



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. 5 May 2009

This Month's Meeting...

Thursday, May 14th, 2009 at 8:00 PM

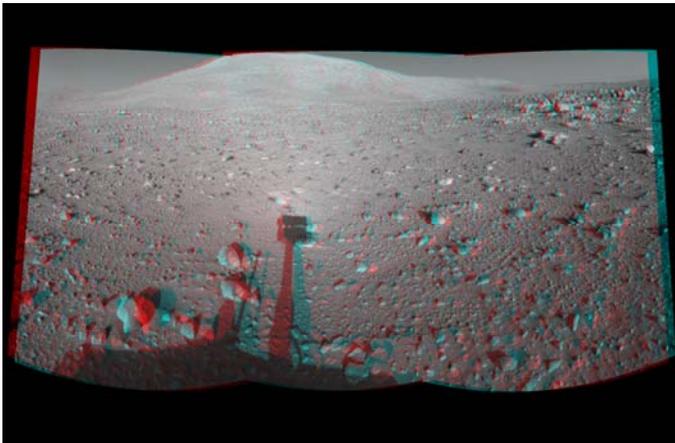
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at CfA is allowed for duration of meeting

Mars in 3D!

Robert Naeye, Editor in Chief, *Sky and Telescope*



Mars in 3-Dimension. Courtesy NASA/JPL-Caltech

Mars has long been a planet of mystery and imagination. But in recent decades, a series of robotic explorers has stripped away much of the unknown. Scientists still lack a detailed understanding of Mars's history, but NASA missions such as Mars Global Surveyor and the rovers Spirit and Opportunity have shown conclusively that liquid water once flowed on Mars. On Earth, wherever we find liquid water, we also find life.

Join *Sky & Telescope* Editor in Chief Robert Naeye as he presents many dozens of the latest and best images of Mars in spectacular 3-dimensions. Robert will provide updates on the status of the various ongoing Mars missions, and explain what they have taught us about the history of water on the Red

Planet. Red-and-blue 3-D anaglyph glasses will be provided for all attendees.

ATMoB member Robert Naeye is Editor in Chief of *Sky & Telescope*, the world's most respected and influential popular astronomy magazine. Robert earned a Master's degree in science journalism from Boston University in 1992, and later worked on the editorial staffs of *Discover* and *Astronomy* magazine. He served as Editor in Chief of *Mercury* magazine (published by the Astronomical Society of the Pacific) from 2000 to 2003. He worked as a Senior Editor at *Sky & Telescope* from 2003 to 2007, before moving to NASA's Goddard Space Flight Center to work as a Senior Science Writer for the Astrophysics Science Division. He returned to *Sky & Telescope* in June 2008 to serve as Editor in Chief.

Robert is the author of two books: [Through the Eyes of Hubble: The Birth, Life, and Violent Death of Stars](#) (Kalmbach, 1997) and [Signals from Space: The Chandra X-ray Observatory](#) (Turnstone, 2000). He has contributed to two other books, and has won several awards for his writing and outreach activities.

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

President's Message...

It's going to be a good meeting this month! I'm really looking forward to Bob Naeye's discussion and seeing images of Mars in three dimensions. While NASA's sending of robotic landers to Mars and probes out into the rest of the solar system has become common place, it is definitely not routine, nor is it easy. Some of our members have worked directly on components of these NASA missions and can tell you of the challenges that need to be faced in terms of weight, reliability, performance, etc. Then there is the problem of getting the probe from point A (Earth) to point B (the last frontier).

The scientists and engineers, who design, build, launch and finally gather the data from these probes and landers weren't born with these skills. They went to college and (most likely) on to graduate school for more advanced degrees in a particular specialty. Some went the "mustang" route and did it on their own via on the job training where they work. In all cases, before they began this journey, they stood-up and said, I want to be an engineer, I want to be an astronomer, I want to be a planetary scientist – you get the idea... It'd be interesting to hear from these people about who or what influenced their individual career choices that years later found them working on these projects.

Unfortunately, today's scientist/engineer will be tomorrow's retiree. Where will their replacements come from, will we have enough of them and will they be just as innovative in research and problem solving as their predecessors? Most importantly, who will inspire them to commit to a science/engineering career?

Two years ago, the ATMoB committed to support the Harvard College Observatory's (HCO) Science Education Department (SED) in a program that will foster in today's youth, interest pursuing careers in science, technology, engineering or mathematics. This will be a three-year, astronomy-centric program with five schools. The students, teachers and ATMoB volunteers will utilize resources from the HCO and Harvard's Earth and Planetary Sciences department. Virginia Renehan has been actively working with the SED over the past two years as they put the program together. John Sheff and Dan Winchell have been in the middle of the action as well and along with Virginia, have been working to define the requirements and roles ATMoB volunteers can play in this program.

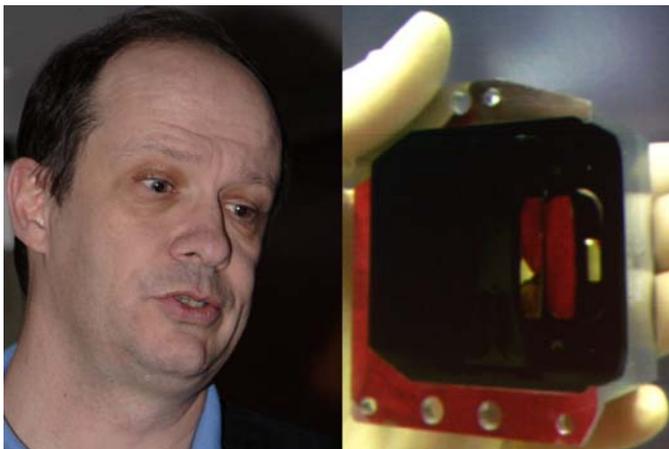
Recently, the SED received from the National Science Foundation the funding it needed for the program and it is time for me to ask for the membership's help in supporting the same. We've long had a successful relationship with Harvard, the HCO and the CFA. They've hosted our monthly meetings Philips Auditorium and have been great resources for terrific guest speakers. I'll be speaking more on the program and providing more detail at the May 14th, monthly meeting.

Who will inspire today's youth in a career that may have them working on the first manned mission to Mars? Perhaps it will be you.

Regards,
- Steve

~ *Stephen Beckwith, President* ~

April Meeting Minutes . . .



The April meeting of the Amateur Telescope Makers of Boston featured Robert Benoit, Manager of the Optical Division and Optical Systems Engineering at SSG Precision Optical in Wilmington, MA. SSG is a 180 person company which was recently bought out and is now part of the L3 Integrated Optical Systems (IOS) Group. Other companies that are under the same umbrella are Tinsley and Brashear. His talk focused on the optical systems that were fabricated and integrated into the Moon Mineralogy Mapper mission that flew aboard the Indian lunar orbiter Chandrayaan-1.

Benoit began by mentioning that his company makes opto-mechanical telescopes with a lot of precision pointing and scanning systems. They have worked with a lot of different materials from aluminum, beryllium, glass and aluminum carbide. About 90 percent of what they do is off-axis aspheric mirrors.

For the Moon Mineralogy Mapper project SSG was contracted to build a fore optics section of an Offner spectrometer for Swales Aerospace. Swale in turn was subcontracted by JPL to integrate the package over in India.

The fore optics package is a 3 mirror system that feeds the spectrometer. The M2 mirror is a round convex sphere while the M3 is a general aspheric biconcave mirror. Benoit stated that "they are made of aluminum which allowed us to do single point diamond turning which will give us a nice specular surface accurate to within a wave or so peak to valley in the visible wavelength... this takes a lot of the burden of polishing away." After final polishing and testing to eliminate any aberrations, the fore optic system was sent to Swales and NASA to be integrated with the spectrometer.

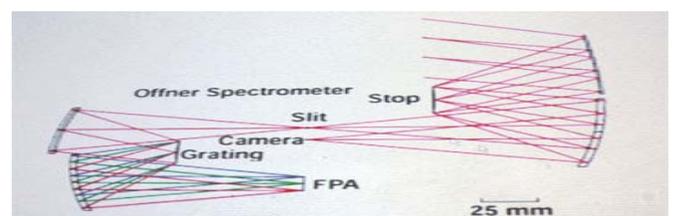
The spectrometer has a special resolution of 70mm per pixel at its 100 km orbit, which will allow the Moon Mineralogy Mapper to detect the fine detail required for mineral identification. Chandrayaan-1 reached the Moon in November of 2008 and has started to scan the surface.

Benoit also talked about the WISE (Wide-field Infrared Survey Explorer) instruments that SSG delivered to NASA last year. WISE will produce an all sky survey in 4 bands from 3 – 25 um for one year.

In this project, the mission goals and requirements were specified and SSG designed and built the payload. The telescope is made up of three sections; the fore optics is a 40-cm on-axis Cassegrain with a spider, a relay module and an imaging module. There are 13 mirrors in total and all of them are aluminum.

Benoit spent a lot of time on the how they test these aspheric optics using computer generated holograms (CGH). This new technology "can make mirrors that are so completely wacky and have so much aspheric departure and slope that it's driving the opticians crazy. The system designers love the CGH but the opticians hate them."

He concluded by describing the projects MICA, SBIR High, Compass, APL Contour, Gator and Hurdles that were built by SSG.



Optical path of the Fore Optics in the Moon Mineralogy Mapper

Voting was held for the 2009 Nominating Committee. The membership selected Virginia Renehan as the Chairperson and Peter Bealo and Steve Clougherty as committee members.

Bob Naeye talked about his trip to the Franklin Institute in Philadelphia, PA to attend the kick-off dinner for the "100 Hours of Astronomy". He also attended the Franklin's opening exhibit of one of Galileo's telescope that is on loan from the Institute of the History of Science from Florence, Italy. He mentioned that this is the only time that this telescope will ever leave Italy. The exhibit will be at the Franklin until September 7th.

Ross Barros-Smith spoke to the membership about the Youth Astronomy Apprentiship events being held this spring. The Cambridge Science Festival being held on April 26th will have hands on activities such as a Star Lab presentation and a theater show that was written and produced by the apprenticeship youth. This is being held at the Center for Astrophysics building. Ross showed some images from last year's event. He also mentioned Astronomy in the City being held on May 15th. Details at <http://yaa.mit.edu>.

The Secretary's report was given by Al Takeda.

Nannette Benoit gave the Membership report for Tom McDonagh. She reported that there are 318 members, announced new member's names and reported the club now has a Facebook presence. Nannette also gave the Treasurer's report.

Steve Clougherty gave the Clubhouse Committee report. He mentioned that the 20 inch mirror has been re-coated. Work on tap for the next workparty will be the basement, near barn, 20 inch telescope and some outdoor work..

Steve Beckwith gave the Observing Committee report. He noted that Sidney Johnston will be putting on a class on spectroscopy at the Clubhouse next Saturday. In the future, Paul Valleli will be holding a class on "Evaluating Your Telescope Optics" in May.

Announcements:

Cambridge Science Fair – April 25 -28

Astronomy Day at the Clay Center – May 9th (3-10 pm)

Evaluating your Telescope Optics – Clubhouse, May 16.

Youth Night at the Clubhouse – May 30, June 27, July 25.

Bruce Tinkler reminded the members that Astronomy Day will be held on Saturday, May 9th. At the Clay Center in Brookline. ATMoB has assisted the Clay Center in putting on this event and the organizers are expecting between 1500 – 2000 people this year.

Volunteers will be needed to set up telescopes or to set up a demonstration inside. The event will take place between 3 and 10 pm. The Indoor demonstrations will be from 4:30 pm to 8:30. The event will be rain or shine.

Bruce asked that people sign up at both the ATMoB and the Clay Center website, www.claycenter.org/astro, as an "Exhibitor/Astronomer", so that you can be given an Astronomy Day badge, food passes for the canteen truck, family passes for shows and to let the Clay Center staff know what requirements you may need for your presentation.

Paul Valleli talked about the upcoming Stellafane Convention taking place on August 13-16. The main keynote speaker this year will be the Apollo 12 moon walker Alan Bean.

In keeping with the 400 years of the telescope, Paul Manning will also be portraying Galileo during Stellafane weekend. Also, Jim and Rhoda Morris, who made a faithful reproduction of the Galileo telescope, will be speaking at the technical talks.

John Briggs announced that there will be a day long "History of Astronomy" workshop at the Hartness House in Springfield, Vermont on Thursday, August 13th (before the main Stellafane convention).

~ Al Takeda, Secretary ~

Nominating Committee . . .

By popular vote at the April meeting, the 2009 Nominating Committee was selected. The results are: Chairperson: Virginia Renehan and members: Peter Bealo and Steve Clougherty.

If any member is interested in running for any of the Executive Board positions, please contact any of the members listed above.

~ Al Takeda, Secretary ~

Clubhouse Report . . .

APRIL 2009

Since the March report, two work sessions took place on April 11th and May 2nd. The April work effort was made possible by 21 members: Bruce Berger, John Blomquist, Paul Cicchetti, Steve Clougherty, Nina Craven, Mike Hill, Anna Hillier, Eric Johansson, Dick Koolish, John Maher, Eileen Myers, John Panaswich, Dave Prowten, John Reed, Junichi Sano, Dave Siegrist, Sergio Simunovic, John Small, Art Swedlow, Al Takeda, and Sai Vallabha. Winter finally receded allowing the following:

- The snow fence was removed and stored.

- The front porch garden was cleared of winter debris and plantings were added by Anna & Eileen and several assistants

- The snow blower was readied for storage and gasoline, propane, and painting supplies purchased

- The near barn walls and ceiling were primed by Bruce, Mike, and Sergio. During later evening sessions white two part epoxy paint was sprayed over the primed areas. Heat needed for curing was provided by John S.

- John S. and Dave P. measured, cut, bent and fit the conduit to continue the electrical layout. These were then removed to allow spray painting. Additional evening sessions provided the time to reattach the conduit and to pull wires after the paint cured.

- The 20 inch Shapley Dobsonian mount in the Ed Knight Observatory was modified to allow for roof clearance in a vertically stowed position. The optical tube was strengthened with the addition of circumference stiffeners. The mirror was re-installed and rough collimation was completed. Subsequent star testing on April 25 showed good point images of Saturn's moons and resolved M3 globular cluster stars with a 14mm eyepiece. A full field 2 inch red laser collimator confirmed rough collimation with a need for fine tweaking by an expert.

- A full set of level indicators to a common height were scribed on the basement walls and support structures to provide a base plane for developing the drain system. This was accomplished at a subsequent session by John B. and John R.



Mike Hill painting the future machine shop. Image by Al Takeda

MAY 2009

The May work session was moved up one week to May 2nd to allow support for the Clay Center Astronomy Day activities on May 9th. This work effort was accomplished by 23 members: Mike Agostini, Bruce Berger, John Blomquist, Barbara Bosworth, Paul Cicchetti, Nina Craven, Steve Clougherty, Harry Drake, Anna Hillier, Gary Jacobson, Eric Johansson,

John Maher, Mike Mattei, Eileen Myers, Dave Prowten, John Reed, Phil Rounseville, Dave Siegrist, Sergio Simunovic, John Small, Ross Baros-Smith, Al Takeda, and Sai Vallabha. These folks' teamwork resulted in the following:

- The first mowing and trimming of the season was completed by Harry D., John M., Dave S., Paul C. and John R.. The bluebirds were feeding as work continued around the observatories and barn. Thanks to Phil R. and Brian L. for their continued efforts to keep the colony, started by our MIT colleague, thriving.

- The Clamshell Observatory, with the Tanguay 8 inch Dall Kirkham, was checked and the base was re-waterproofed by Dave P.

- The 20 inch Dob mount (in the Knight Observatory) azimuth bearing surface was replaced by Dave P. and Steve C. assisted by others. They also repositioned the Teflon elevation bearing blocks supporting the optical tube. These changes resulted in much smoother control at the eyepiece. The entrance doors were checked for vertical telescope clearance, modified, and checked again. The mirror cover disc with 7 watt red bulb heaters was finished and put in place.

- The 20 inch Shapley electrical outlet was repositioned to match the dob footprint by Steve C., Dave P., John S. and John R. The 3 circuit breakers control the lights and outlets along the West wall, the lights and outlets along the East wall, and the two telescope outlets in the center.

- The basement water table was tested by digging a hole next to the vertical termination of the 6 inch drain pipe by Paul C.. We will test again in a few days, hoping the table continues to lower. The lowest point in the drain system will then be connected.

- The first painting of the season started at the North end of the West barn wall. It makes a big difference. This was started by Mike A., Eileen M., Dave S., Al T. and additional members. They will need your help through the summer to finish the job.

- The conduit is back up and wires pulled in the near barn by John S. and Sergio S.; the work now awaits floor preparation and equipment placement to allow the final conduit work and wire pulling.

- The inside of the house was a little worse for wear for all the outside being trekked in. This was tackled by Gary J., Eileen M. Sai V., and Al T. at the end of the work session with vacuuming, dusting, moping and trash removal. Look for the info on trash removal at the clubhouse. Basically it is we bring it in-we take it out anyway we can.

This work effort was only possible on a full stomach. So we must thank our crew of intrepid food preparers. Those delicious salads are prepared by Sai V. The grilled big dogs

and burgers are the domain of chefs Eric J. and Art S.. The broiled/baked chicken is the result of the clubhouse recipe started at home by John R. And the whole thing works as orchestrated by Eileen M., Art S. and Anna H. Thanks for the food!

The next work party will be held on the Saturday after Full Moon to allow our most active members to attend Starconn on June 6th. **Therefore our work party will be held on Saturday June 13th.** We anticipate working on the basement drain, continue painting white stain on the barn rear and sliding roof observatory, mortar the remaining stone pieces to finish the 4-holer foundation, and assisting in the completion of the work necessary to really convert the near barn into our new machine shop. I'll bet that the lawn will need be mowed too. **See you on June 13th.**

POSTPONED: The 75th Anniversary Picnic has been rescheduled for Saturday, September 26th. ~ A/ T. ~

~ John Reed, Steve Clougherty and Dave Prowten ~

Clubhouse Saturday Schedule

May 16	Brian Leacu	Phil Rounseville
May 23	Brian Maerz	Sai Vallabha
May 30	Chuck Evans	Tom Lumenello
June 6	J. Panaswich	D.Prowten
June 13	Bruce Berger, Mike Hill (Work Party)	
June 20	Ed Budreau	Rich Burrier
June 27	Eileen Myers	David Siegrist
July 4	John Blomquist, A Takeda- Work Party	
July 11	Paul Cicchetti	Henry Hopkinson

**Sky Object of the Month -May 2009
Mizar, the First Double Star. . .**



Mizar (right) and Alcor. North is up in this 1/4" field. Observation made with a 2-inch Gilbert reflecting telescope at 80X. An 8th magnitude field star at the bottom has an unusual name. Do you know what it is? (Answer next month)

It was my high school friend Ray Gerbi who introduced me to backyard astronomy. On a late summer evening in 1963 (yes, I am that old!), he plunked a Gilbert reflecting telescope on an open area in his back yard and proceeded to show me Saturn and a pair of fuzzy blobs of light (M13 and M31). But

the highlight of the evening, an event that would give direction to my pursuits in amateur astronomy, came when Ray showed me the double star Mizar. I was totally mesmerized by the sight of two sparkling white stars shining side-by-side. For years afterward, double stars would be my favorite deep-sky objects.

The middle star in the handle of the Big Dipper, Mizar is the easiest double star for the novice to locate. It boasts historical importance as the first double star discovered. Until a few decades ago, credit for the discovery went to the Jesuit astronomer Jean Baptiste Riccioli, who reported the star's duplicity around 1650. But a recent investigation of Galileo's notebook reveals that a former student of his, Benedetto Castelli, saw Mizar several decades earlier.

If you study Mizar carefully with the unaided eye, you'll see a fainter star close by. This is Alcor, Mizar's 4th magnitude optical companion. The two appear at opposite sides of a low-power telescopic field. Look closely at Mizar. This 2nd magnitude star is attended by another 4th magnitude companion just 14 arc-seconds away. The pair lies about 80 light-years from Earth.

May brings us Astronomy Day and the opportunity to introduce backyard astronomy to the general public. If you decide to become involved in a public star party, be a Ray Gerbi and introduce your guests to Mizar. You might just inspire a future double star aficionado.

Your comments on this column are welcome. E-mail me at gchapple@hotmail.com.

~ Submitted by Glenn Chaple ~

Thoreau on Astronomy . . .

Looking into the northwest horizon, I see that Wachusett is partially concealed by a haze. It is suddenly quite a cold southeast wind. (When I started, at two, it was also southeast, and thermometer 69.) This is one of the values of mountains in the horizon, that they indicate the state of the atmosphere. I should not have noticed this haze if I had not looked toward the mountains.

Journal 24 May 1860

~ Submitted by Tom Calderwood ~

POSPONED: The 75th Anniversary Picnic has been rescheduled for September 26th.

**June Star Fields DEADLINE
Saturday, May 30th**

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

POSTMASTER NOTE: First Class Postage Mailed May 10th, 2009

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c/o Tom McDonagh, Membership Secretary
48 Mohawk Drive
Acton, MA 01720
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OBSERVING AND PUBLIC OUTREACH

STAR PARTY COORDINATOR:
Virginia Renehan starparty@atmob.org

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.

May 17 Last Quarter Moon
May 24 New Moon
May 25 Jupiter 0.4 degrees S. of Neptune
May 30 First Quarter Moon
June 5 Venus at Greatest Western Elongation (Morning)
June 7 Full Moon
June 15 Last Quarter Moon