



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. 19, No. 9 October 2007

This Month's Meeting...

Thursday, Oct. 11th, 2007 at 8:00 PM

Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at CfA is allowed for duration of meeting

This month we are happy to welcome Dr. Lisa Kaltenegger, astrophysicist from the Harvard-Smithsonian Center for Astrophysics. Her research is focused on the search for extrasolar planets and the simulation of detectable planetary atmospherics. Dr. Kaltenegger and her colleagues have built a model of Earth's evolution over geologic time, noting its detectable biomarkers and the signatures of life found in our atmosphere. This model is the basis of comparison for analyzing light from planets in distant solar systems. By looking for similar spectral characteristics, indicators of atmospheric composition, scientists in the near future may be able to determine if the planet harbors life – and at what stage that life form may be in its evolution. Using such telescopes as Kepler, James Webb Space Telescope (JWST), Darwin and Terrestrial Planet Finder (TPF), and masking the star light, the light from small Earth-like planets can be collected and analyzed. Join us for what promises to be an intriguing talk: signatures of life on extrasolar planets.

Please join us for a pre-meeting dinner with our speaker at 5:45PM, Chang Sho Restaurant located at 1712 Massachusetts Avenue in our fair city, Cambridge, MA.

~ Virginia Renehan ~

President's Message...

This month marks the 50th anniversary of the surprise launch of the Russian satellite Sputnik, on October 4th, 1957. The small, 184 lb. ball orbited the Earth once every 98 minutes, transmitting at 20 and 40 MHz. With its famous A-flat, beep-beep-beep radio signal, it was the first

artificial satellite to orbit the Earth. Conventional thinking at the time was the Soviet Union might use the technology to launch a nuclear missile at the United States. Professionals and amateur astronomers alike were recruited to help pinpoint Sputnik's orbit around the Earth. This was the dawn of the space age – and no surprise that amateur astronomers, including some of our own ATMoB members, were there.

A key search on the internet for "Sputnik" yields interesting results including several short stories commissioned by the BBC, a New York Times retrospective on Sputnik including an audio file of the transmission, and a nice article by *Sky and Telescope* in which ATMoB members Anna Hillier and Paul Valleli among others, remember their experiences during the first few days after the launch of Sputnik 1 and Sputnik 2. For those who haven't seen it yet, there is also an interesting account in the ATMoB club history book.

ATMoB's own Anna Hillier is credited as the first amateur astronomer in New England to spot the satellite as its orbit passed over Cambridge on October 12th, 1957. Two articles at www.sas.org, the Society of Amateur Scientists web site, are first-hand accounts written by Anna, in which she shares her experiences on the roof of the CfA, as a participant in Project Moonwatch, and describes the transit telescopes designed specifically for satellite tracking. Project Moonwatch was organized in 1955 by Fred Whipple, then director of the SAO, who recognized that amateur astronomers could be instrumental in tracking the first US-made satellites. Even though the US Vanguard satellite program was for all intents and purposes a failure, by October 1957, scores of amateurs all over the world were ready to go into action, with home-built spotting telescopes and a commitment to doing real science to aid the professional community.

When news of the launch of the Russian satellite Sputnik reached the West, the Moonwatch network was the only one world-wide prepared to search for and track Sputnik, and relay its orbital coordinates to the professional scientific community.

Since that time, the amateur scientific community has developed a highly successful and rewarding partnership with the professional community. Today, members of the AAVSO contribute thousands of variable star readings annually, helping to augment a catalog of observations begun in 1911. And anyone with a computer, internet access and some spare time can be part of the Stardust@home initiative. The Stardust investigation team has enlisted amateur astronomers to hunt for interstellar dust in the microscopic images taken from the Stardust comet-hunter aero gel collector. These are only two of many collaborative efforts in which amateurs can play an important part.

This month we proudly acknowledge and celebrate the contributions ATMoB members' Anna Hillier, Ed Knight, and Paul Valleli and other amateur scientists world-wide have made to the fields of astronomy and space science since 1957.

As always, if you have any questions, feel free to contact me at vrenehan@gis.net. Clear Skies!

~ Virginia Renehan, President ~

Sept. Meeting Minutes . . .

The September meeting of the Amateur Telescope Makers of Boston and the Bond Astronomical Club featured ATMoB member and astrophotographer extraordinaire, Neil Fleming. His talk on Astrophotography allowed him to highlight some of his amazing images. He described some of the requirements and limitations that he encountered in the Boston area and elaborated on the equipment needed for image acquisition and processing.

To start his discussion, Neil linked up with his observatory in Walpole, MA, through his cell phone's cellular broadband connection and started a fully automated image centering, focusing and acquisition of the Veil Nebula in Cygnus.

Fleming then asked a question many have asked: "Why even try from Boston?" His answer was, "Because you can get reasonable results." He then proceeded to show some deep sky images such as the Tulip nebula, M3 and the Propeller Nebula. He also explained that good planetary images can be acquired from these skies. He pointed out the great work of John Boudreau who has been imaging planets from his home in Saugus. Since Neil's passion is deep sky work he focused his lecture on imaging those objects.

In the deep sky imaging realm there are 2 paths one can take. The 1st type is RGB (Red, Green and Blue). An RGB one shot cameras such as the DSLR (Digital Single Lens Reflex) cameras typically have micro filters attached to each pixel. In order to emulate what the eye sees, the different colored filters are laid down in a pattern called a Bayer array. Unfortunately, as Neil points out, there are more green pixels than red or blue pixels. It is easy to work with but you are losing resolution. The preferred method is to use a monochrome camera and add a filter wheel. "Imaging on bright objects such as the Orion Nebula (M42), M31 and M27 can be quite satisfying." The RGB filters let in the full spectrum but it also picks up light pollution gradients which are hard to eliminate.

The 2nd method is narrowband imaging. "Where a broadband filter will let in 200 nm of width of wavelength, the narrowband...will let in only 3 to 13 nm of light." The most popular ones to use are Hydrogen alpha (Ha), Sulfur (S2) and Oxygen (O3). Since the filter lets so little light through the exposures must be longer "but the result is clear and deeper images."

Fleming then moved on to the equipment requirements. His view is that "by far and away the most important doodad that you can buy is a good mount." His contention is that "half your money should go into the mount the other half split between the camera and the scope."

Neil then discussed the many camera options that are available. They include the DSLRs, one shot color CCD cameras and mono CCD cameras and their filter wheel

attachments and guiding accessories. The major cameras are SBIG, FLI, Apogee, Starlight Xpress, QSI, Canon and Nikon. For a great deal he highly recommended the Meade DSI Pro because its price is extremely attractive at \$49 to 80 dollars especially for someone experimenting with imaging.

RGB and narrow band filter options were extensively discussed. Some of the major vendors are Astrodon, Custom Scientifics, Baader, and HuTech (IDAS filters). Fleming's comment on what filter to get is that it is "difficult to say what's better. It's a price/performance thing."

The question of who has the best image capturing software has generated a great deal of controversy in the astro-imaging community. SBIG uses CD Soft and CCD Ops. Since Maxim DL allows both image capture and processing, it is the best value, although it has an expensive fee structure for upgrades. Neil prefers Maxim but both programs work well.

Programs that Fleming uses for image processing are CCD Stack, Adobe Photoshop and plug-ins from Russell Croman and Noel Carboni to name a few.

Neil then described his astrophotography journey beginning with his first mount. It was a Takahashi NJP, German Equatorial Mount (GEM) on which he placed a good refractor and a Meade DSI one shot color camera. His imaging moved farther into the RGB realm with his acquisition of a mono Meade camera. He progressed further when he got an SBIG ST2000 and a Takahashi FSQ102 refractor, one of the best wide-field imaging scopes in his view. His current setup is a Paramount ME, a TMB 203 refractor and an SBIG STL6303 CCD using narrowband filters.

The final subject dealt with the workflow to produce an image. First you wait for a clear sky night. Once imaging is initiated, Neil would typically invest 20 to 40 hours of total exposure time for the narrowband image. He also reminded us not to forget the darks and flats. His darks are built up from a library and he takes a "dawn" flat at the end of the night.

After he has acquired the images he proceeded to calibrate them, performed a dark subtract, registered, aligned and averaged them all with CCD Stack. He then converts the image into a TIFF (Tagged Image File Format) file and finishes image processing in Photoshop and sends the image to the website. Neil has taken up to a week or more to process an image. "The short answer is that it takes a long time."

Before Fleming concluded he linked into his observatory to see how the imaging was going. He did a quick calibration on one 30 minute O3 image so that we could see it on the screen.



(L-R) Neil Fleming and IC1805 "Heart Nebula"

The Treasurers, Membership Secretary, Secretary and Clubhouse reports were given.

Virginia reported that Eileen Myers is working on the *Sky and Telescope* magazine collection at the clubhouse. If anybody is able to help placing the magazines in the binders please contact Virginia or Eileen or just come down to the clubhouse and lend a hand. It is hoped that there will be two sets of each issue going back to the dawn of *Sky and Tel*. The extra issues were sent to a literacy Project in Westford and will go to students around the country and abroad. She also reported on the chimney repair by Jim Sullivan from Londonderry, New Hampshire.

Virginia also reported on the work of the Telescope Advisory committee and the Executive board to revive the Observing committee. The Observing committee is now chaired by Steve Beckwith, John Mahr and Mike Matti and they will be working closely with the Clubhouse committee to move a number of projects forward.

A reminder was given for upcoming star parties, including the Chelmsford star party next Saturday.

A dome raising party is also scheduled for next week at Fred Ward's house. Fred is the person that donated the 14 inch Celestron to the club along with a Bino viewer, a host of eyepieces, software and other astronomy gear. Bruce Berger will be sending out a reminder e-mail to ask for volunteers to help out with this project.

Halden Menali talked about his July trip to put on the first mirror making workshop in Turkey. A Turkish University that supports Astronomy paid for all his and Dick Parker's travel expenses and all materials for the workshop. He also showed pictures of the participants grinding, polishing and testing their mirrors. The Turkish group has now expanded to 165 members in at least 12 cities and towns. Half of them are now making their own telescopes.

Paul Valleli spoke to the membership about the history project of making live recordings of various members. Paul and Virginia started with Ed Knight. The recording came out well and Al Takeda has succeeded in transcribing that recording and will be able to place this on the web site.

Paul also received a photo of a mahogany telescope from the Clarks Trading Post in NH and he went up to investigate. While it had no glass in the objective or any eyepieces, he discovered that it was a Henry Fitz refractor. He also reported on his Astromart purchase of an EX camera for Dino Argentino's scope at Stellafane. Paul also has to remove all of his extra glass from his house and needs assistance to catalog the stuff and move it out. He also reported on the Star Party at Stellafane this weekend in which the public is also welcome.

John Sheff announced that the CFA events will be starting up next week. There will be observing nights and on the 1st Thursday of the month will be "Family Night" which is primarily geared toward kids.

~ Al Takeda, Secretary ~

Clubhouse Report . . .

September 22nd Work Party #10

Despite the multiple ATMoB events this weekend, a few people were able to volunteer for this Work Party. Thanks go out to John Blomquist, Paul Cicchetti, Steve Clougherty, Dick Koolish, John Reed, Al Takeda and Sai Vallabha.

Steve C. sprayed the Clubhouse shingles again to try to get rid of the wasps but was unsuccessful. Using a long pole he was able to stain the remaining area on the gable end. He was also able to adjust and collimate the 17 inch Dobsonian.

Al T. and Sai V. mowed the lawn around the barn area at the back and side of the Clubhouse.

John R., Paul C., John B. and Al T. installed 2 sections of the Rain Handler system above the bulkhead area.

Al T. and Sai V. tweaked the video projector system and installed the screen. The screen is not retracting properly so more work must be done. At the present time the screen can be brought down but it must be removed from it's hanger to be rolled up.

Paul C. set up his Hydrogen Alpha solar scope and we were able to see a few small prominences on the limb but no sunspots.

Correction: Sept. '07 Newsletter; Brian Maerz also helped to paint the gable end of the Clubhouse.

Clubhouse Saturday Schedule

Oct 6	Dave Prowten	Sai Vallabha
Oct 13	Al Takeda	Rich Nugent
Oct 20	Bill Toomey	Sai Vallabha
Oct 27	WP#11: John Reed + workshop leader	
Nov 3	Henry Hopkinson	Bruce Berger
Nov 10	Steve Clougherty	Chuck Evans

~ John Reed, Steve Clougherty, and Dave Prowten ~

ATMoB – AIAA Joint Event . . .

Join us on Friday, November 9th - 6:15 p.m. - for a star party at the clubhouse with members of the New England chapter of the American Institute of Aeronautics and Astronautics (AIAA). The group, which consists of engineers, students, and scientists, is interested in learning more about the club and what we're all about. Please come out and introduce yourself, set up a telescope and share views of the night sky. Refreshments will be served. All ATMoB members and family are welcome!

Star Party Thank You's . . .

Chelmsford - Thank you to all those who volunteered at the Chelmsford Town Star Party on Saturday night, September 15th. About 70-80 people came to the event. The skies cleared in time that afternoon, and it was a great night – cool, lots of dew, but excellent transparency. On behalf of the town, thanks to Kelly Beatty, Bruce Berger, John Blomquist, Gary Jacobson, Bernie Kosicki, John Maher, George Paquin, Brian Primeau, and Jun-ichi Sano

Cambridge - Thanks go to Nanette Benoit, Dick Koolish, Virginia Renahan and John Sheff for help at the Harvard Extension School Alumni star party at the CfA on September 28th. This was the third year for this event and the most well attended with 80 attendees. Skies were reasonably clear and everyone had a terrific time!

Area Concerts . . .

Join ATMoB member, conductor and composer, **Hayg Boyadjian** for two local concerts featuring his work, “**Cassiopeia**” and “**Perseus**”. The later piece for flute and cello was written for the famous retired first flutist of the Boston Symphony Orchestra, Doriot Anthony Dwyer.

When: Sunday October 21, 2007 at 7 pm
Where: Wellesley College, Jewett Art Centre Auditorium
Admission: Free

Works by Britten, Richard Strauss, Liszt, Beethoven, and **Hayg Boyadjian's** trio **CASSIOPEIA (after the Constellation)** for clarinet, cello, and piano

When: Sunday October 14th at 4pm
Where: Wellfleet Library, Main Street, Wellfleet
508-349-0310

Presents pianist Karine Bagdasarian
Program of Sonatas for Piano - Haydn-Sonata, **Hayg Boyadjian**-Sonata No. 3, Brahms-Sonata No. 3 opus 5 in f minor

Out of this World Contest . . .

Here is an excerpt from letter explaining that we LOST our bid for the “Out of this World” contest.

"Thank you for submitting an entry for Astronomy magazine's 2007 "Out of this world" outreach award. We received 41 entries from all over the United States and from as far away as Romania. Although Amateur Telescope Makers of Boston was not among the finalists, we want to congratulate you on your enthusiastic commitment to astronomy. Your work helps inspire the next generation of scientists and astronauts".

~ *Anna Hillier - Historian* ~

Conjunction 2007 . . .



Paul Cicchetti signs the 25th Anniversary banner

Connecticut River Valley Astronomers Conjunction, simply called “Conjunction”, was held in Northfield, MA on the weekend of July 13-15. As usual the event was well attended by members of ATMoB – I stopped counting members after 14.

This was the 25th anniversary of Conjunction, which first began as an educational program for non-astronomers. Photos of past Conjunctions included one of a young Ed Los, who was present in the audience.

The presenters: Carl Lancaster gave details on his automated backyard observatory in Greenwich, CT. Carl mentioned that he used Sarnafil for roofing material and found that snow and ice does not stick to it. If you know Phil Harrington and have read any of his many books, you would have enjoyed hearing how he first got started in astronomy as a 12-year-old after seeing a total lunar eclipse and writing his impressions for a school presentation. Phil explained how he first got started writing his Star Ware books, requesting experiences from people over the Internet.

ATMoB member John Briggs is a collector of antique telescopes and brought several to Conjunction. John told the story of Alvan Clark and his son George. In 1844 George was enrolled at Phillips Academy, where one day he rang the dinner bell and broke it. George carried home the broken pieces, and then melted down the metal from the broken bell to make a mirror for a telescope. Alvan Clark so enjoyed watching what his son did that that making mirrors soon became a passion.

Brown University Professor Peter Schultz spoke about the findings from the Deep Impact mission to Comet Tempel 1 - see http://deepimpact.umd.edu/flash/di_science.htm

William Andrewes spoke about Egyptian water clocks, Italian sundials and other types of time-measuring instruments. He also showed the unique sundials that he makes.

The keynote speaker was Father Doug McGonagle, PhD, who studied radio observation of nitrogen-bearing molecules in space, then became a Roman Catholic priest. His talk was an examination

of the premise that science and religion are not at odds with each other.

Do try to attend Conjunction. It is a well-run convention, has wonderful telescopes set up for solar observing, dark skies at night - weather permitting, and very friendly folks attending.

See photos at <http://www.philharrington.net/astroconjunction/con07.htm>

~ Eileen Myers ~

Astro Trivia . . .

WHY IS THE SKY BLUE AFTER SUNSET and well into twilight? After sunset the sun's light rays no longer strike the dense, lower atmosphere where air molecules preferentially scatter blue light (Rayleigh scattering). Therefore, the sky should not be blue during twilight. But it so happens that during twilight sunlight does shine on the upper atmosphere and particularly the ozone layer. Ozone absorbs (Chappuis absorption) the yellow, orange and red wavelengths from sunlight leaving blue as the background sky color. So the blue daytime sky is primarily due to the scattering of blue light by air molecules while the blue of twilight (often referred to as the Blue Hour) is due to the spectral absorption of ozone.

NEWTON HAD A DAY JOB. From the mid-1690s, Newton became more and more involved in British public life. In 1696 he was named Warden of the Royal Mint in London, and was promoted to the mint's Master four years later. He held this position until his death. Newton reportedly devoted much of his energy to this job, which included implementing a re-coinage to stabilize the currency and prosecuting counterfeiters.

~ Ted Poulos ~

The Transit Scopes of the Moonwatch Program ...

Sitting in the warm September sun, I thought of all the people whom were part of the Moonwatch experience. They are not here to add their voice on this 50th anniversary of the dawn of the space age.

Some members asked "Why did people look down instead of up?"

The scopes were transit scopes because they were meant to watch for objects (mainly satellites) to pass in front of the telescope. These scopes were never meant for nightly observing sessions and were designed for the express purpose of the Moonwatch program.

They consisted of a flat or front surface mirror at a 45-degree angle permitting the sky to be reflected into an

eyepiece. The eyepiece was an Erfle with a 1.25-inch focal length and a 68-degree field of view giving a wide area of the sky to watch. The eyepiece was set at eye level viewing so that no matter what setting was applied for the scope, this gave the observer a comfortable position for observing when sessions could last as long as an hour. The observing station was placed on the roof of the Harvard College Observatory where the Amateur Telescope Makers of Boston had their observational training programs and where the actual observations were recorded and tracked.

The Amateur Telescope Makers of Boston were asked to design a transit scope that would be used for the Vanguard program. Winfred Shattuck designed the scope that was perfect for the job. Sam Gardiner worked with the optics. 12 scopes were finished in time for the program even though the Russians put the first satellite into space. Other teams were organized into a worldwide network and used their version of transit telescopes for their observations. When the scopes were no longer used for the satellite program, they were retained by their owners or returned to their point of origin.

There is much other information on Moonwatch under NASA History News and Notes, The IGY site and The *Sky and Telescope* October issue and their remembrances website. A conference called "Remembering the Space Age" is being given in Washington, D.C. on October 22-23, 2007 in the AAAS Auditorium.

~ Anna Hillier - Historian ~



ATMoB members participating in Project Moonwatch.

The Club Picnic has been canceled...

Due to many scheduling conflicts, the Picnic has been canceled for this calendar year.

~ Eileen Myers ~

**Nov. Star Fields deadline
Sat., Oct 27th**

**Email articles to Al Takeda at
secretary@atmob.org**

POSTMASTER NOTE: First Class Postage Mailed Oct. 10th, 2007

Amateur Telescope Makers of Boston, Inc.
c/o Dave Siegrist, Membership Secretary
34 Millwood Dr
Shrewsbury, MA 01545-2228
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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 Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.

Oct 11 New Moon
Oct 19 First Quarter Moon
Oct 22 Orionid Meteor shower
Oct 26 Full Moon
Oct 28 Venus at greatest western elongation (46 deg.)
Nov 1 Last Quarter Moon