and other contributions are welcome. Membership in the Greenbelt Astronomy Club is open to anyone interested in astronomy. The club meets on the last non-holiday Thursday of each month at 7:30 p.m. at the H. B. Owens Science Center. The Greenbelt Astronomy Club is a not for profit community based organization with the goal of encouraging public interest in science and education in general; astronomy in particular.

More detailed information on our club activities and organization can be found at our web site. The Editor of this newsletter, Albert T. Sheldon, Jr. Ph.D. can be contacted at: Greenbelt Astronomy Club

The Clubs location on the world wide web is: http://lheawww.gsfc.nasa.gov/docs/outreach/gac/GAC.html

Next Greenbelt Astronomy Club Star Party and Meeting

A star party is scheduled for Saturday, May 4th at James Wolfe Ball fields in Greenbelt. A map is available on the club web site. You are invited to attend and bring a friend with cookies. Since star parties are dedicated to observing the night sky, they will only be held if the sky is clear enough to permit observing. Star parties will not be held if skies are overcast or mostly cloudy.

The next regularly scheduled meeting of the Greenbelt Astronomy Club will be Thursday, May 30th at 7:30 PM at the H. B. Owens Science Center on Greenbelt Rd. in Lanham, Md. All events and meetings are open to anyone with an interest in astronomy. Theme for the meeting is “Titan -- Our Second Sister Planet” presented by Lou Mayo (Raytheon, NASA/GSFC). Abstract- Larger than some planets of our solar system, Titan is in many ways a better candidate for Earth's sister than the traditionally recognized planet Venus. The late Dr. Carl Sagan believed that Titan's cloud layers could consist of complex organic molecules, making the moon a likely home for life in our solar system. Currently, the Cassini spacecraft is transporting the European Space Agency's Huygens Probe designed to be released into Titan's atmosphere in 2004. Mr. Mayo's presentation will review our understanding of the physical properties of Titan based on data from the Voyager missions and current HST observations. Using historical data, Mr. Mayo will make the argument that Titan is a better candidate for "sisterhood" with the earth than is the planet Venus.

The Discovery of Galaxies

By G.W. Gliba

Although the Andromeda galaxy (M31) and the Magellanic Clouds to the far south have been visible to the naked-eye by humans since we evolved into Homo Sapiens, they were not considered external galaxies by all astronomers until relatively recently. As late as 1920, astronomer Harlow Shapley, in his great debate with astronomer Heber D. Curtis, at the NAS Meeting held in Washington D.C. that year, thought that the Milky Way was the entire Universe! The matter was finally resolved in the year 1944 when astronomer Walter Baade resolved the Andromeda Galaxy into individual stars with the 100-inch Hooker reflector at Mt. Wilson Observatory. So, it has been less than 60 years that we have known for certain that the cosmos is a very huge place; and full of many other far flung galaxies, each containing billions of stars.

However, there was some very good observational evidence before 1920 that the universe was enormous and that there were many other external galaxies. In the year 1917, the Mt. Wilson astronomer and optician George Ritchey, using the
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60-inch reflector, was the first to photograph novae (supernovae) in some "spiral nebulae". He saw them in NGC 6946, M81, M101 and NGC 2403. These observation were soon corroborated by the independent observations of Curtis at Lick Observatory, also in southern California, who also saw several novae (supernovae) in spiral nebulae. There were some astronomers at the time that didn't think these discoveries were very important. Harlow Shapley assumed they were only galactic novae, as he thought the "spiral nebulae" were inside the Milky Way. He was stuck in the old paradigm, and thus was not able to see the other additional evidence available to him at the time. Also, he put too much trust in the uncorroborated observations of spiral nebulae rotation, based on a few photographic measurements by the astronomer Adriaan van Maanen at Mt. Wilson Observatory.

There was more evidence after 1920, but before 1944, that some nebulae may be other remote galaxies. Some other astronomers, notably Edwin P. Hubble and Henrietta S. Leavitt, had known M31 and the Magellanic Clouds respectively, had several Cepheid Variable Stars in them, plus there was spectroscopic evidence from astronomers like Edward A. Fath, that most of the so-called "spiral nebulae" were a continuum of stars by the mid-1920s, just a few years after the great debate between Shapley and Curtis. Plus, there were thousands of apparently small faint nebulae, many of which were spirals in big telescopes that were found by the Herschels, Lord Ross, Lewis Swift, and others. This should also have been a big hint to astronomers that the spiral nebulae were the true "Island Universes" of the famous 18th century philosopher physicist Immanuel Kant.

After the mid-1920s, almost all astronomers, including Shapley, realized the importance of Ritchey's discoveries when the distance to M31 was found to be at least 600,000 light years away (it is really 2.8 Mly), using Cepheid variables and RR Lyrae stars as standard candles. That would also explain the historical superluminous nova in M31 in 1885 (S And), Kepler's star in 1604, and Tycho's star in 1572, as a very special type of dying star, called a supernova. This implied a great distance to the spiral nebulae, and that they were external systems of billions of suns. Unfortunately, Ritchey got little credit for his important discovery. Instead of getting the Henry Draper Medal, or other recognition for his discovery, George E. Hale fired George Ritchey in 1919 just after he finished making the 100-inch Hooker reflector mirror for him. There was ego conflicts between Hale, director Walter Adams, and Ritchey at Mt. Wilson during this time period; when Hale and Adams teamed up against poor Ritchey, he lost. It is unclear to me if it was justified, as all three men had huge egos, and frankly, were not very nice people. However, egos aside, George Ritchey never got the recognition I think he should have. Most of this saga is in the book, Pauper & Prince - copyright 1993, by Donald E. Osterbrock.

The first scientific speculation that some of the nebulae might be other galaxies can be attributed to the "Island Universes" hypothesis about the structure of the cosmos proposed by the German philosopher physicist Immanuel Kant around 1755. Although an Englishman named Thomas Wright published a new hypothesis in 1750, his galaxies were spherical shells, and he embellished them with his metaphysical speculation of an "Eye of God" at each center. Later, he abandoned this wrong notion and adopted something totally different, that was not pluralistic, and even more incorrect, while Immanuel Kant always believed his "Island Universes" were flattened disks of stars, a concept which he continued to develop using Newtonian mechanics as he grew older. He was a scientist, while Wright was a speculating clergyman. So, although the absolute proof that other external galaxies exist is only about 58 years old, the idea of Kant's "Island Universes", which included physics and telescopic evidence, goes back about 247 years.

References -
Walter Baade - a biography, copyright 2001, by Donald E. Osterbrock
Pauper & Prince - copyright 1993, by Donald E. Osterbrock
The Discovery of Our Milky Way - copyright 1971, Charles A. Whitney

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Moonstruck and Averted Vision
By Doug Love

Now that the club has a powerful and good `scope (That's powerful good!) we can see fainter objects than ever before, and we can look much closer at many of the bright objects we have already been studying. I have a warning and an asked-about technique to share in this regard.

A. Moonstruck
I have sometimes become moonstruck by looking at the full moon with a low-power eyepiece. Usually it deletes my night vision, and sometimes it gives me a short-duration headache. I'm not referring to going crazy by being out under the full moon, as the ancients used it. My recommendations:
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1. Use higher power for bright objects such as the Moon, Venus, and Jupiter. Yes, I got moonstruck by Jupiter on Astronomy Day!
2. Use a filter with low power. A Neutral Density (ND) filter should do nicely.

B. Averted Vision
Someone asked me about this technique at the Girl Scout camp the night before Astronomy Day, and it is worth rehashing for our members. Since our eyes focus with color-detecting cone cells that receive bright light, this leaves a shortage of rod cells that receive faint light when we are dark-adapted. Therefore, there is a blind spot in our dark-adapted eyes that you can find by focusing on faint distended objects and see them disappear. The simple answer is to look away from the object, but focus your attention on it. This takes practice. Right now, I am looking at these words but focusing my attention on my fingers below the computer. I can see them moving, but I can’t make out much detail. So I need to focus my attention on something closer, such as one of the icons on the screen. I can’t read the keys under them unless I look directly at them, but our dark-adapted eyes have a much wider attention focus. It’s a good skill to develop.

And while you’re developing your averted vision, try some of the ideas below, where averted vision has been made into a real science. Let me know how you do with it. It’s too big a universe to focus on!

Jeff Blanchard: "Averted Vision scale"

In the latest issue of the Webb Society "Deep Sky Observer", Ron Morales proposes a basic scale of averted vision in an attempt to quantify what we mean by averted vision. I don’t how many of us would want to use this type of technical scale on a regular basis, but keeping these concepts in mind when you take notes would be very helpful in comparing observations.

AV 1: The object is seen with averted vision, but once found could be seen occasionally with direct vision.
AV 2: The object is seen only with averted vision but is held steadily.
AV 3: The object is seen with averted vision only occasionally as it "comes and goes with the seeing conditions. In this case the object is seen more than 50% of the time.
AV 4: Again, the object is seen with averted vision only occasionally as it comes and goes with the seeing condition, but in this case is seen less than 50% of the time.
AV 5: The object is only glimpsed with averted vision after continuously viewing the field for a few minutes or more. This level of averted vision occurs when one observes a field carefully for a lengthy period of time. My notes indicate that this often occurs within the first three to five minutes of viewing the field.

Elrien

T’was the middle of Spring in 2001,
The night sky stretched out forever.
She was one and he was one,
But Astronomy brought them together.

Nature provided the beautiful weather,
At Northway fields in the city, Greenbelt.
A telescope showed the wonderful treasure,
That grand nebula in Orion’s Belt.

She was descended from some ancient Celt,
And he from a place of everything green.
Who knew that one day their hearts would melt,
Their engagement on Valentine’s Day was seen.

With loving hearts and the magic of stardust,
Bring light wedding plans for the tenth of August.

Below is a poem about how astronomy brought together Valerie O’Brien and Matthew Elliott.
May 5th Department of Astronomy at the University of Maryland, College Park hosts open houses at the Campus Observatory. On Open House evenings a guest speaker will give approximately a half hour talk about a topic in astronomy. During the May 5th open house, Dr. Mark Pound will speak on “Not Stars” at 8:15PM and at 9:00 PM, respectively. Viewing of celestial objects follows the talk through the observatory's telescopes, weather permitting. For more info call the Department of Astronomy at (301) 405-3001 weekdays 9:00 AM to 4:30 PM. Their web site has the most up to date info: http://www.astro.umd.edu/openhouse/oh.html.

May 11th Greenbelt Astronomy Club Star Gazing at James Wolfe Ball fields in Greenbelt, Md. Open to the public, no admission. Begins at dusk, scheduled to last until at least 10:30 PM. Since star parties are dedicated to observing the night sky, they will only be held if the sky is clear enough to permit observing. Star parties will not be held if skies are overcast or mostly cloudy.

May 11th Montgomery College at Takoma Park Campus Planetarium will present, at 7:00PM, The Search for Extra-Terrestrial Intelligence. Since Marconi invented the radio transmitter (1897) and we first started sending radio messages we have been announcing our presence to the technologically advanced civilizations of the cosmos. How likely is it that we have been heard? How likely is it that we have been visited before or after we started radio broadcasts, which go out to all of space? How would we go about listening for extra-terrestrial intelligence? What are we doing now about searching for extra-terrestrial intelligence? Come to this planetarium show and find out. Call (Phone: 301 650-1463 ) or visit their web site that has the most up to date info: http://www.mc.cc.md.us/Departments/planet/planet/SETI.htm.

May 20th Department of Astronomy at the University of Maryland, College Park hosts open houses at the Campus Observatory. Dr. Jim Stone will speak on “The Sun's Magnetic Field’ at 8:15PM and at 9:00 PM, respectively. See May 5th above for additional details.

Greenbelt Astronomy Club Board Meeting of April 18, 2002

By Valerie O'Brien, Secretary of the Greenbelt Astronomy Club

The members of the Greenbelt Astronomy Club met at 7:30pm on Thursday, April 18, 2002. The meeting was held in the Greenbelt Community Center. All of the Board members were present plus Ray Stevens and Tom Bridgman.

Club President, William McHale who dispensed with the reading of the March 28 meeting minutes, called the meeting to order.

Announcements:
- The Goddard trips to Caroline Furnace are scheduled for the weekends of April 12 – 14 and October 4 – 6, 2002. Contact Keith Evans with the Goddard Club at evans@umbc.edu for details.

Business Item: Membership Dues
- Please remember to pay your membership dues of $15.00 by bringing them to the next meeting or mailing them to: Greenbelt Astronomy Club, P.O. Box 727, Greenbelt, MD 20768. Make checks payable to the “Greenbelt Astronomy Club”.

Astronomy Day 2002
- The event will take place on Sat. April 20, 2002 from 6:00 – 10:00pm at the H.B. Owens Science Center, 9601 Greenbelt Road, Lanham, MD, 20706 (301) 918-8750, next to DuVal High School.
- George Gliba and Lynne Gilliland are making a generous donation of a handmade telescope to be raffled at this year’s Astronomy Day event.

Business Item: The Observatory Project Update
- Doug Love and Ray Stevens met with Celia Craze and Kristen Jalo of the Greenbelt City Planning Staff on Friday, April 5 to discuss the costs for the observatory construction. Two plans were discussed. The
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first plan, which involves a more elaborate design, would cost $55,187. The second plan, which is more simplified, would cost $30,000.

Business Item: Caroline Furnace Costs
- It was agreed for the Greenbelt Astronomy Club and the Goddard Astronomy Club to share equally in the payment of the negative balance for the Caroline Furnace site rental.

Business Item: GAC Website
- The club is considering various options for the official GAC Website. Currently Goddard Space Flight Center services it.
- The Board of Directors is currently exploring options regarding setting up a website independent of Goddard under the domain name of greenbeltastro.org which is currently owned by the Club. They have a goal for the end of the summer to have at the very least a mirror site of the Goddard Location set up.

The meeting was adjourned at 9:15 pm.

Greenbelt Astronomy Club Regular Meeting of April 25, 2002
By Valerie O'Brien, Secretary of the Greenbelt Astronomy Club

The members of the Greenbelt Astronomy Club met at 7:30pm on Thursday, April 25, 2002. The meeting was held in the H.B. Owens Science Center. There were 24 attendees.

Club President, William McHale who dispensed with the reading of the April 18 meeting minutes, called the meeting to order.

Announcements:
- The Goddard trip to Caroline Furnace is scheduled for the weekend of October 4 – 6, 2002. Contact Keith Evans with the Goddard Club at evans@umbc.edu for details.

Business Item: Membership Dues
- Please remember to pay your membership dues of $15.00 by bringing them to the next meeting or mailing them to: Greenbelt Astronomy Club, P.O. Box 727, Greenbelt, MD 20768. Make checks payable to the "Greenbelt Astronomy Club".

Treasurer’s Report: Doug Love stated that the club has $1022.87 in the operations account and $11,450.24 in the capital account. As of April 25, 2002.

Astronomy Day 2002
- Astronomy Day this year was a big success and very organized thanks to the Co-chairs, Tom Bridgman and Joel Miller. The event took place on Sat. April 20, 2002 from 6:00 – 10:00pm at the H.B. Owens Science Center, 9601 Greenbelt Road, Lanham, MD, 20706 (301) 918-8750, next to DuVal High School. Although it was cloudy most of the day, there was a break in the clouds about from about 9:00pm to 10:30pm, which allowed club members and the public to do some viewing of the night sky and the planetary alignment.
- George Gliba and Lynne Gilliland made a generous donation of a handmade telescope which was raffled at this year’s Astronomy Day event. And the winner was Evan Camera. The second door prize was also a Gliba 402 Power Telescope and was won by Matthew Early.

Business Item: The Observatory Project Update
- Doug Love and Ray Stevens met with Celia Craze and Kristen Jalo of the Greenbelt City Planning Staff on Friday, April 5 to discuss the costs for the observatory construction. Two plans were discussed. The first plan, which involves a more elaborate design, would cost $55,187. The second plan, which is more simplified, would cost $30,000.
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- Many thanks to Ray Stevens for presenting the Observatory dome on April 20, 2002, for the Public Works Open House Field Day. Many adults and children expressed interest in it.

Business Item: The Telescope Committee
- After about two and a half years of work, the 17.5” Dobsonian telescope is now completed and was used at Astronomy Day on April 20. Thanks are given to the members of the committee for all of the work put into the project. The members include: Ed Abel, Sue Bassett, Tom Bridgman, Forrest Hamilton, Joel Miller, Bill McHale, and John Settle.

Main Presentation: The Dynamic Universe, Paintings by Margaret Alleva
- A presentation of beautiful oil paintings was on display along with a slide show of some of the artist’s larger paintings, which were too large to transport. Margaret Alleva is a local artist located in Fairfax VA. Some of her work included renditions of the Orion nebula, Crab Nebula and the Seven Sisters as well as spiral galaxies. Her work will be on display at the Foundry Gallery at Dupont Circle for May 28 – June 23.

The meeting was adjourned at 8:30 pm.

The Greenbelt Astronomy Club
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Thanks to all that contributed articles to this issue of The Meteor