



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. 29, No. 1 January 2017

This Month's Meeting . . .

Thursday, January 12th, 2017 at 8:00 PM
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at the CfA is allowed for the duration of the meeting

Wallace at 45: Charting a Course for the Future



George R. Wallace Jr. Observatory Complex. Copyright MIT

Within walking distance of our Westford Clubhouse is MIT's George R. Wallace Jr. Astrophysical Observatory. Observatory Manager, Tim Brothers, will review how Wallace started in 1971 and describe the ambitious goals set forth by Director McCord. (*Editor: Thomas B. McCord is a former MIT Professor of Physics and was the initial Director of the Wallace Observatory*) As the technological capabilities of the Wallace Observatory have improved, opportunities for undergraduates to perform exciting research have become more accessible. There has been steady progress from local to remote to automated observing in the past decade – but did the Wallace Observatory achieve McCord's dream? Brothers will conclude with a review of major renovations at Wallace, a "large" discovery behind a

hidden door, and address the growing need for more outreach in science as we try to fill that gap while also educating the public on light pollution.

Tim Brothers has been the Observatory Manager for MIT's George R. Wallace Jr. Astrophysical Observatory since 2009. Prior to this, he was the Curator of the Hagar Planetarium and observatory at San Francisco State University, an optical engineer at MIT's Spectroscopy Laboratory where he helped design and develop portable cancer detectors, spent time at Bluefin Robotics in Cambridge working on autonomous submarines, and worked as an observer at MIT Lincoln Lab where he co-discovered hundreds of asteroids and comets as part of the LINEAR program in New Mexico. Tim received his Physics and Astronomy degree at UMass-Amherst, not far from where he grew up in western Mass. Today he lives in Pepperell with his wife and two boys.

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 . . .

The Amateur Telescope Makers of Boston (ATMoB) is a diverse group, and I don't mean by ethnicity, religious or political affiliation, or gender. I'm referring to our varied astronomical interests.

First is the group by which our club earned its name – **telescope makers**. This relatively small faction includes some of the finest optical craftsmen in the country, if not the world. At the annual Stellafane Convention, ATMoB members are frequent prize winners in the telescope-making competition. Several coach newbies at Clubhouse mirror-making sessions, thereby passing on the art of telescope-making to future generations.

If you step outside the Westford Clubhouse on a clear, moonless Thursday, Friday, or Saturday evening (or any other evening, if a special cosmic event is in the offing) you'll find upwards of a dozen ATMoB members plying the heavens with their telescopes. These are the **observers**, who keep an eye on everything from the moon, 1.3 light-seconds away, to quasars whose light began their earthly journeys billions of years ago. They share the observing field with our club **astroimagers**. Modern CCD technology has made it possible for the amateur astronomer to make deep-sky images that far surpass in quality those made at the world's greatest observatories several decades ago. Examples of the fine astroimages made on club grounds or at member backyard observatories are on display in the Gallery section of our website.

What could be more personally rewarding than to hear someone gasp in awe as they see for the first time the rings of Saturn through your telescope? It could be a life-changing moment, transforming a casual interest in astronomy into a passion. Besides bringing telescopes to schools and public star parties, our **outreach facilitators** present talks at civic events and astronomy conventions, and publish articles in local newspapers and in various astronomical publications.

Some ATMoB members might be referred to as “**unpaid professional astronomers.**” They differ from the casual amateur astronomer in that they make valid contributions to the scientific community. They have contributed brightness estimates of variable stars to the American Association of Variable Star Observers (AAVSO), timed occultations of stars by minor planets, and even monitored exoplanets.

With the spread of light pollution, some ATMoB members have become **activists**. From town and city meetings all the way to the Massachusetts State House, as well as through various media outlets, they educate the public about the detrimental effects of poor outdoor lighting and work with lawmakers to pass legislation to make sure future outdoor lighting doesn't contribute to the demise of our night sky.

The bulk of ATMoB membership is made up of so-called “**armchair astronomers.**” It's an unfair term that conjures up visions of sedentary folks parked in recliners, noses buried in astronomy magazines or books. In truth, these are avid astronomy enthusiasts who eagerly ply the Internet and printed media in an effort to learn about the latest astronomical discoveries. Because our monthly meetings are held near a world center for astronomical research, ATMoB has a rich pool of potential guest speakers, making all of us privy to cutting-edge astronomical news.

The beauty of this diversity is that anyone with an interest in astronomy can join ATMoB and immediately connect with folks who have the same interests. Most importantly, we may be diverse in our astronomical interests, but we're one in our connection to the cosmos.

Clear Skies and Happy New Year,

~ *Glenn Chaple – President* ~

December Meeting Minutes . . .



Andrew Vanderburg *

Minutes of the monthly ATMoB meeting held December 8, 2016 in the Phillips Auditorium at the Harvard-Smithsonian Center for

Astrophysics. Club President Glenn Chaple called the meeting to order at 8:00 pm.

- Phil Levine read the Secretary's Report.
- Eileen Myers gave the Treasurer's Report.
- Chris Elledge gave the Membership Report.
- Glenn Chaple presented the Observing Report.
On December 11, Mercury was at greatest eastern elongation.

On January 12, Venus and Neptune will be in close conjunction.

The Sue French Fan Club Pick of the Month for December was M33.

The LVAS Observers Challenge for December was M74.

- Bruce Berger observing suggestions for December are the open clusters, M36, M37 and M38 in Auriga. In addition, Bruce recommended the Chesire Cat asterism in Auriga.
- Steve Clougherty gave the Clubhouse Report.
Please note, Steve mentioned that mirror making at the Westford Clubhouse will be moving from Thursday nights to Saturday nights, beginning on the first Saturday in January.
- Announcements:
Glenn mentioned an interesting book entitled *Earth in Human Hands*, by David Grinspoon, <https://www.amazon.com/Earth-Human-Hands-Shaping-Planets/dp/1455589128>. A book signing at the Harvard Coop Bookstore was held on December 9th.

Glenn also informed the membership of an interesting astronomy related website, universalworkshop.com maintained by Guy Ottewell. (*Editor: Guy Ottewell will no longer publish his annual Astronomical Calendar, but will instead maintain an astronomical blog at the Universal Workshop website.*)

Eileen Myers informed the membership of the upcoming New Year's Party at the Westford Clubhouse.

Mario Motta announced that two major U.S. cities, Los Angeles and Chicago, are moving to 3K LED lighting instead of 4K LED lighting. These are positive developments that help preserve the night skies.

Michael O'Shea, from the urban astronomy outreach group Popscope, informed the membership about the Friday evening Star Parties at the Boston Children's Museum, and invited ATMoB members to assist.

<https://bostonchildrensmuseum.wordpress.com/2016/12/08/seeing-stars-on-the-waterfront/#more-2556>

- Old Business:

Maria Batista gave the membership an overview on navigating and logging in to the new ATMoB website. President Glenn Chaple and Vice-President Tom McDonagh, thanked all members of the Website Committee for all their hard work getting the new club website operational. The members are Maria Batista, Bruce Berger, Glenn Chaple, Chris Elledge, Neil Fleming, Kristy Glidden, John Harrington, Bernie Kosicki, Brewster LaMacchia, Ricky Leiserson, Tom McDonagh, George Paquin, Dave Stanley and Bernie Volz.

- New Business:

Bernie Voltz informed the membership about an opportunity to assist with Star Parties organized by the Appalachian Mountain Club (AMC). Bernie will be writing up some information for interested ATMoB members who would like to volunteer for AMC Star Parties. Contact Bernie (volz@cisco.com) if you are interested.

Glenn Chaple introduced the guest speaker for the evening: Andrew Vanderburg, a graduate student at the Harvard-Smithsonian Center for Astrophysics (CfA). Andrew gave an overview of white dwarf stars, presented background on the Kepler space telescope mission as planet hunter, and gave an in-depth look at the white dwarf star (WD1145 +017) research project he is leading at the CfA. He explained that light curve data from distant stars are being collected by the Kepler Space Telescope, to identify planets by analyzing possible planetary transits crossing in the path of stars.

<https://kepler.nasa.gov/Mission/QuickGuide/howKeplerFindsPlanets/>

Andrew highlighted how a white dwarf burns up its hydrogen and then helium, after which the gas shell goes through various cycles of extreme expansion and contraction. Because of the enormous gravitational force of the white dwarf, orbits of planetary bodies are likely altered, becoming more elliptical and likely drawing some bodies much closer than usual.

The original Kepler mission (K1) operated with 4 gyroscope devices (wheels) which pointed Kepler in an area between Vega and Deneb. In 2012 one of the 4 gyroscopic wheels failed, but Kepler only required 3 out of 4 wheels to orient its position, and was able to continue collecting data. In 2013 another wheel failed which disabled the Kepler space telescope. NASA was able to problem-solve the loss of the orientation wheel, by utilizing the pressure of solar radiation as an orientation aid. The resulting planet search area was vastly increased, meaning the Kepler telescope could continue (as Kepler K2) to function and collect data.

<https://www.nasa.gov/feature/ames/kepler/mission-manager-qa-recovering-the-kepler-spacecraft-to-hunt-for-exoplanets-again>

Andrew noted the data obtained by K2 was not as “clean” as K1, due to increased drift after the loss of the second wheel, and potential light curve data indicating a planet transit was difficult to analyze. By recognizing the error in the data had a repeatable pattern, Andrew Vanderburg, along with John Asher Johnson, developed an algorithm to improve the quality of light curve data, to detail possible planet transits.

<https://arxiv.org/pdf/1408.3853v1.pdf>

Andrew described how light curve data and spectral analysis from a white dwarf star, WD1145 +017 indicated something interesting was happening. Light curve data showed a sharp dip and then a gradual rise in intensity, suggestive of a planetary transit, but the gradual rise in intensity was unusual. In addition, other light curve data showed intermittent dips and rises in light intensity. This finding was not expected. Extensive analysis suggested that a small planetoid was being pulled very close to WD1145 +017, and was being torn apart with a resulting “tail” of debris which followed the planetoid as it orbited the white dwarf. Trace elements of heavy metals and elements representative of rocky content were detected in the spectral analysis. The material from the planetoid is thus being incorporated into the white dwarf star.

https://www.cfa.harvard.edu/~avanderb/wd1145_017.pdf

Andrew detailed how amateur astronomers have been very helpful providing corroborative light curve data to assist this research project at the CfA. ATMoB members Mario Motta (at his home observatory in Gloucester) and Gary Walker, resident astronomer at Maria Mitchell Observatory on Nantucket, have helped by recording and providing light curve data from WD1145 +017.

Refreshments for the evening were provided by Tom McDonough

Glenn Chaple adjourned the meeting at 9:50 pm

~ Phil Levine - Secretary ~

Membership Report . . .

Important notice regarding our transition to the new ATMoB Website through Club Express:

All members with email addresses on record with the club should have received a Welcome email from Club Express on behalf of ATMoB with a username and password. If you did not receive the email and wish to have a login on the new website, please contact me. The new website is currently available at <http://atmob.clubexpress.com>.

There will be a small delay in switching <http://www.atmob.org> to point to the new website. We hope to have this happen in early January. This will also switch our mailing lists over to the combined Forum and Email system at Club Express. We greatly appreciate your patience and understanding as we deal with this difficult transition.

I am pleased to welcome our newest members: James Synge and Steve McDonald.

This report and future reports that I give will be from the Club Express Database, so the information provided is a bit different from before. As of December 25th, 2016 we have 365 members. This is broken down as follows: 174 Regular Members, 89

Senior Members, 5 Student Members, 29 Family Accounts with 91 Members, and 6 Guest Members

~ Chris Elledge – Membership Secretary ~

Meeting Recordings . . .

The recording of ATMoB meeting #894 is available on YouTube: <https://youtu.be/FvkupkSYf1E>

This link is different than the one I sent out on ATMoB Announce. I needed to make a small edit to the video, and the old version will be deleted in the near future.

I would like to thank Andrew Vanderburg for allowing us to record his presentation on The Story of WD 1145+017 – Destruction of an Exoplanet.

~ Chris Elledge – Membership Secretary ~

Clubhouse Report . . .



Painting the Polishing Room.
(Front) Steve Clougherty, Background (L-R) John Stodieck, Brian Rusch *

December 2016 Clubhouse Report

During the month of December there were two actual work parties. The first work session took place on Saturday, Dec. 10, with 17 volunteers present. The second one for the New Year's Eve set up party occurred on Monday, Dec. 26 with a total of 14 volunteers. Each was a great success!

Volunteers pitched in and completely cleaned and painted the ceiling and walls in the polishing room on Saturday, Dec. 10. Everything was back in its place by the end of the work session that day. We would like to completely paint the entire first floor as a goal for the remaining winter work parties this season.

John Maher installed a cord on the first floor stairwell to turn on/off the second floor hallway light.

Bruce Berger and Jim Gettys tackled the installation of the new circuit board in the Paramount and it is working properly. They

also re-greased the RA and Dec gears in the mount. Final alignment will be done in the near future. The heating cables which were installed during last month's work party have been operating well. Please check with Bruce or Jim before attempting to operate the observatory when there is ice and snow on the dome roof.

Eric Johanssen and Mike Mattei reinstalled the field mirror in the Schupmann telescope after the recoating was completed by Steve Jaynes of West Medford. Members who are interested in using this wonderful planetary telescope should get in touch with Eric who will help them with their observing projects.

Al Takeda replaced the CMOS battery, and cleaned and reinitialized the controller, for the Losmandy Gemini 2 mount. The Clamshell Observatory is operating well and John Maher is the contact person for members who are interested in operating the 10-inch Meade scope.

Sai Vallabha has maintained an inventory of food and soda at the Cubhouse and handles the coffee fund for us. Many thanks for his efforts this year!

Our kitchen crew prepared a lunch of pasta, salad and chicken. The desert menu was pears, orange slices and panettone. Thanks to Jim Gettys, Eileen Myers, John Reed, John Stodieck, Art Swedlow and Sai Vallabha.

Fantastic Hydrogen-alpha views of the Sun were provided by Paul Cicchetti.

Special thanks go out to Eileen Myers and Al Takeda for doing a tremendous job in organizing the New Year's Eve party once again this year!

We would like to thank the following volunteers for their very helpful efforts during the month of December: Bruce Berger, John Blomquist, Glenn Chaple, Paul Cicchetti, Steve Clougherty, Jim Gettys, Eric Johansson, Rachel Legmann, Phil Levine, Ed Los, John Maher, Mike Mattei, Eileen Myers, Ben Myers, John Reed, Brian Rusch, Sergio Simunovic, John Stodieck, Art Swedlow, Al Takeda, Bill Toomey, Bob Toop and Sai Vallabha.

Our next scheduled work session will be held on Saturday, January 14.

Important Notice: Due to changing work schedules and commuting times for our optical experts, the Clubhouse **WILL NOT** be open on Thursday evenings. Mirror making sessions will now take place on **Saturday evenings beginning at 7:00 pm**. We hope that you will have patience with us as we transition to this new time period.

~ Clubhouse Committee Chairs ~

~ Steve Clougherty, John Reed and Dave Prowten ~

Clubhouse Evening Schedule	
Friday Night Educational Videos	7:00 pm - 10:30 pm #
Saturday Night Mirror Making	7:00 pm - ##
Saturday Night Observing	7:00 pm - ##
# Closing time is determined by the organizers	
## Closing time is determined by the "A" members on duty	
Note: The Clubhouse is closed on the 2nd Thursday of the month for our monthly meeting in Cambridge.	
Due to inclement weather conditions on Saturday evenings, the "A" members on duty may elect to close the Clubhouse. Please call the Clubhouse at (978) 692-8708 or check for messages posted to ATMOb-ANNOUNCE.	

Clubhouse Saturday Schedule		
January 14	WORK PARTY # 1 NO DUTY	
January 21	Phil Rounseville	Joe Wolfe
January 28	Steve Clougherty	Joe Henry
February 4	John Panaswich	Jim Gettys
February 11	WORK PARTY #2 NO DUTY	
February 18	Nina Craven	Brian Maerz
February 25	Bruce Berger	Glenn Meurer

****Duty member is supplemented by a work crew volunteer. If a volunteer is not available, the work crew closes the Clubhouse**

Sky Object of the Month . . .

January 2017

Courtesy LVAS Observer's Challenge***

NGC 1545 – Open Cluster in Perseus

Magnitude 6.2; Size 12'



NGC 1528 (top right) and NGC 1545 (bottom left). www.alsonwongastro.com

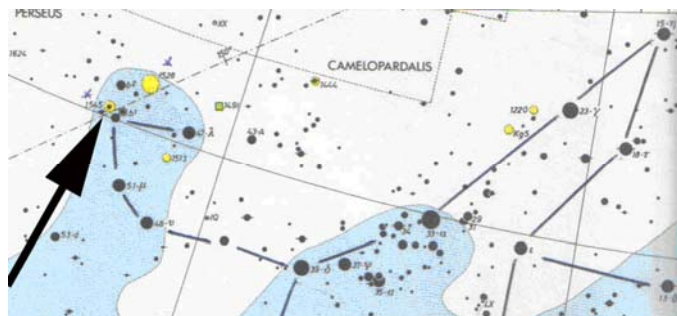
In the northeast corner of Perseus is the beautiful open cluster NGC 1528. This is not the January, 2017, Observer's Challenge object, but it's worth starting here before moving 1.5 degrees southeastward to our real target, the open cluster NGC 1545 Both

clusters shine at magnitude 6.2, with NGC 1528 being larger and richer.

NGC 1545 lies a few arcminutes east of the 5th magnitude star b Persei, and is dominated by the wide triple star South 445 (observed and catalogued by the British astronomer Sir James South in 1825). Its three members, of magnitudes 7.1, 8.1, and 9.3, form an isosceles triangle. The brightest is a yellow-orange K5 giant. About 7.5' north of S445 is the double star Struve 519 (magnitudes 7.9 and 9.4, separation 18.3") whose primary is also yellow-orange.

On March 18, 1979, I observed and sketched S445 and Struve 519 using a 3-inch f/10 reflector at 60X. I failed to notice the fainter stars that comprise the bulk of NGC 1545. My Observer's Challenge will be to re-observe the area with the 3-inch and see if I can pick out some of the dozen or so 10th to 11th magnitude members. Steven O'Meara, author of the *Herschel 400 Observing Guide*, reports adding 3 dozen more stars with a 4-inch scope at 101X.

Discovered by William Herschel in late December, 1790, NGC 1545 also bears the Herschel designation HVIII85 (H858) – the 85th entry in his 8th category of deep-space objects (coarsely scattered clusters of stars). It lies an estimated 2500 light years away.



Sky Atlas 2000.0

***The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone who is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in their monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either [Roger Ivester \(rogerivester@me.com\)](mailto:rogerivester@me.com) or [Fred Rayworth \(fred@fredrayworth.com\)](mailto:fred@fredrayworth.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.

~ Glenn Chaple – Observing Committee ~

AMC Astronomy Program . . .

The AMC (Appalachian Mountain Club) has had an astronomy outreach program for several years (see <http://www.outdoors.org/outdoor-activities/astronomy.cfm>).

Recently, I spoke with Dr. Douglas Arion, who heads the program, to see if there is something the ATMOb might be able to do to participate. He is very interested in volunteers to help out

with their programs and any equipment donations that would assist the program.

As an initial step, contact me (volz@cisco.com) if you're interested in volunteering (even if just a day or two) during the months of May through September when the program is active.

Dr. Douglas Arion may be a future meeting speaker to talk about the AMC program.

~ Submitted by *Bernie Volz* ~

Mini Grant Program for the 2017 Eclipse . . .

I have been appointed to the American Astronomical Society (AAS) eclipse committee for the past 2 years. The AAS was able to collect funds from various sources (including the National Science Foundation (NSF)), with the purpose of distributing the funds to worthy local outreach. If the club or anyone in the club wants to make an outreach attempt, you can apply for funds to help cover that expense. You do **NOT** need to say that you are going to the area of totality. The club can host a free outreach program for the partial solar eclipse here in Boston.

Note, time is very short. (Editor: The deadline is 5:00 p.m. Eastern time, Friday, January 13, 2017.)

<http://cs.astronomy.com/asy/b/astronomy/archive/2016/12/22/a-mini-grant-program-for-the-solar-eclipse.aspx>

~ Submitted by *Mario Motta* ~

Chandra Software Developer Needed . . .

The software development team of the Chandra data system division has an opening for a software developer to support data reduction and analysis tools for NASA's Chandra X-ray Observatory. The successful candidate will work to extend and maintain the data system functionality and to support its operations.

Knowledge required for the position includes

C/C++, Python, Java, Unix based operating system, and data bases and data access via standard protocols. We offer a challenging environment working in partnership with science and data systems operations teams and an existing software development team, to bring Chandra data products and science analysis tools to the astronomical community at large.

Duties include:

- Communication with scientists for software requirements.
- Software development and maintenance through all phases of the software development lifecycle.

- Technical writing support for internal and user documentation.
- Problem analysis and evaluation in support of science operations and user input.
- Ability to work as part of a team.

We will only accept applications on line for this position. To view the complete vacancy announcement and online application procedures, please visit

<https://www.usajobs.gov/GetJob/ViewDetails/448766700/>

~ Submitted by *Jan E. Kansky* ~

ATMoB's 2017 New Year's Eve . . .



About 40 partygoers arrived early and left early due to the rain, with 10 revelers remaining to welcome in Eastern Daylight Time's midnight. Everyone dressed themselves in funny hats and beads, and while blowing or shaking noisemakers, toasted the arrival of 2017 at various locations around the globe. By 9:00 PM the Clubhouse was jumping, with live music provided by Ed Los (fiddle), Claude Galinski (guitar) and Amy Colby (5-string violin). Julie Kaufmann led us in line dancing. Dancers had fun moving to the music under the twirling colored lights and turning mirror balls over the kitchen dance floor (thanks to Al Takeda) – “an ole time kitchen dance” is what Ed Los called it.



(L-R) Julie Kaufmann, Monique Reed, Dave Wolfendale, Eileen Myers *

However, a sudden shock came over everyone when the Zenomorph from “Alien” walked into the Clubhouse...staying for a while and calmly speaking with all who dared to come close.



(L-R) Eileen Myers and the Alien *

Lots of food was enjoyed: turkey with stuffing, salmon, avocado with smoked salmon sushi, spanakopita, meatballs, couscous, Portuguese chorizo and pepper sandwiches, Greek salad, deviled eggs, antipasto, pizza, and more, with desserts such as Phil Levine’s homemade chocolate chip cookies and his wife Linda Levine’s homemade fudge, candy cane cookies, powdered sugar covered nut balls, chocolate log, cakes and cupcakes, pies, fruit salad, and more.



Another year, more desserts! *

Thank you to the 14 folks who answered the call to clean the Clubhouse and set up decorations, and enjoy the traditional bagels and lox brunch, along with ham contributed by Phil Levine and his wife Linda: Al Takeda, Art Swedlow, Bob Toop, Eileen Myers, Eric Johansson, Glenn Chaple, Marsha Bowman, Mike Mattei, Nina Craven, Paul Cicchetti, Phil Levine, Rachel Legmann and Sai Vallabha. Set up was completed in record time!

Thank you to Al Takeda and Julie Kaufmann, with help from Marsha Bowman, for maintaining the food tables during the party.

Thank you to party coordinators Al and Eileen who took down and re-organized all of the decorations for storage, and for performing Clubhouse clean up chores during the next 2 days.

Despite the threat of where the rain/snow line would fall, folks came to the party and a fun time was had by all!



(Clockwise from top left) Monique Reed, John Reed, Marsha Bowman and Eric Johansson and Rachel Legmann *

~ Submitted by Eileen Myers ~

Julie Sage's Science News Site . . .



Julie Sage - Supernova Style Science News. Image courtesy J. Sage

Junior ATMoB member, Julie Sage, has started her own science news show, [Supernova Style Science News](https://www.youtube.com/channel/UCv8v8v8v8v8v8v8v8v8v8v8), on YouTube. Her web site is

www.supernovastylesciencenews.com.

She currently has 9 videos, with more on the way.

~ Submitted by Christy Sage ~

Editor: * Photos by Al Takeda unless otherwise noted.

February Star Fields DEADLINE
Sunday, January 22nd

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed January 8, 2017

Amateur Telescope Makers of Boston, Inc.
c/o Chris Elledge, Membership Secretary
99 College Ave
Arlington, MA 02474
FIRST CLASS

EXECUTIVE BOARD 2016-2017

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NEWSLETTER Al Takeda newsletter@atmob.org

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 see www.atmob.org and check your email on the ATMOB-ANNOUNCE list.

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.

Jan 5 First Quarter Moon (Moonset at midnight)
Jan 12 Full Moon, Venus at greatest eastern elongation (evening)
Jan 12 Venus 0.4-deg. N. of Neptune
Jan 18 Porrima (Gamma Virgo) Occultation by the Moon. 05:15:50 UT
Jan 19 Last Quarter Moon (Moonrise at midnight)
Jan 27 New Moon
Feb 3 First Quarter Moon (Moonset at midnight)
Feb 10 Full Moon
Feb 10 Penumbral Lunar Eclipse. 07:43:49 EST (00:43:49 UT - Feb 11)