



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

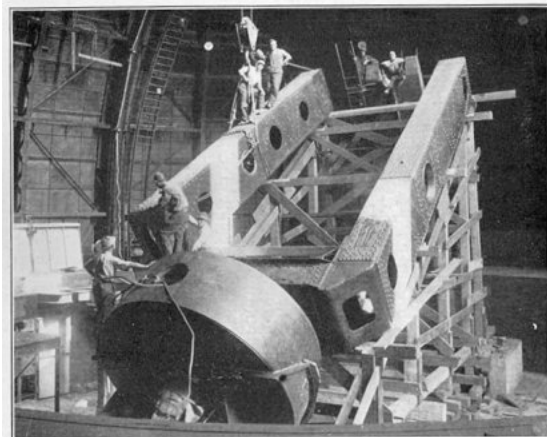
Vol. 29, No. 9 October 2017

This Month's Meeting . . .

Thursday, October 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



Erecting the polar axis of the 100-inch telescope. George Ellery Hale

Building the One Hundred Inch Telescope - In Boston

ATMoB members are likely well aware that the Hooker telescope on Mt. Wilson was used to measure the distance to the Andromeda galaxy, and thereby establish the true scale of the universe. But few know that the mechanical system for the instrument was largely built at the Fore River Shipyard under the supervision of MIT professor emeritus Peter Schwamb. Peter was a scion of Arlington's Schwamb families, who ran woodworking factories along Mill Brook. The Charles Schwamb mill, now known as the Old Schwamb Mill, was once the location of the ATMoB workshop.

The Mt. Wilson archives preserved the correspondence between Peter and the observatory management in California, while they tried building the giant mount and tube in the face of

technical and budget problems, upheavals at Fore River, and the onset of a world war. The Hooker was the Space Telescope of its day (it had a flawed mirror, too) and its construction is a fascinating story of early Big Science.

Tom Calderwood will give a talk about the 100-inch Hooker telescope and the connection between that instrument and the Schwamb family. Tom is a long-time member of the ATMoB, now retired in his home state of Oregon, from whence he came east to attend MIT. His local career as a software engineer included an extended stint working on the Chandra X-ray Observatory's data system. In the comparatively cloud-free environment of the Central Oregon desert, he practices photoelectric photometry and helps with the public programs of Pine Mountain Observatory.

Please join us for a pre-meeting dinner discussion at House of Chang, 282 Concord Ave, Cambridge, MA at 6:00 pm before the meeting.

President's Message . . .

You're sitting in the waiting room of your doctor's office. Through the door comes an elderly man on a walker. You get a single mental snapshot – that of a frail, white-haired old man. That's your only glimpse into the scrapbook of his life. You don't see the little boy playing catch with his dad, the teenager being scolded for pulling on a girl's pigtails in math class, or the young man slogging ashore at Omaha Beach praying to God that he survives the day. You don't see that same young man a year later as he walks down the aisle with his new bride – that same pig-tailed girl he tormented in school. There are other snapshots – the man holding his newborn baby daughter, nervously watching the clock as he waits for her to return from her first date, misty-eyed walking her down the aisle. There is so much of the scrapbook of his life that you never get to see. All you have is the one of a frail, white-haired old man.

And so it is with Howard LeVaux. I never knew him in his younger days. Sadly, my single snapshot is that of a frail gentleman sitting in a wheelchair at the monthly ATMoB meetings. Recently, I read his obituary in *Star Fields*, and the scrapbook opened up. I saw images of a young scientist studying the aurora australis in Antarctica and a world traveler whose adventures took him to Australia, Hong Kong, Japan, and Europe. There were snapshots of Howard the skier, challenging slopes in the Alps, Canadian Rockies, Sierra Nevada, and Laurentian Mountains near Montreal, where he met his wife, Jean. Two snapshots showed him skiing Tuckerman's Ravine and bungee-jumping off Victoria Bridge in Africa – the man must have been certifiably insane!

My snapshot of a wheelchair-bound Howard LeVaux belies an active life which, besides skiing, included rock and mountain climbing, kayaking, running marathons and, to cap it off, a ritualistic 32-mile hike around Mt. Kailash in Tibet. There was a snapshot of Howard the deer and elk hunter who probably captured his prey by running them down on foot. Of course there are snapshots of Howard's years as an active amateur astronomer who made his first telescope at age 12 and later traveled the

world from Mongolia, Baja California, and Australia to China, Aruba, and Hungary chasing solar eclipses.

I'm sure that Howard's obituary was a mere glimpse of a life of adventure and love that Howard shared with Jean, his family, and his friends. Rest in peace, Howard – you compiled quite a scrapbook!

Clear Skies,

~ *Glenn Chaple – President* ~

September Meeting Minutes . . .



Total Solar Eclipse from Marion, Illinois, Image by Bert Halstead

Minutes of the monthly ATMoB meeting held September 14, 2017, in the Phillips Auditorium at the Harvard-Smithsonian Center for Astrophysics. Vice-President Tom McDonagh called the meeting to order at 8:00 pm.

- Phil Levine read the Secretary Report
- Eileen Myers presented the Treasurer's Report
- Chris Elledge presented the Membership Report
- Tom McDonagh presented the Observing Report
- Steve Clougherty presented the Clubhouse Report
- Announcements:
John Sheff informed the membership about the upcoming Cassini "end of mission" plunge into Saturn, to be broadcast on NASA TV within the next few days.

Tom McDonagh listed upcoming events: The Astronomer's Conjunction in Northfield September 15-17, Acadia Night Sky Festival September 21-24, and the annual ATMoB Picnic Saturday September 23.

Tom McDonagh led the membership in a moment of silence in memory of longtime ATMoB member Howard LeVaux who recently passed away.

- Old Business: none

- New Business: none

Tom informed the membership that the guest speaker next month will be Tom Calderwood. The title of his presentation: "Building the One Hundred Inch Telescope – in Boston".

The guest speakers for the September meeting included various ATMoB members, who recounted their great American total eclipse experience. Entitled: "ATMoB Members' Eclipse Adventures", the speakers delivered striking PowerPoint presentations.

Participants included: Jean LeVaux, Bernie Volz, Mario Motta, Phil Levine, Arianna Roberts, Maria Batista, Tom McDonagh (presented a PowerPoint by Bruce Berger), Michael Brown, and Alan Sliski.

The first presentation included a photo montage of ATMoB member Howard LeVaux's professional scientific contributions and accomplishments during his life, followed by photos of Howard's various scientific expeditions and solar eclipse experiences over the years.

Howard's wife, Jean LeVaux then presented a touching retrospective recollection of how much Howard loved sharing astronomy experiences with ATMoB members, and with his family over the years. During his life Howard viewed many solar eclipses with Jean. She presented a photo of Howard, surrounded by loving family members, experiencing his last solar eclipse on August 21, 2017. Mario Motta recounted sharing many eclipse trips with Howard, and fondly mentioned Howard was always famous for packing mass quantities of astronomy equipment.



Jean LeVaux *

The next two members presenting eclipse highlights were Bernie Volz and Mario Motta. Bernie and Mario were instrumental in organizing the ATMoB group's eclipse trip with 147 people gathering in Columbia, Missouri. There was a pre-eclipse tour and viewing at the Morrison Observatory on Saturday, August 19th.

Weather forecasts for the Columbia area prompted Bernie, Mario, and ATMoB's chief weatherman, Dr. Fred Ward, to seek an alternate "Plan C" viewing site. Ninety-Three members departed Columbia, MO on 3 buses at 4:30 a.m. for a four hour bus drive to an undetermined viewing site. Bernie and Mario had to make last minute arrangements for food to be packed for the bus trip. The group ended up on the grounds of the Cornerstone Church in Marion Illinois.



(L-R) Bernie Volz and Mario Motta *

Photos from various club members were then presented, with individuals describing various software programs and methods used for their photos: Evan Slater, Michael Aramini, Justin Motta, Bernie Volz, J. Sano, Sal LaRiccia, Bert Halstead (Mario Motta indicated he feels Bert has the most outstanding eclipse photos of any he has seen), George East, Noreen Grice, Eric Reines, Nick Bealo, Mario Motta, Al Takeda, Doug Paul, Evan Slater, Tomek Mragalski, Peter Bealo, Dick Koolish, Charles Leiserson, Richard Nugent and Ben Myers.

Also shown were some outstanding images from Jay Pasachof and NASA. Bernie Volz informed the membership there was a surplus of \$2600 from the ATMoB trip, which will be donated to ATMoB.



Phil Levine *

The next PowerPoint was from Philip Levine. This presentation showed partial solar eclipse photos from the ATMoB Clubhouse in Westford MA. Photos were submitted by Joe Wolfe, Phil

Levine, George Paquin, and Debra Mahoney. The members and guests who attended (a turnout of some 40 people) enjoyed a festive event, with food provided and cooked by George Paquin and Debra Mahoney.



Arianna Roberts *

Arianna Roberts presented a summary of the Citizen CATE Project: "The Citizen CATE (Continental-America Telescopic Eclipse) experiment aims to capture images of the inner solar corona using a network of more than 60 telescopes operated by citizen scientists, high school groups and universities. CATE is currently a joint project involving volunteers from more than 20 high schools, 20 universities, informal education groups, astronomy clubs across the country, 5 national science research labs, and 5 corporate sponsors. The goal of CATE is to produce a scientifically unique data set: high-resolution, rapid cadence white light images of the inner corona for 90 minutes."

Arianna thanked ATMoB for providing monetary assistance and training help. She expressed special thanks to Glenn Chaple and Bruce Berger who provided equipment training at the Westford Clubhouse. ATMoB will receive the equipment Arianna used during the solar eclipse, which includes a telescope, mount, and camera. This equipment will be available at the Westford Clubhouse for public outreach use.

<http://eclipse2017.nso.edu/citizen-cate/>



Maria Batista *

Maria Batista gave a presentation of the total solar eclipse as viewed from Ocean Lake, Wyoming. Maria's trip out to Wyoming included visits to Craters of the Moon National Park, Yellowstone, and the Grand Tetons. The photo presentation included images taken by Maria and Jerry Dreiss.

Bruce Berger put together a presentation of solar eclipse images as viewed from Hopkinsville, Kentucky. Tom McDonagh stepped through the presentation, as Bruce was unable to attend the meeting. Images included local scenes of people getting into "eclipse fever", reflecting a party and festive atmosphere.

The next presentation was from Michael Brown who viewed the solar eclipse from Madras, Oregon. This area of Oregon, usually sparsely populated, became overpopulated, becoming inundated with visitors all thinking the area would be deserted. Michael ended up modifying his long standing plans and viewed the eclipse from an agricultural research center.

The last presentation was given by Alan Sliski, who viewed the solar eclipse from Salem, Oregon. Alan presented a dramatic video of the solar prominences on eclipse day, providing the best images of solar prominences shown during the meeting.

James Syngé set up and demonstrated the Project Panoptes equipment he fabricated and exhibited at Stellafane this year, where he was awarded 3rd prize in the Special Award Category. John Blomquist provided assistance to James at various stages of the project, utilizing the machine shop at the Westford Clubhouse.

Dick Koolish thanked Bernie Volz, Mario Motta and Fred Ward, for all their hard work planning, organizing and coordinating the ATMob solar eclipse trip to Missouri.

Refreshments for evening were provided by Maria Batista.

Tom McDonagh adjourned the meeting at 9:30 p.m.

~ Phil Levine - Secretary ~

Meeting Recordings . . .

The recording of ATMob meeting #901 is available on YouTube: <https://youtu.be/5pmZS5dtdCs>

I would like to thank Bernie Volz, Mario Motta, Phil Levine, Arianna Roberts, Maria Batista, Bruce Berger, Michael Brown, and Alan Sliski for their presentations.

This link is to the publicly available cut of the meeting recording. To view the original version of the meetings, please see the Announce Forum on the ATMob Website <http://www.atmob.org>

~ Chris Elledge - Membership Secretary ~

Membership Report . . .

I am pleased to welcome our newest members Daniel Bernstein, James Liu, Alex Bowers, Evelyn & Lillian Bowers-Liu, Barry Jensen, and the family Harrison, Gabrielle and Arianna Roberts.

As of September 26th, 2017 we have 244 memberships covering 293 members. This is broken down as follows:

- 127 Regular Members
- 86 Senior Members
- 3 Student Members
- 26 Family Membership covering 75 Members
- 2 Guest Members

Renewal season is over so our membership numbers have dropped. 110 renewals are still due. Memberships that are not renewed by December 1st will expire.

You can check if you need to renew and start your renewal process on the website at <http://www.atmob.org/renew>.

You can also download the membership application from the website at <http://www.atmob.org/signup> by clicking on the "Download an application" link.

Donations are encouraged during membership renewal to help keep our club running smoothly, our Clubhouse maintained, and telescopes in good condition. Donations are tax deductible to the extent allowed by law. If you choose to pay by credit card please consider making at least a small donation since credit card companies take a few percent of your payment to the club. Credit card payments will be charged through Club Express.

Please contact me if you need any help with renewing or logging into the website.

~ Chris Elledge - Membership Secretary ~

Clubhouse Report . . .



(L-R) Tom Wolf and Chris Elledge *

August 2017 Clubhouse Report

The August 5th work party was the final help session for eclipse preparation before members left for their chosen viewing sites. Since a majority of members would be observing from the Clubhouse or local sites, the normal grounds mowing, raking, and trimming, delayed by inclement weather, was accomplished the next day by Al Takeda and mowed again by John Blomquist before the eclipse.

The hornet removal process continued, and a broken pane from a 2nd floor window was temporarily covered. Damp weather precluded scraping or painting until September. A grilled lunch was served by the Clubhouse lunch team.

Thanks to the 17 members who signed in the log book: Maria Batista, John Blomquist, Marsha Bowman, Nina Craven, Ed Los, John Maher, Nkosi Muhangi, Eileen Myers, Dave Prowten, John Reed, Christy Sage, Dan Sage, Julie Sage, John Stodieck, Bill Toomey, Sai Vallabha and Tim Yip.

September 2017 Clubhouse Report

The September 9th work party concentrated on sprucing up the Clubhouse for the upcoming annual picnic. Observatories were cleaned, hornets "dispatched", the house cleaned and the grounds were "manicured". The front porch was scraped, washed and stained with fresh white solid stain by Marsha B., Tom W., Maureen G., John S., & Chris E.

The intrepid lunch crew was grateful to the paint crew for allowing them to temporarily use the grill and lunch was served on time. The 23 members who made this day possible were: Bruce Berger, John Blomquist, Marsha Bowman, Paul Cicchetti, Chris Elledge, Maureen Galevi, Jim Gettys, Eric Johansson, Dick Koolish, Bernie Kosicki, Ed Los, John Maher, Mike Mattei, Ben Myers, Eileen Myers, Dave Prowten, John Reed, John Stodieck, Art Swedlow, Al Takeda, Bill Toomey, Sai Vallabha and Tom Wolf.

Of special note were the special presentations given by members of various eclipse expeditions. This gave us a preview of the larger synopsis of eclipse stories presented at the September 14th club meeting at the Center for Astrophysics at Harvard University.

In the midst of all this activity, the club was notified by member Steve Mock that we were offered the 16-inch Meade Schmidt-Cassegrain telescope on an altitude/azimuth (alt/az) mount from Bentley University. If we accepted the offer, it had to be moved expeditiously. Many decisions were carefully made during an initial visit to the Bentley Observatory and the acquisition trip was made on September 16th, led by Steve Clougherty and Dave Prowten. This took a team effort to assess this donation and move it to the Clubhouse.

Dave Prowten then acquired a machined mounting plate to mate the 16-inch to the Schupmann pier in the Ed Knight Observatory. The telescope was installed before the picnic on September 23rd. The system checked out "A-OK" and was

available for viewing as twilight fell on our picnic. Observing through the 16-inch scope lasted well past midnight.

Important Notice: Mirror making sessions will now take place on **Saturday afternoons beginning at 3:00 pm. Other times may be scheduled. Check your email on the ATMOB-ANNOUNCE list.**

~ *Clubhouse Committee Chairs* ~

~ *Steve Clougherty, John Reed and Dave Prowten* ~

Clubhouse Saturday Schedule		
October 14	Glenn Meurer	Dave Prowten
October 21	Joe Henry	Paul Courtemanche
October 28	Mike Hill	Brian Maerz
November 4	WORK PARTY # 11 Dave Siegrist & John Small	
November 11	Eric Johansson	Tom McDonagh
November 18	Karl Dean	Sai Vallabha
November 25	Phil Rounseville	Joe Wolfe
December 2	WORK PARTY # 12 NO DUTY **	

** Closing time for the Clubhouse is determined by the work crew

Clubhouse Evening Schedule	
Friday Night Educational Videos	7:00 pm - 10:30 pm #
Saturday Afternoon Mirror Making	3:00 pm - ##
Saturday Night Observing	7:00 pm - ##
# Closing time is determined by the organizers	
## Closing time is determined by the "A" members on duty.	
Saturday afternoon mirror making schedules will be posted to the ATMOB-ANNOUNCE email.	
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.	

Sky Object of the Month . . .

October 2017

Courtesy LVAS Observer's Challenge***

Messier 15 (NGC 7078) - Globular Cluster in Pegasus
Mag. 6.2; Diam. 18'

Pease 1 - Planetary Nebula in M15
Mag. 14.9[p]; Diam. 1"



Messier 15. Mario Motta, MD

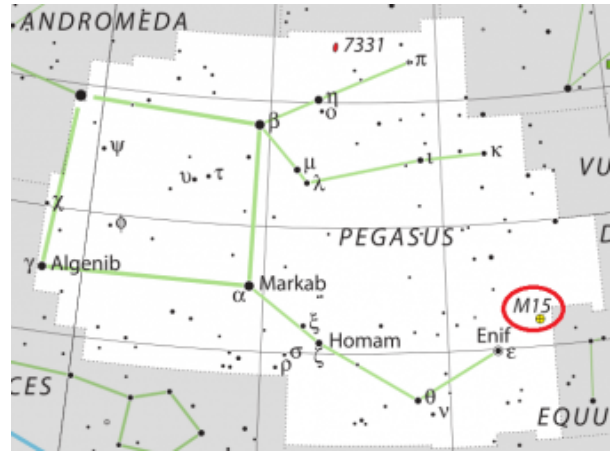
As difficult as last month's LVAS Challenge (NGC 6905) was to locate, this month's target, the globular cluster Messier 15, is a breeze to find. It lies 4° NW of the 2nd magnitude star Enif (epsilon [ε] Pegasi) and, at magnitude 6.2, can be glimpsed with the unaided eye from dark-sky locations. It's visible in binoculars as an out-of-focus star and in small-aperture scopes as a small roundish haze.



M15 and Pease 1 (pinkish object near top left) Hubble (STScI/AURA)

Telescopes in the 4 to 6-inch aperture range will resolve the outer portions of M15, but even much larger instruments will have difficulty resolving the core. That's because Messier 15 is quite possibly the densest globular cluster in the Milky Way. Half of its estimated 200,000 stars are concentrated within a 10 light year radius from the core. The jury is still out on whether this high concentration is due to the gravitational pull of a massive centrally-located black hole or merely the cumulative gravitation of the stars themselves.

If you own a large-aperture scope, try your luck with the embedded planetary nebula Pease 1. In his book, *Cosmic Challenge*, author Phil Harrington includes this planetary in a chapter devoted to "monster-scope" challenges. Discovered in 1928, it's one of just four planetary nebulae inhabiting a globular cluster and the "easiest" to capture visually. Those fortunate enough to have notched this 15th magnitude object have used scopes typically with apertures of 14 inches and up, although Pease 1 has reportedly been sighted in 8-inch instruments. With a diameter of just 1 arc-second, Pease 1 mandates near-perfect seeing conditions and a magnifying power in excess of 300X. An accurate finder chart like the one found on the messier.seds website (www.messier.seds.org/more/m015_ps1fc.html) is a must, as is an OIII filter to help you confirm the sighting. As you flicker the OIII filter back and forth between eye and eyepiece, Pease 1 will retain its brightness while surrounding stars fade noticeably.



www.universetoday.com

IAU, and *Sky and Telescope* (Roger Sinnott & Rick Fienberg)

M15 was discovered by the Italian astronomer Jean-Dominique Maraldi on the night of September 7, 1746 during observations of Comet de Chéssaux and independently by Messier about 18 years later. It lies about 34,000 light years away and is some 175 light years in diameter. Spectroscopic analysis shows that Messier 15 is approaching us at a rate of 66 mi (107km)/sec.

***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:Roger Ivester) or [Fred Rayworth \(fred@fredrayworth.com\)](mailto:Fred Rayworth). To find out more, click on the following links: [LVAS Observer's Challenge past reports](#) and/or visit the [Las Vegas Astronomical Society website](#).

~ Glenn Chaple for the LVASS ~

Annual ATMoB Picnic . . .



(L-R) Marsha Bowman and John Reed at the grill *

For over 20 years ATMoB has celebrated an Annual Picnic. The Clubhouse is transformed from a quiet farmhouse into a world of tents, telescopes and treats, to be enjoyed by members and their guests.



(L-R) Phil Rounseville and Phil Levine with their solar telescopes *



Mirror making demonstration by Julie Sage *

Making the Picnic happen takes a small army of volunteers with a desire to have fun. All involved feel it's worth the effort to show off the building and grounds we use to advance our common enjoyment of astronomy. Major cleaning, set-up and take-down efforts take place. Tours of observatories, mirror making demonstrations, a 2-mile hike to see the MIT radio observatories, and kids' activities all on one day. Lots of good food is prepared, brought and eaten. Members get to "hang" in small groups to talk and contemplate their past and future observing accomplishments and dreams.



(L-R) The Alvarez family: Christina, Hugo and Valentina *

This year's call for help brought out Christina Alvarez (kids' activities), Diego Alvarez, Hugo Alvarez, John Blomquist, John Boudreau, Marsha Bowman, Steve Clougherty, Nina Craven (kids' activities), Phil Levine, Skip Gaede, Maureen Galevi, Jim Gettys, Dick Koolish, Bernie & Pat Kosicki, John Maher, Terry Manning, Jim Mahoney, Eileen Myers, Dave Prowten, John and Monique Reed, Julie Sage (mirror making demo), John Stodieck, Al Takeda, Bill Toomey (tour guide for the walk-up-the-hill), Bill, Ned and Ray Toomey (large tent), and Brian Zemba. Please let me know if I missed your name.

We sincerely thank these hardworking volunteers, and when you see them, please thank them too.

~ Picnic Coordinators Eileen Myers, John Reed, Al Takeda ~

Asteroid (31848) Mikemattei . . .

A main belt asteroid that was discovered by the [Catalina Sky Survey](#)¹ on March 3, 2000 has been named for ATMob member Mike Mattei.

The citation from the IAU (International Astronomical Union) is reprinted below.

Congratulations Mike!

(31848) Mikemattei = 1990 SJ25 = 2000 EM21
 Discovered at Catalina on 2000-03-03 by CSS.
 (31848) Mikemattei = 2000 EM21

Michael Mattei (b. 1940) worked at Harvard College Observatory Agassiz Station as a young man moving to optics with various institutions and companies culminating in his work with M.I.T. Lincoln Labs working on projects from microscope optics to space telescopes. [Ref: Minor Planet Circ. 106501].

Citation written and submitted by Richard E. Hill - CSS.

¹The [Catalina Sky Survey](#) (CSS) is a NASA funded project supported by the Near Earth Object Observation Program (NEOO) under the Planetary Defense Coordination Office (PDCO). It is based at the University of Arizona's Lunar and Planetary Lab in Tucson, Arizona.

~ Al Takeda – Newsletter Editor and Member at Large ~

Editor: * Photos by Al Takeda unless otherwise noted.

November Star Fields DEADLINE
Sunday, October 22nd

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed October 10, 2017

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

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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 Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.

Oct 5 Full Moon
Oct 12 Last Quarter Moon (Moonrise at midnight)
Oct 17 Zodiacal Light visible before twilight in the East (next 2 weeks)
Oct 19 Uranus at opposition, New Moon
Oct 21 Orionid meteors peak
Oct 27 First Quarter Moon (Moonset at midnight)
Nov 4 Full Moon
Nov 5 Daylight Saving Time Ends