



STAR FIELDS

Newsletter of the
Amateur Telescope Makers of Boston
Including the Bond Astronomical Club
Established in 1934
In the Interest of Telescope Making & Using

Vol. 14, No. 10 November 2003

This Month's Meeting...

Thursday, November 13, 2003 at 8:00 PM

Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics

OUR GUEST SPEAKER will be Joshua Roth, Senior Editor of Sky & Telescope Magazine. The title of his talk will be, "A New Chapter in Cosmology: Dark Energy and the Accelerating Universe". Cosmology is undergoing a quiet revolution, thanks to a flood of outstanding data and an eruption of computing power unimaginable for most of the 20th century. Hotly contested numbers like the Hubble

Constant have been pinned down with parts-per-hundred precision. And one of the biggest surprises -- the discovery that the universe's expansion is speeding up -- actually solves a number of cosmological puzzles, most notably the paradox of a universe younger than the stars it contains.

Sky & Telescope senior editor Joshua Roth will take us from Edwin Hubble's discovery of cosmic expansion to today's dark-energy-dominated runaway cosmos. An editor at Sky & Telescope since 1995, Joshua Roth got a bachelor's in astronomy at U.C. Berkeley, where, in his spare time, he designed gamma-ray detectors for studying nuclear reactions in solar flares. After three years of scuba diving, radio astronomy, house painting, office work, and shrimp farming, Josh took up graduate studies at Caltech, where he measured the effects of dark matter on the motions of spiral galaxies. Josh recently edited Stephen James O'Meara's second in-depth field guide, Deep-Sky Companions: The Caldwell Objects, and now writes about

the science and the hobby of astronomy for Sky & Telescope, Sky Watch, and SkyandTelescope.com.

Please join our speaker for a pre-meeting dinner at 5:45 PM (seating at 6:00 PM) at the Changsho Restaurant located at 1712 Mass Ave. in our fair city, Cambridge.

-Eileen Myers, President-

President's Message...

HOW EXCITING IT WAS setting up for a star party when suddenly the sky was ablaze with a spectacular aurora! In Lynnfield it all began at about 6:50 PM with an intense pink patch in the NW that soon turned into brilliant magenta, extending about 80 degrees high. About two minutes later, just West of the patch, many greenish-white rays appeared, like spokes on half of a bicycle wheel. This must have been an auroral corona. We remarked at how the rays had very distinct edges to them. The aurora continued to develop towards the West, where arcs of red began to appear. Soon the entire field up to the zenith was encircled by the aurora.

A second wave arrived around 7:25 PM, this time more red but not as intense, the patches varying from very faint to very bright. Then the lecture indoors ended and youngsters with parents streamed through the doors and entered the field. They were eager to see Mars and the night sky, but we kept an eye on the aurora too. We argued with each other about whether there were wave-like pulsations in the diffuse greenish-white glow that was all around us.

We called back and forth to each other as different colors appeared. Someone reminded us that each atmospheric gas glows with a particular color, depending on its electrical state (ionized or neutral) and on the energy of the particle that hits the atmospheric gas. Oxygen produces the brilliant red aurora at high altitudes and the bright yellow-green at lower altitudes. Ionized nitrogen molecules produce blue light; neutral nitrogen glows red. The nitrogens create the purplish-red lower borders and ripple edges of the aurora. Later a useful table was found on the Internet:

Red - Oxygen, above 200 km (above 125 miles)

Blue - Nitrogen, between 100 and 200 km (60 - 125 miles)

Green - Oxygen, hit by secondary electron (after Nitrogen) between 100 and 200 km (60 - 125 miles)

Crimson/purple/violet - Nitrogen, above 100 km (above 60 miles)

We also wondered about the lighter gases high in the ionosphere, like hydrogen and helium. They make colors like blue and purple, but our eyes cannot always see them in the night sky. They show up better in photographs.

I found a website with some tips that may be helpful in determining whether there is a chance of seeing an aurora: <http://sec.noaa.gov/pmap/> *-Eileen Myers-*

October Meeting Minutes. . .

Eileen Myers opened the 763rd meeting of the Amateur Telescope Makers of Boston with a short excerpt on the History of the club focusing on the Optical Company Itek of Lexington, MA started by a group of ATMob members during the early 1940s. This was followed by the main speaker Mark Daigle of President & CTO of Optical Alchemy Inc. Mark spoke to us about the architecture and presented an overview of the upcoming James Webb Space Telescope (JWST) slated for launch in 2011. This is a huge telescope with a 6 meter Beryllium mirror. At almost twice the size of Hubble's mirror this one will be much lighter due to a radical design that uses 18 segmented thin mirror sections that will be actively aligned to act as a single surface. The telescope will be used primarily in the infrared region of the spectrum and due to this the telescope and especially the 3 science instruments must be kept very cold. The telescope will be kept cold through shielding from the sun and heat sinks to radiate heat out into space. The instruments will be cryogenically cooled using liquid helium. This of course puts a constraint on the useful lifetime of the telescope which had been designed for a 5 year mission. Northrup Grumman is the prime contractor building the telescope. The mirror is being made by Ball Aerospace. The European Space Agency is part of this project as well, supplying two of the science instruments and the Ariane-5 launch vehicle. The most impressive aspect of the whole project is the fact that the whole thing will be folded up like an accordion in the nosecone fairing of the launcher and then be required to unfold itself up in space to tolerances on the order of nanometer accuracy; an unprecedented feat of engineering indeed. The primary purpose the JWST is to study very early galaxy formation and the beginnings of the universe. The telescope will be located at the L2 Lagrange point and hence will be unserviceable as Hubble has been.

The business section followed the speaker. Reports were given by club officers. John Reed informed us of the ongoing work to dig drainage and power trenches out by the observatory and requested a good turn out for the next work party. Three star parties were announced – Lexington, Lynnfield, and Plaistow, NH. Eileen let us know that the new Club Shirts are available for purchase. These are cotton collared shirts with a pocket and the club logo embroidered on the front. Mario Motta provided some more details on the 2006 eclipse trip and informed us that he was not collecting any money until hotel confirmations had been made. He announced the arrival of the 2004 Calendars and provided the latest on Janet Mattie's health. Michael Carnes was given a warm farewell as he heads off to Utah. The meeting concluded with slides presented by Dick Koolish of his trip to Denver to the annual meeting of the Antique Telescope Society.

–*Michael Hill*–

Treasurer's Report...

As of October 31, 2003:

Checking account balance: \$13,958.74

Money market savings account balance: \$30,566.87

Of that:

Land fund: \$2,984.96

Clubhouse key deposits: \$155.00

For October:

Receipts: \$739.34

Expenses: \$3016.26

Net outflow: \$2,276.92

– *Gary Jacobson, Treasurer* –

Membership Report...

To be presented at meeting.

– *Shilpa Lawande, Membership Secretary* –

Clubhouse Report

During the last work party, we dug two parallel trenches about 18" deep in order to install conduit for power and data to the Ed Knight Observatory. We rented a trencher and first dug a trench for the 1 1/2 inch diameter conduit (power). Once installed and covered, we dug the next trench for the 2" data conduit. Both are gray PVC made for electrical jobs. Work still needs to be made to run wire and data cabling (fiber optic) from the clubhouse to the observatory. Thanks to: JOHN REED, JOHN PANASWICH, BRUCE GERHARD, SAI VALLABHA, BRIAN MAERZ, DICK KOOLISH, ED KNIGHT, JOHN BLOMQUIST, STEVE CLOUGHERTY, WELCOM BENDER, AND KARL COEOECKE.

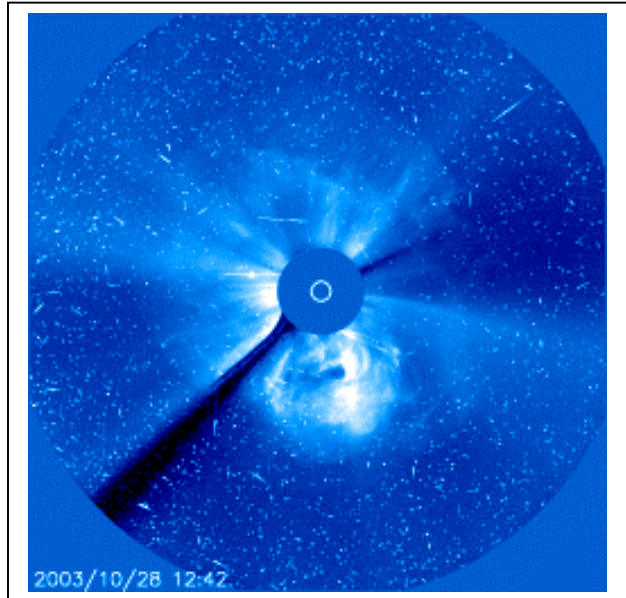
– *Paul Cicchetti* –

Clubhouse Saturday Schedule

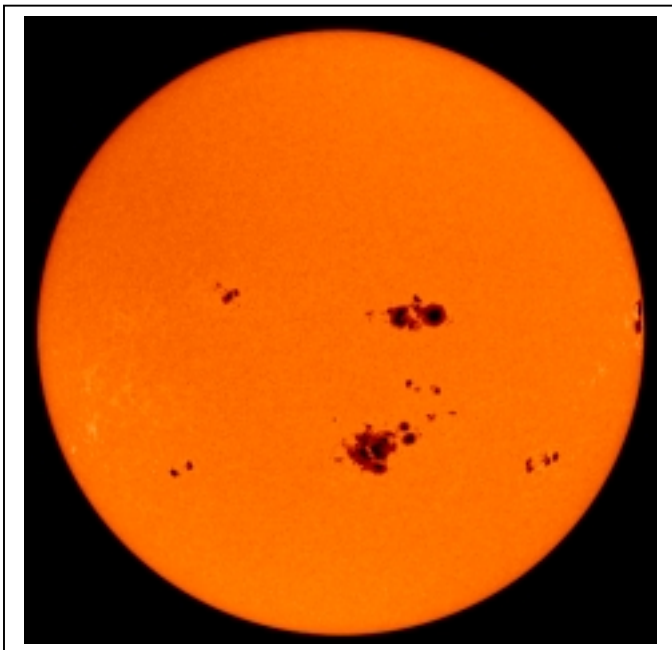
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|-------------|------------------|---------------|
| November 1 | Rick Burrier | Brian Maerz |
| November 8 | Gary Walker | John Reed |
| November 15 | Rich Nugent | John Small |
| November 22 | Phil Rounseville | Eileen Myers |
| November 29 | Bruce Berger | Mike Hill |
| December 6 | Dan Feldkhun | Peter Psychos |

Solar Activity and Auroras

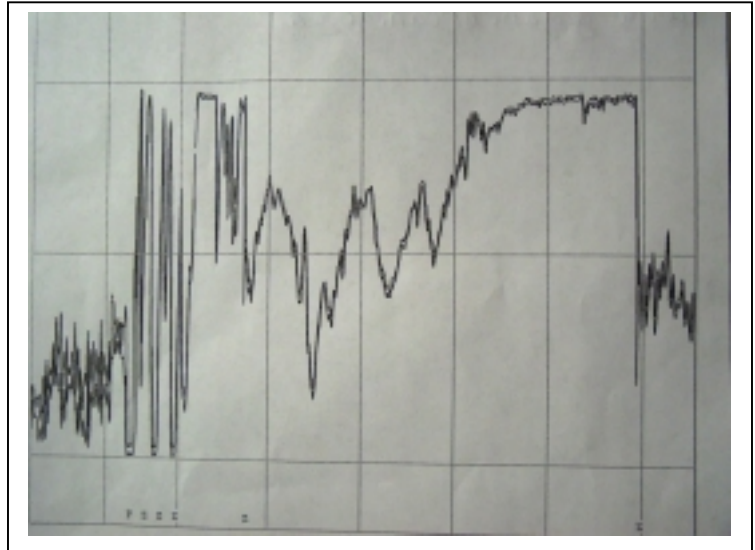
Late October proved to be quite a treat to solar observers with some of the largest sunspot groupings in recent memory and certainly ranking amongst the largest seen in this solar cycle. Along with the magnificent views, these active regions of the sun proved to be even more so with two extremely powerful X-Class flares erupting within two days, accompanied by Earth Directed coronal mass ejections (CME^s). And along with these, low and behold, came – Clouds – (Just kidding) Yes we finally got auroras!! Pictures of the auroras could not be done justice in the newsletter so I'll leave those for the meetings but here is a sampling of the activity that lead up to them including a great magnetometer trace recorded by Ed Los using his homemade magnetometer in Nashua on the 30th of October. Here is graphic evidence of the intensity of the geomagnetic storm. –*Michael Hill* –



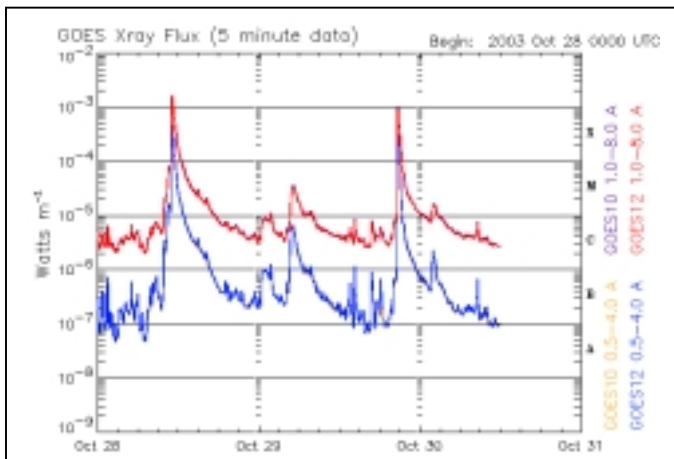
The Earth directed Coronal Mass Ejection (CME)



Two Giant Sunspots Cross the Sun – Late October



Magnetometer trace of a portion of the resulting geomagnetic storms - Ed Los – October 29- 30th



Two X-Class Flares - October 28th and October 29th



An excellent shot of the Aurora by Tom Bergman

The James Webb Space Telescope

After attending the last meeting of the ATMoB, which was all about the architecture of the next space telescope now named the "James Webb Space Telescope" (JWST) I came away with a bad feeling about it. I felt it was too complicated to be guaranteed to work, and that it would certainly be very costly. Given that it was only going to have a 5 year lifetime I really questioned the merits and the need for such a costly venture in these lean economic times. Could we really justify such a thing? If I was thinking this, what would the general public think? I decided to get more informed so sought out a web site that might focus on the JWST. There was indeed a web site with a myriad wealth of information, and of course lots of this meant to sway the public to become proponents of the next BIG venture in space science.

I myself was swayed by the least technical but most informative material made available at this site. The simple down to the facts FAQ list (Frequently Asked Questions). Here I really got the low down on the reasons for building this telescope, the implicit needs, and the cosmological questions that astronomers were going to try to answer with this new tool. And best of all I learned that the telescope was in fact going to cost less, much less, than the Hubble telescope. OK, we're not taking into account cost overruns and all, but given that the estimated cost is one quarter that of Hubble, I think there is room for overruns which, as we know, are a part of life in the technology of space.

What really helped sway me, once the cost thing was out of the way, was the science that this telescope is slated to accomplish. This is an infrared telescope and one that is very sensitive. Infrared light cannot penetrate the Earth's atmosphere. To see it we must be in space. The primary goals of this telescope are to study galaxy and planet formation. The galaxies that astronomers want to study, however, are not the nearby ones, but instead the very, very distant ones formed as close to the beginning of the universe as possible – the very old ones. These are so distant in fact that all the light, even the ultraviolet has been shifted into the red end of the spectrum, and even beyond to the near and mid-infrared regions. The extreme sensitivity in the infrared will allow astronomers to see galaxies that are older and more distant than ever seen before. Closer to home, observations of star and planet formation within thick dust clouds will be possible due to the nature of infrared light not being blocked by the very large dust particles. Astronomers will therefore be able to explore activity and objects in nearby star forming regions that have also never before been seen at visible wavelengths.

So the James Webb Space Telescope really is a telescope that astronomers do need, to continue delving deeper into the formation of the universe, and the formation of stars and planets in a way not at all possible with ground based telescopes no matter how big or how sensitive. Given that

we as a society want our scientists to continue the discovery process that has been going on for thousands of years, this tool certainly is worth the time, and effort and expense that it will cost us, even in these economic times. The knowledge gained will undoubtedly go far in solving the mysteries of space, and answering the fundamental questions about the expansion of the universe, its' age, and of course, its' ultimate fate.

- *Michael Hill* -

Star Party Thank You's...

Marlborough Middle School

On Wednesday October 1st, we had our annual Marlborough Middle School star party. It was as usual a great success and everyone, children, parents, and teachers were happy to have this as last year we missed out due to weather. Viewing was of the Moon and Mars primarily with a few extras for those that stayed on later. Many thanks to those that helped out. JOHN BLOMQUIST, ERNIE GINETTI, MIKE HILL, STEVE SARGENT and son COREY. -

Steve Sargent-

Star Party Statistics...

I WOULD LIKE to congratulate all of the star party area coordinators for running 30 star parties between August 2002 and July 2003, with a total attendance of over 6,000. I appreciate the help of everyone who brought telescopes, lectured, directed traffic, gave out materials at tables and helped in so many other ways. I appreciate all of your efforts. We had a fantastic year! I would also like to thank Eileen Myers for all of her support in helping me get star party announcements and thank you's into Starfields. -*Charlie McDonald*-

Obituary . . .

HARRY STUBBS WAS a Bond Club member. He was mentored by Donald Menzel and wrote early articles about Mountains on Mars. Harry loved writing about the future in a realistic manner. He was a wonderful, quiet man who preferred the company of Science Fiction and who attended many conventions. He died quietly in his sleep on October 29th, 2003. His science-fiction persona was Hal Clement. He is fondly remembered. -*Anna Hillier, Historian-*

The following biography was found at
<http://www.geocities.com/gamgeephile/hal/hcbio.html>:

Hal Clement (Harry Clement Stubbs) was born in Somerville, Massachusetts on May 30, 1922, to Harry Clarence Stubbs and Marjorie (White) Stubbs. He grew up in Greater Boston, attending schools in Arlington and Cambridge, finishing Rindge Tech in 1939.

He received his B.S. in astronomy from Harvard in 1943, an M. Ed. from Boston University in 1946 (G.I. Bill) and an M.S. in chemistry from Simmons College in 1963 (Sputnik panic).

Upon finishing Harvard, he entered the Army Air Corps Reserve, received pilot wings and lieutenant's commission at Stewart Field, New York, in March 1944, and flew 35 combat missions as copilot and pilot in Liberator (B-24) bombers with the 8th Air Force. Recalled to active duty in 1951, he spent eight months as a squadron executive officer at Bolling Air Force Base and sixteen months as a technical instructor at the Armed Forces Special Weapons School in Sandia Base, New Mexico. He retired from service as a full colonel in 1976.

His interest in both science and science fiction started in 1930 when he saw a Buck Rogers comic strip featuring a space ship en route to Mars. His father, an accountant unable to answer young Harry's scientific questions, took him to the local (Arlington) public library; he returned with an astronomy book under one arm and Jules Verne's **Trip to the Moon** under the other. His first story, "Proof", appeared in the June 1942 issue of **Astounding Science Fiction (now Analog) Magazine**, and his first novel, **Needle**, serialized there in 1949. His best known story, **Mission of Gravity**, appeared in 1953 and has been in print most of the time since. Other well known novels are **Iceworld**, **Close to Critical**, **Star Light**, and **Still River** (DelRey, June 1987; paperback February 1989). **Fossil** was published in November, 1993 by Daw Books.

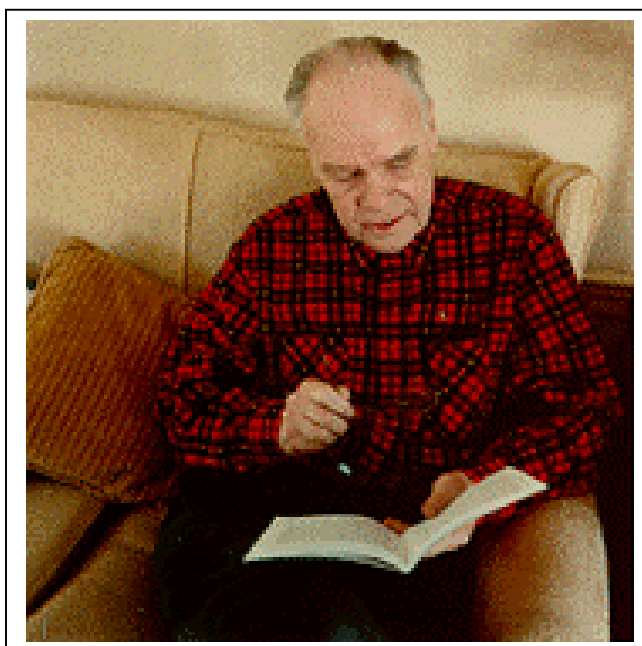
Mr. Stubbs married Mary Elizabeth Myers in 1952. They have two sons, George Clement and Richard Myers, and a daughter, Christine (Mrs. David O. Hensel). Hal has a grandson, Jackson Clement Stubbs (Warning: Hal carries pictures).

Hal Clement is now a 23 gallon Red Cross blood donor, and hopes to reach 25. He taught high school science for

forty years, two in a public school and 38 at Milton Academy in Milton Massachusetts, from which he retired in 1987. He has served the New England Association of Chemistry Teachers as a Division Chairman, in various positions for its regular Summer Conferences, and finally as President. He is an honorary member of NEACT and of Aula Laudis, an honor organization of high school teachers.

Since 1972, he has also painted astronomical and science-fiction art as George Richard. It is assumed by fans that Star Trek honored Hal by naming the U.S.S. Clement in his honor.

Tidbit for fans: How Hal writes his stories... On a 3x5 index card, Hal writes a scene, conflict or idea related to a plot he has in mind. When he has collected many dozens of these cards, then he sets about to arrange them on the floor into a coherent story until the plot requirements are fulfilled. Only when he has a satisfactory story laid out in front of him will he begin to type it in.



December *Star Fields* deadline
Sunday, November 30th

Email articles to Mike Hill
at noatak@aol.com

POSTMASTER NOTE: First Class Postage Mailed November 7, 2003

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c/o Shilpa Lawande, Membership Secretary
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How to Find Us...

Web Page www.atmob.org

MEETINGS: Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION listen to WBZ (1030 AM)

CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.

Heads Up For The Month . . .

To calculate Eastern Standard Time (EST) from Universal Time (UT) subtract 5 from UT.

November 8 Full Moon – Total Solar Eclipse
November 16 Last quarter Moon
November 17 Leonids peak
November 19 Moon near Jupiter in early morning sky
November 20 Venus passes 5' south of mag 4.2 – 44 Ophiuchi 5 p.m.
November 23 New Moon
November 25 Moon near Venus just after dusk
November 30 First quarter Moon