



## 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

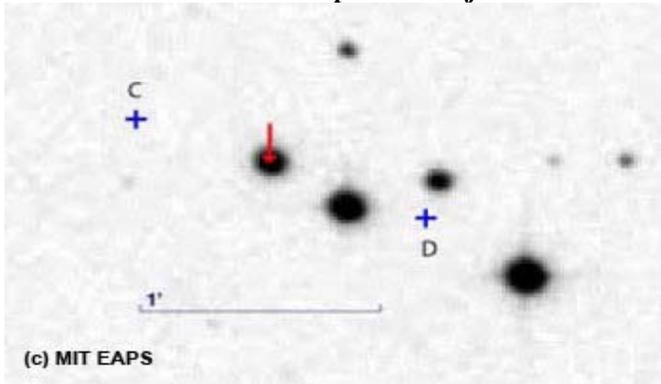
Vol. 21, No. 10 November 2009

### This Month's Meeting...

Thursday, November 12<sup>th</sup>, 2009 at 8:00 PM  
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics  
Parking at CfA is allowed for duration of meeting

The Occulation of Kuiper Belt Object 55636



In October, ATMoB members Gary Jacobson, Bernie Volz, John Briggs, Paul Valleli and Bruce Berger traveled to different parts of the globe in hopes of being part of the first team to capture the occultation of a distant star by a Kuiper Belt Object. This was part of a program of the MIT-Williams Occultation Consortium that is co-chaired by James Elliot of MIT and Jay Pasachoff of Williams College.

The teams were outfitted with the latest CCD cameras, GPS receivers and laptops. This system, dubbed PICO, for Portable Instrument for Capturing Occultations, fits into a ruggedized carry-on case suitable for travel almost anywhere on the globe. Leading the teams were Dr. Michael Person and Matthew Lockhart at MIT's Planetary Astronomy Lab. Telescope sizes ranged in size from a borrowed 8" SCT (with an interesting story behind it) in Australia to a 1.5-meter Ritchey-Chrétien high in the mountains of the Mexican Baja.

Team members as well as one of the leaders from MIT or Williams will be relating their individual occultation experiences.

Please join us for a pre-meeting dinner discussion at [Changsho, 1712 Mass Ave, Cambridge, MA](http://Changsho.1712MassAve.Cambridge.MA) at 6:00pm before the meeting.

### President's Message...

Pro-Am? Most people hear the expression and think of golf tournaments. In our astronomy neck of the woods, it means a collaboration between amateur and professional astronomers.

Dr. James Elliot, last June's guest speaker, talked on the occultation of Kuiper Belt Objects (KBOs). He discussed how information is gathered during a KBO occultation and what can be learned about KBOs from the resulting data. The talk ended with a request for ATMoB members to assist him in an upcoming observation run that required the volunteers to travel across the globe to operate telescopes and record information of an upcoming KBO occultation.

If you've read the subject of this month's meeting, then you know that November meeting speakers will be ATMoB members who volunteered to support Dr. Elliot's project.

There aren't many fields of sciences that encourage such program collaborations. Fortunately, astronomy is a field in which help from amateurs is actually encouraged. Keep in mind that a new class of galaxies was discovered by a school teacher using internet resources to data mine various images of galaxies. Most recently, an amateur planetary imager in Australia discovered another impact on Jupiter. While most of the work provided by amateur astronomers is lower in profile and rarely makes headline news, it is still both important and rewarding.

We're fortunate in that our location allows us direct access to the professional astronomers with whom we can set-up working relationships so from time-to-time we can partake in opportunities such as the KBO occultation. A few of our members worked as Teaching Assistants at the Harvard College Observatory, CfA's Clark refractor for public nights and even have started a second career as an astronomer at the Maria Mitchell Observatory.

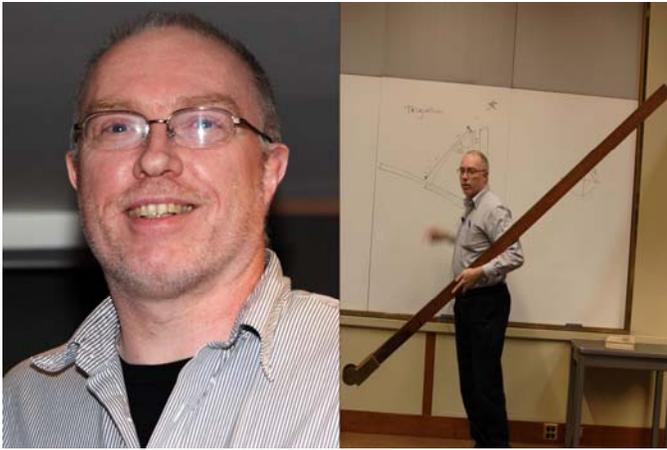
The American Association of Variable Star Observers ([www.aavso.org](http://www.aavso.org)) is right here in Cambridge, MA and will take your variable star observations (it's easy) and provide them to many professional astronomers. In addition, you can join the [Association of Lunar and Planetary Observers \(ALPO\)](http://www.alpo.org), Society for Astronomical Sciences ([www.socastrosci.org](http://www.socastrosci.org)) and a number of other astronomy based organizations with similar goals.

So the opportunities are there, jump-in, help out and have some fun!

Clear Skies, - Steve

~ Stephen Beckwith, President ~

## October Meeting Minutes . . .



(L-R) Jay Cross and his Triquetrum Measuring Arm. Images by Al Takeda

The October meeting of the Amateur Telescope Makers of Boston featured Jay Cross presenting *State of the Art Astronomy Circa 1540*. Cross wanted to pick a date before the book *Torinensis De revolutionibus orbium coelestium, Libri VI (On the Revolutions of the Heavenly Orbs)* by Nicolaus Copernicus was published (1543). Before this book most people thought that “the Earth was at the center and the sun and the planets and the stars were all going around.” Even with this view of the heavens they were able to guess pretty accurately, within a tiny fraction of a degree, where the planets should be. Cross wanted to know how they were able to predict planetary locations and how pre-telescopic astronomers measured them.

The first step was to research all of the instruments available at the time. He discovered the astrolabe but judged that it would not accurately measure the time. The cross-staff was another instrument and it was used to measure the distance between various objects. Cross determined that “the primary instrument that was being used, by most of the astronomers from Hipparchus all the way up to Copernicus was an instrument that is called a Triquetrum or Parallactic Ruler.”

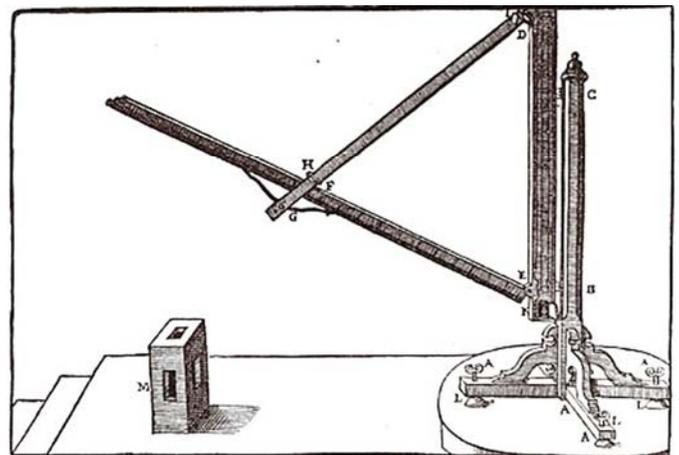
The Triquetrum assembly is based upon an isosceles triangle. The upright post has a plumb bob within its structure to allow the user to keep that post vertical through an adjustable stand. A second graduated equal length beam is attached to the top of the vertical post and is allowed to pivot in altitude and azimuth. This second post has sighting slits which is used to observe your astronomical object. A third beam with graduated markings is also attached to the vertical post to form the base of the triangle.

To set up the Triquetrum the upright post has to be made absolutely vertical using the plumb-bob. The observer would then look through the sighting slits at the star under study and a reading was made from the “base” beam. This reading measured the chord of the vertical angle and with a “table of chords” you can tell how far away the star or “wanderer” (planet) is from the zenith.

To determine the time for an event, 24 of the brightest stars were selected and their altitudes above the horizon would be used to calculate the “clock time”. Using these clock stars you can calculate what time it is to within 10 seconds.

One of Tycho Brahe’s books had a description of the Triquetrum that Copernicus used in his research. Using Brahe’s description, Cross was able to build a reproduction. The vertical post stands 8.5 feet tall and the measuring arm is at least 6 feet long. The entire assembly is made out of pear wood and weighs over 300 pounds. He only brought the measuring arm to the meeting and it was passed around the audience.

For 17 years, Cross was able to find and measure the clock stars and plotted out the movements of Jupiter, Venus and Mars. He found that star or planet positions could be measured to within 3 minutes of arc.



The parallactic instrument from Tycho's observatory as illustrated in his *Astronomiæ instauratæ mechanica* (Wandenburg, 1598)

The Secretary’s report was given by Al Takeda.

The Membership Secretary was absent from the October meeting. President Steve Beckwith reminded the membership that over a hundred people have not renewed their memberships and that the deadline has passed.

The Treasurer was also absent and the report was given by Steve Beckwith.

Steve Beckwith gave the Observing Committee report. John Maher is currently presenting the DVD Cosmology course on Friday nights at the ATMöB Clubhouse.

Steve Clougherty gave the Clubhouse report. Two work sessions will be held in October. The first will be held on the 3<sup>rd</sup> and the second on Halloween (Oct 31<sup>st</sup>). If members are available on those days please stop by the Clubhouse and give us a hand. For a detailed account read this month’s Clubhouse report.

Eileen Myers announced that she had some club historical information packets available for any interested members. Steve Beckwith then asked the membership to congratulate Eileen for arranging the 75<sup>th</sup> Anniversary Picnic.

Howard LeVaux showed the group his 35mm slides (Fuji Velvia, ISO 50) of the 2009 China solar eclipse in Hangzhou. Howard's photography setup included a 4-inch refractor (FL=822mm), a 70mm Televue refractor and a 200mm camera lens. He noted that the eclipse seemed "awfully dark" due to the high clouds and he could not see much of the corona.

Howard also showed a few photos of previous eclipses from Bolivia (1994) and Aruba (1998).

John Small reported that the Belmont Light Department has installed 30 LED streetlights along Concord Ave. The lights appear to be a blue/white type which according to Mario Motta is the worst kind of glare.

Haldun Menali mentioned that the November *Sky & Telescope* has an article about the 2<sup>nd</sup> telescope workshop in Turkey. Haldun participated in this event and with his assistance the Turkish members produced a hundred telescopes in 7 days.

Bruce Tinkler noted that the *Boston Parents Magazine* featured an article called "Great Places to Stargaze". It mentions the Center for Astrophysics, the Clay Center and other clubs and organizations including our own. Bruce has a number of images in the magazine featuring the Clay Center and one image with Al Takeda demonstrating his solar telescope on Astronomy Day.

Vladimir Vudler showed us a high efficiency; water cooled 100 Watt equivalent LED lamp that only uses 10 Watts of power.

#### October Announcements:

- LCROSS probe will impact the Moon on Friday, October 2, at 7:30 EDT. The Clay Center is also an official observation site for this event.
- Orionid meteor shower between October 17<sup>th</sup> – 25<sup>th</sup> (peaking on the 21<sup>st</sup>).
- Telecon: The Birth of Stars and Planets (October 27<sup>th</sup>)
- Dick Koolish announced that the Photographic Historical Society of New England will be putting on a camera show on the weekend of Oct 24/25.

#### October Star Parties:

- Annual Plaistow Star Party - Oct 9, postponed
- Lexington Christian Academy Star Party – Oct. 23
- Star Party for Families of Military Service Men and Women Oct. 24, postponed
- Country Day School Star Party – Oct. 23

#### New Announcements:

- Leonid Meteor Shower – Peaks on the evening of Nov. 17

#### Star Parties:

- Annual Acton Town-wide Star Party – Nov. 13
- Swallow Union Elementary School – Nov. 17

~ Al Takeda, Secretary ~

## Clubhouse Report . . .

### September 2009

During the last work session which took place at the ATMob clubhouse in Westford on Saturday, Oct. 10<sup>th</sup>, the weather cooperated and a good deal of work was accomplished. Volunteers tackled the staining of the West side of the clubhouse primarily on the second story. Another group stained the Ed Knight roll off roof observatory completing the entire structure, including the roof!

We will ask for volunteers at the Oct. 31st work session to continue with the clubhouse staining and hopefully the 17<sup>th</sup> shed will be included. This will be our last opportunity for painting and staining for this year. The snow fence will be erected during the next session as well.

The lawn was mowed around the clubhouse including a good portion of the observing field. The weed whacker was used to trim grass and weeds around the observing pads and observatories. Volunteers will be called upon to finish mowing during the next work session since this will be the last opportunity to complete this work for the current calendar year. We would like to call upon members to help out with tree trimming and brush hauling around the perimeter of the observing field on Oct. 31st.

Work continued in the new near-barn workshop including relocating several pieces of equipment from the old workshop. This project will continue throughout the upcoming winter season.

Lunch was provided for all who volunteered.

Thanks to all who volunteered on Oct. 10th. A list will be published in next month's *STAR FIELDS* for all of you who have given your time for the two work sessions in October.

~ Clubhouse Committee ~

~ John Reed, Steve Clougherty and Dave Prowten ~

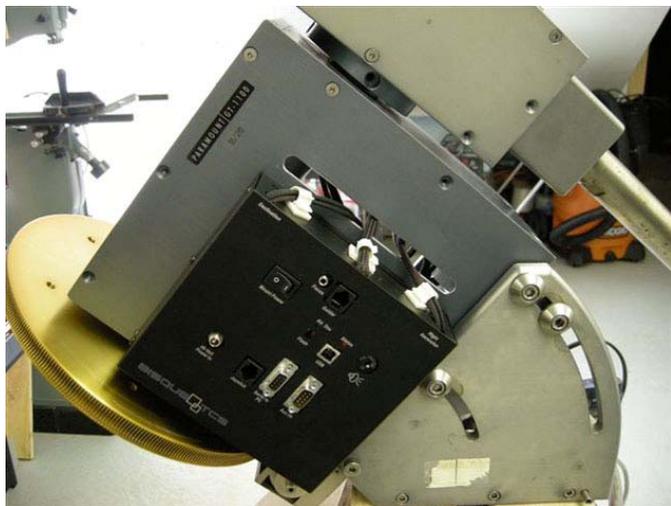


Painting the Ed Knight Observatory. (L-R) Chuck Evans, John Maher, Eileen Myers, Jun-ichi Sano, Mike Hill and Dave Prowten. Image by Al Takeda.

## Clubhouse Saturday Schedule

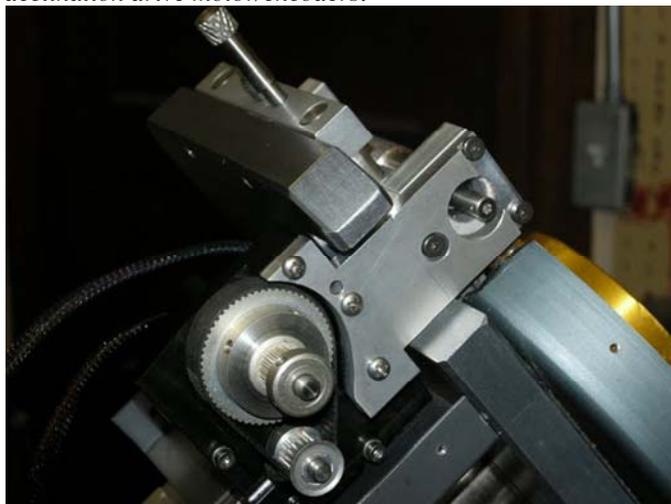
Nov 7	Al Takeda	Bill Toomey
Nov 14	Shilpa Lawande	Nitin Sonawane
Nov 21	Bernie Kosicki	Tom Wolf
Nov 28	Glenn Meurer	John Panaswich
Dec 5	Dave Prowten, John Reed- <b>Work Party</b>	
Dec 12	Steve Mock	Rich Nugent
Dec 19	John Small	Art Swedlow
Dec 26	John Maher	George Paquin
Dec 31	<b>New Year's Party</b>	

## C-14 Paramount Mount Upgrade . . .



The Paramount has been upgraded with a new control system from Software Bisque. The MKS4000 system uses the same control boards and servo motors as the Paramount ME, so we know it is reliable and thoroughly field tested by hundreds or thousands of users. Our friends Steve and Tom Bisque have been very generous in their support of ATMob in the past, and that generosity has been magnified a hundredfold with an 80% discount on the MKS4000. Please mention your gratitude to them whenever possible

*Editor's Note: The mount required an extensive rework to allow the attachment of the new right ascension and declination drive motor/encoders.*



As project manager I've put in countless hours over the past few months to bring this project to fruition but I could not have done it without support from the Executive Board, and several people who made valuable contributions of machined custom parts and their expertise. My thanks and yours should go Mike Hill, John Blomquist and Alan Sliski for their skill in the machine shop and to John Maher and John Reed for asking the important questions that will make this new tool easier for all to use.

As of the end of September the mount and scope are installed in the Knight Observatory and work continues on polar alignment and the pointing correction maps. We hope to complete these important last steps in a couple of weeks.

Update:

- The observatory computer had a bad power supply and was replaced. The operating system, The Sky 6 and CCD Soft software were reloaded.

- The mount was polar aligned but due to a loose interface plate another polar alignment will have to be performed.

- The Declination worm gear was pinned to prevent it from slipping.

- The new metal dew shield has been installed on the C-14. Two of the Kendrick heater strips that had broken wires have been repaired. Condensation is forming on the C-14 corrector plate when it is covered by a closed plastic cover. Attempts to prevent dew from forming are an ongoing project.

- Producing an all-sky T-Point model to accurately point the C-14 telescope is proceeding slowly because of the above polar misalignment. A software patch for the CCDSoft camera control was needed to allow the SBIG ST-7 camera to work properly.

- Balancing the scope is still an issue.

- The Paramount system can be used by experienced users but its pointing accuracy needs to be improved.

*Editor's Note: Images in this article are courtesy of Bruce Berger.*

~Submitted by Bruce Berger~

## Carlise Star Party Thank You! . . .

I just wanted to thank you for helping us organize last Friday night. We had a great turn out. Everyone is so nice and helpful with the kids and adults, showing them all the "cool" stuff in the sky! One person actually gave out bookmarks and information sheets about what we could see! It truly is an amazing group!

Thanks to everyone involved!

Holly A. Hamilton Mansfield :)  
Director of Recreation  
Town of Carlisle

## Membership Report . . .

Membership as of 10//29/2009 - 365 members.

Membership renewals were due by September 1st, 2009.

Please remit your membership payment ASAP to avoid *Astronomy* and *Sky & Telescope* subscription delays. You can re-new on-line or download the renewal form from the website and send it to Tom McDonagh. Payments can be made with PAYAL through the ATMoB website renewal system, or by mailing a check. Navigate using the following link after logging in to renew your membership today!

<http://www.atmob.org/members/person.php?frid=renewals>,  
then click on the red renewal tab to renew online!

Please contact the Membership Secretary if you have any problems logging into the ATMoB website or navigating through the renewal process, at [Membership@ATMoB.org](mailto:Membership@ATMoB.org).

New members in 2009 are not required to renew till September 2010. Members that fail to renew by December 1st will be dropped as a member. Please contact the President of the club at [President@ATMoB.org](mailto:President@ATMoB.org) if you are having trouble paying the dues.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the extent allowed by law. While the deadline for 2009 charitable donations is almost here, please consider making a tax-deductible contribution to the club when planning for 2010 and beyond.

All members are encouraged to seek out and welcome our new members:

**Jacob Chambers**

**John Hatfield**

Welcome!

[membership@atmob.org](mailto:membership@atmob.org)

~ Tom McDonagh – Membership Secretary ~

## Thoreau on Astronomy . . .

Now a man will eat his heart, if ever, now while the earth is bare, barren and cheerless, and we have the coldness of winter without the variety of ice and snow; but methinks the variety and compensation are in the stars now. How bright they are now by contrast with the dark earth! The days are short enough now. The sun is already setting before I have reached the ordinary limit of my walk, but the 21st of next month the day will be shorter still by about twenty-five minutes. In December there will be less light than in any month in the year.

Journal 28 Nov 1853

~ Submitted by Tom Calderwood ~

## Sky Object of the Month . . .

November 2009

$\beta$  Persei (Algol, the “Demon Star”)

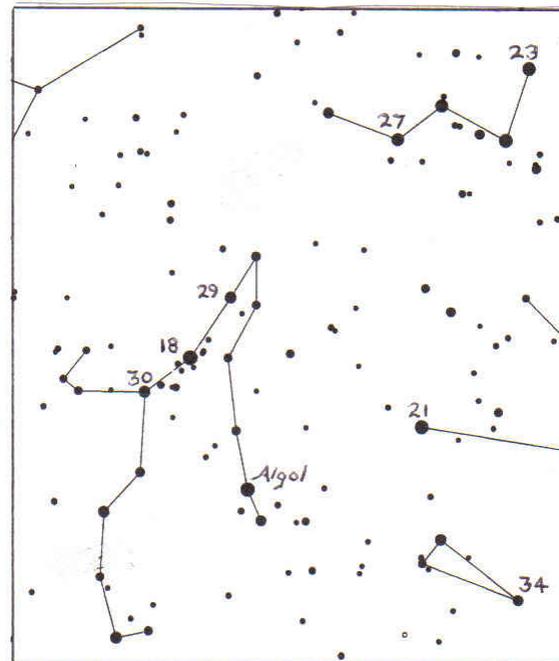


Chart for beta Persei  
From Cartes du Ciel  
Magnitudes to nearest tenth with decimals omitted  
(courtesy AAVSO)

Are you ready for the eclipse of November 13<sup>th</sup>? I'm not talking about the sun or moon. I'm referring instead to an eclipse of the fascinating star  $\beta$  Persei (Algol).

Algol is arguably the best-known example of an eclipsing binary. Every 2.867 days like clockwork, Algol dims from magnitude 2.1 to 3.4. The entire fade-away and return to normal brightness takes about 10 hours. Algol's variability was first described by Italian astronomer Geminiano Montanari in 1667. However, its Arabic name (from *Al Ra's al Ghul* "The Demon's Head") suggests that Algol's odd behavior was noted centuries earlier.

Algol is comprised of a bright B8 main-sequence star orbited so closely by a fainter K-type subgiant that the two appear as a single star. Because their orbital plane is nearly edge-on to our line-of-sight, the faint member periodically passes in front of the primary, the eclipse causing a temporary dimming of the system's light.

There are two windows of opportunity for viewing an Algol eclipse. First, you'll need an evening from mid autumn to late winter when Perseus is well-placed in the sky. Next (unless you're a night owl who doesn't mind being out during the wee hours of evening) you'll want an eclipse that begins after sunset and winds down around midnight.

According to the RASC *Observer's Handbook 2009*, a favorable Algol eclipse will occur on Friday, November 13<sup>th</sup>, with mid-eclipse predicted for 8:21 pm, EST. Although the complete event takes about ten hours, most of the action can be seen within a 6-hour span. Starting about 3 hours before mid-eclipse (around 5:20 pm, or as soon as darkness permits), record your initial magnitude estimate. Use the accompanying chart, which shows the magnitudes of nearby comparison stars (to the nearest tenth, with decimals omitted). Continue at 15-minute intervals until Algol has returned to its original brightness. Special equipment won't be necessary – Algol is readily visible to the unaided eye. One hint: go outside an evening or two before the eclipse to identify Algol and its comparison stars. You'll avoid a lot of confusion and wasted time on eclipse night.

Observing an eclipse of Algol is a great group project for an astronomy club. I took part in one a few years ago with members of the Boston ATMs. Between estimates we had time to conduct regular skygazing through our telescopes – a combination which made for a fun and fast-paced evening. Should clouds prevail on the 13<sup>th</sup>, you can scout out future Algol eclipses by consulting the *Observer's Handbook* or a current issue of *Sky and Telescope*. Observing and recording an eclipse of Algol should be on every backyard astronomer's "to-do" list.

Your comments on this column are welcome. E-mail me at [gchaple@hotmail.com](mailto:gchaple@hotmail.com).

~ Submitted by Glenn Chaple ~

## Anniversary Picnic Thank You . . .



(L-R) Paul Valleli and Dave Prowten

What a fine day we had for the Annual Picnic and 75<sup>th</sup> Anniversary of ATMoB (including the 80<sup>th</sup> Anniversary of the Bond Club). Estimates are that well over 100 attended. The temperature was perfect - a beautiful Autumn day. The following list of thank yous will give you an idea of what the day was like:



(L-R) Paul Cicchetti, John Reed, John Maher and Paul Valleli

Thank you to Paul Cicchetti for allowing us all to look at the sun through his solar scope. John Maher also observed the sun with his Coronado PST solar scope. Phil Levine set up his 10" reflector and nice binos with a mount. Phil Rounseville set up his solar filtered scope and folks were excited with the view.

Thank you to all the folks who set up scopes in the hopes of even semi-clear night skies. Although it did not rain, the clouds made observing even the Moon and Jupiter difficult.

Thank you to the ISS for that 2 minute bright pass directly over the observing field.

Thank you to Nina Craven for running the kids activities. Thank you to Marsha Bowman for her assistance.

Thank you to Bill Toomey for leading the outdoor up-the-hill walking tour of the Haystack facility.

Thank you to Bruce Tinkler for bringing and demonstrating radio astronomy



Thank you to Nina Craven for helping the kids to assemble Galileo-style refracting telescopes. Thank you to John Reed for bringing a small tripod to mount the scopes on. There was certainly delight in the eyes of at least one youngster when she saw the Moon through her new telescope.

Thank you to John Maher for giving tours of the Ed Knight observatory and tours of the clubhouse.



Thank you to Al Takeda who put together a marvelous slide show with selections of his own photos of recent club activities, photos from Club Historian Anna Hillier, slides archived in the clubhouse office, and photos from Paul Valleli.

Thank you to Ken Launie for bringing his slides of the early days of the clubhouse taken in the 1980's and narrating as they were projected on the screen.

Thank you to Paul Valleli who showed images from his website's archive of ATMoB events and for his narration.

Thank you to Mario Motta who agreed to be the back-up presentation MC.

Thank you to Anna Hillier for all of her many years of dedication to the club in maintaining the club's history, and for researching and putting it all together in a wonderful book.

Thank you to Paul Valleli for keeping the club history too.

Thank you to food and supplies shoppers John Reed, Eileen Myers and Nina Craven.

Thank you to the set-up and break-down volunteers, to those who put up the tents and those who took them down, those who brought tables and chairs outside and those who brought them back inside, those who set up activities, membership tables and food tables, and those who cleaned up at the end of the day: Bruce Berger, Marsha Bowman, Paul Cicchetti, Nina Craven, Carl Hein, Julie Kaufmann, Philip Levine, John Maher, Eileen Myers, John Reed, Art Swedlow, Al Takeda and Sai Vallabha. I know there were more – everyone pitched in to help!

Thank you to Chefs Eric Johansson, Art Swedlow and Sai Vallabha for cooking all those hamburgers, kielbasa and hot dogs.

Thank you to EVERYONE who brought such delicious food. We have many great chefs and bakers in the club!

Thank you Nina Craven for ordering the 75<sup>th</sup> Anniversary ATMoB balloons, and also for the 80<sup>th</sup> Anniversary Bond Club balloons, wherever they are after their long flight high up into the sky!

Thank you to Eileen Myers for preparing and to John Blomquist, Barbara Bosworth, Nina Craven, John Maher and Eileen Myers for assembling the handouts on the club's history. A few packets were distributed at the October club meeting.

Thank you to Vladimir Vudler for bringing that sci fi movie to relax with late in the evening after all clean up was completed. The door to the clubhouse was finally locked at 2:30 AM.

Thank you to the coordinators Eileen Myers, Al Takeda, John Reed, Sai Vallabha and Art Swedlow.

A good time was had by all!

~ Submitted by Eileen Myers ~

## Calendars for Sale . . .

I still have a few Astronomy Deep Space Mysteries 2010 Calendars available for sale. They list for \$12.95 (see <http://www.kalmbachstore.com/68158.html>) but the club sells them for \$8 (this includes a small profit to the club – so you not only get a great buy, but you help support the club as well).

It is greatly appreciated if you have exact change available. Or, you can write a check (made payable to the ATMoB).

Sorry, but I will only sell them at the monthly meetings, first come, first served.

~ Submitted by Bernie Volz ~

### Corrections

The person looking through the reproduction Galileo Scope in October's newsletter is Dwight Lanpher, board member of the Island Astronomy Institute. Marcia Bartusiak's name was misspelled in the September and October Newsletters. ALPO's website is now <http://www.alpo-astronomy.org/>.

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**December Star Fields DEADLINE**  
**Wednesday, November 25<sup>th</sup>**

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

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**POSTMASTER NOTE:** First Class Postage Mailed Nov 4<sup>th</sup>, 2009

Amateur Telescope Makers of Boston, Inc.  
c/o Tom McDonagh, Membership Secretary  
48 Mohawk Drive  
Acton, MA 01720  
**FIRST CLASS**

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John Maher (978) 568-1253

#### OBSERVING AND PUBLIC OUTREACH

STAR PARTY COORDINATOR:  
Virginia Renehan [starparty@atmob.org](mailto:starparty@atmob.org)

## How to Find Us... Web Page [www.atmob.org](http://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.*

Nov 6 Moon is 0.9 degrees North of M35 (Gemini)  
Nov 9 Last Quarter Moon  
Nov 12 North Taurid Meteor Shower peaks  
Nov 16 New Moon  
Nov 17 Leonid Meteor Shower peaks  
Nov 24 First Quarter Moon  
Dec 2 Full Moon