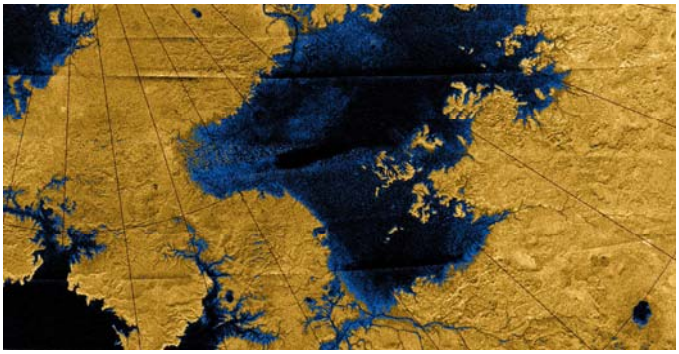
# STAR FIELDS

Newsletter of the
Amateur Telescope Makers of Boston
Including the Bond Astronomical Club
Established in 1934
In the Interest of Telescope Making & Using

**Vol. 25, No. 3 March 2013**


## This Month's Meeting…

**Thursday, March 14th, 2013 at 8:00 PM**
**Phillips Auditorium**
**Harvard-Smithsonian Center for Astrophysics**
Parking at the CfA is allowed for the duration of the meeting



PIA10008: Titan's North Polar Region. Copyright NASA/JPL-Caltech/USGS

## Rain, Rivers and the Icy Landscape of Titan

This month's speaker will be Dr. Taylor Perron of the MIT Department of Earth, Atmospheric and Planetary Sciences, whose research focuses on the physical processes that create landscapes, both on Earth and on other planets and moons. He will be speaking to us about Saturn's moon Titan, which is only one of three bodies (the others being Earth and Mars) in the solar system, where rivers of liquids have carved branching networks of valleys into the surface. Unlike those on Mars, Titan's rivers have been known for less than a decade, and they may be currently active. Unlike rivers on Earth and Mars, Titan's water ice landscapes have been carved by liquid hydrocarbons. Despite this exotic combination of materials, Titans river networks look strikingly similar to Earth's. Dr. Perron will describe his group's efforts to understand how Titan's rivers have shaped its landscape and how that landscape can constrain rates of methane rainfall, which have not been measured directly.

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…

When I was just getting into this wonderful hobby I read a book called *Starlight Nights* by Leslie Peltier. I'm sure many of you have also read this great book. It is indeed a classic. Among the vivid recollections I have of his book was when he described his early boyhood years growing up on a farm and his pleasant nights out under the dark skies, discovering for the first time the many wonders of the heavens. I'm sure his skies were indeed DARK. What a treat it would have been to have grown up in the days before electric lights permeated the darkness with such strength as to steal away from most of us, especially our younger members, the awe inspiring sight of the starry sky. The constellations would have been so full so as to be difficult to find, the band of the Milky Way cascading from horizon to horizon, and the occasional surprise when the glow of the ghostly zodiacal light showed itself just after sunset in the spring or before sunrise in the fall. These are things I long for but no longer see so easily – at least not from home. Not even from Westford which is supposed to be our dark sky retreat. Oh the wonders of electricity! I certainly wouldn't want to be without it, nor be without electric lights. But do we need so much lighting? We have entered into a time where light pollution is so pervasive as to be almost beyond hope. It has reached a point where you might just throw up your hands and give up.

But that is not the case. Yes it is bad, and it will never be the same as it was when living on a farm in 1910. But people are fighting back. Long time member, Mario Motta has been tirelessly pushing the State legislature for passage of a Dark Sky bill to try to arrest the growth of even more excessive lighting on our highways and public places. It has been an uphill battle for sure, but he has not given up. The time is near for its passage, and one can only hope, after years of ups and downs, that this time around it will finally make it through. There are other members of our club that have worked hard with their local towns to enact ordinances that work to control public and private light pollution. These grass root efforts have been quite successful, and we should be proud of all of them for being involved by working with their local officials and getting the word out. Lights are good, but they must be implemented with less waste, less excess and less light trespass. Even big name stores like Lowes are now starting to offer better lighting. The word is out and progress is being made. Let's all give thanks to all of those that have worked to make this happen, both members of our club and other clubs across the country. It would be nice if we could go back to the skies of the early 20th century, but I don't think that will be the case. At least we have begun to slow the growth and maybe, just maybe, keep the skies from getting any brighter.

***~ Mike Hill – President ~***

# February Meeting Minutes . . .

Arne Henden, AAVSO Director. Image by Al Takeda

February 14, 2013.

- Meeting held in Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics.
- President Mike Hill called the meeting to order at 8:00 PM.
- The Secretary's Report of the January 10, 2013 meeting was given by Sidney Johnston.
- President Mike Hill gave the Treasurer's Report which was prepared by Nanette Benoit.
- Glenn Chaple gave the Observing Committee Report.
- Steve Clougherty gave the Clubhouse Report.
- Old Business: None.

New Business:

- Mike Hill mentioned that there is a Board meeting scheduled for March 19, 2013. Mike also mentioned the mirror making activity at the Clubhouse on Thursday evenings.
- Al Takeda mentioned that MIT has invited ATMoB members to attend the February 15th activity of tracking the flyby of asteroid 2012 DA14 by radar at the MIT Haystack site.
- Mario Motta showed a large lens that he had purchased. The lens is 6.1-inches in diameter, f/1.25 with a focal length of 125 millimeters (mm), and has an exit pupil of 25 mm.

President Mike Hill introduced the speaker, Dr. Arne Henden, who spoke on the topic "Measuring the Unknown Universe". Arne received a Bachelor of Science in Astrophysics from the University of New Mexico (UNM) in Albuquerque in 1972, and a Masters in Physics from UNM in 1975. He later went on to receive a Master of Science in Astronomy in 1978 and a Ph.D. in Astronomy in 1985 from the University of Indiana in Bloomington.

Dr. Henden is the current Director of the American Association of Variable Star Observers (AAVSO).

Arne mentioned that there are more than 200,000 variable stars which need magnitude measurements on a regular basis. The ATMoB's 14-inch telescope in the ARIO (ATMoB Research and Imaging Observatory) Observatory is ideally suited to make many measurements on this universe of variable stars.

Arne mentioned that the history of the AAVSO traces to the Harvard photographic sky survey of the late 1800's - early 1900's. Local Boston amateurs were enlisted to monitor newly discovered variable stars. The AAVSO has always had a strong association with Harvard College Observatory (HCO) in the professional-amateur (pro-am) collaboration. The AAVSO office was at HCO until the 1950's and then moved off-campus in Cambridge in 1954. The AAVSO computerized database of variable stars dates from the 1960's, microcomputers were introduced in the 1980's, and the website in the 1990's. The AAVSO is today about 2 kilometers from the Harvard-Smithsonian Center for Astrophysics.

Variable stars are classified as "extrinsic variables" where planets or other bodies eclipse the star; or as "intrinsic variables" where the star simply varies in brightness, often due to "star spots" moving across the star. The Kepler space telescope finds that one half of stars are variables. There is a lot of overlap with some stars showing both extrinsic and intrinsic variability.

Arne then showed a light curve of the star SS Cyg from 1896 through 2004. The star has what appear to be regular brightening phases followed by declines to dim phases several times per year, but not quite with a cyclical regularity.

There is great value in measuring light curves of variable stars. Some of the value is in using them as standard candles such as supernovas to determine the age of the universe; making evolutionary studies of stars to learn how stars are formed, progress through their lifetime, and later die; studying the interstellar environment; and just having fun watching the variations in magnitude. There are variable stars in every image that you take. A movie made of a sequence of images of a globular cluster showed stars in the cluster blinking on and off.

Steps in studying variable stars include: planning, imaging, processing the images, measurement, analysis, and submitting results to the AAVSO, and writing papers about the results, etc. In planning one selects the objects to observe, locate the object with finder charts, and possibly join a campaign of many observers to follow a particular object. In image acquisition one can automate, set a schedule, etc. In processing, analysis, and measurement of the images one makes a measurement of the magnitude observed of the object in the image.

Telescope systems available to amateurs include the C-14 class telescope like the ARIO telescope. A C-14 class telescope is a workhorse instrument capable of monitoring millions of objects. A smaller telescope, or a DSLR camera, can be used to monitor brighter objects, to about magnitude 8. For example, a variable

TrES-1 star with a magnitude swing of 0.02 magnitude was discovered using a 10-centimeter telescope.

The AAVSO has 35-centimeter telescopes remotely operated in several locations throughout the world which operate about 300 nights per year. These telescopes were installed for about $40,000 each. One class of objects which are monitored includes R Coronae Borealis stars which are a rare class of object. These objects are evolved and have mostly a helium atmosphere and are covered with carbon dust which forms episodically, causing dimming of the star. Carbon absorption lines appear in spectra of the objects.

Another class of stars which can be monitored includes W Virginis stars. These are pulsating variables, similar to Cepheids except they are older stars and have lower metallicity as can be seen from spectra. These stars often have bumps and wiggles in their light curve from shocks. They are common in globular clusters, along with RR Lyr stars.

Asteroids are also variable in magnitude, especially as they rotate. The light curve of an asteroid can show cycles of a few hours as the object rotates. The variation can be a few tenths of a magnitude.

Variable stars in nearby galaxies can be observed with amateur equipment, say a C-14 class telescope with a CMOS chip, in just a minute of imaging. These are stars which Edwin Hubble, using the 200-inch telescope, required hours of exposure using the photographic film of the 1920's – 1930's. An amateur can trace the Cepheid variable in M31, which Hubble discovered, using only minutes of image exposure; and which Hubble discovered in 1926 using hours to image on a photographic plate and a 200-inch aperture.

An especially important class of observations which an amateur can perform is to be on alert when a supernovae is first discovered and measure the decay in magnitude from first discovery until it fades. An amateur on the night side of the Earth may even be able to capture the increase in magnitude of a supernova if the discovery is early enough, and it is night and clear skies at the amateur's location.

Also, amateur spectra, for example taken with commercially available gratings and software such as R-Spec, can make a valuable contribution.

In summary, amateur telescopes in the 14-centimeter aperture range are capable of doing cutting edge science. You can use the telescope when the sky is clear. You do not have to wait for a telescope committee to grant time. Automation makes things much more efficient. The best use for an amateur telescope is for studying variable stars, but many projects can make use of small scopes.

President Mike Hill adjourned the meeting at 9:30 PM.

***~ Sidney Johnston, Secretary ~***

# Clubhouse Report . . .

**FEBRUARY 2013**

Paul Cicchetti clearing the snow near the 17-inch Dobsonian shed. Image by Al T.

Last month's *Starfields* reported through the January 26th work session. It missed a significant contribution by Eric Johansson and Bill Toomey and his father/student-daughter team of J.T. and Catherine Amirault, who reorganized the barn loft following Mike Hill's lead the month before. Job well done.

We were into the second cycle of Thursday evening mirror making, Friday Astro class, and Saturday night observing when the Blizzard of 2013 hit with almost 2.5 feet of snow at the clubhouse. Having determined that most of us North of Boston could be dug out by Saturday evening from the February 8th piles of snow, we met on Sunday morning for clubhouse snow removal. Only with the Legacy crew's assistance could we make the first cut. Then JohnB.'s plow took over followed by PaulC. on the snow blower. When the drive and field were cleared, hand shoveling commenced by everyone. All observing pads were cleared and access to all five housed scopes were cleared and ready for use. Many thanks to JohnB., PaulC., EileenM., DaveP., JohnR., ArtS., AlT., and SaiV. for donating 5 hours of hard work removing snow.

The scheduled full moon Saturday work session was held February 23rd. Nineteen members donated their day to this effort: Dave Wolfendale, Sai Vallabha, Al Takeda, Art Swedlow, Sergio Simunovic, John Reed, Dave Prowten, Drew Prescott, Eileen Myers, Mike Mattei, John Maher, Dick Koolish, Eric Johansson, Marion Hochuli, Neil Fleming, Steve Clougherty, John Blomquist, Bruce Berger, and Joshua Ashenberg. EileenM. was assisted later by Rich Nugent for clubhouse duty. Several projects were tackled during the day as follows:

The detailed inventory of donated telescopes and accessories continued by the team of AlT., NeilF., JohnM., and MarionH. This effort will continue at the next work party.

The barn sill repair, uncovered during the machine shop construction, was tackled by the team of DaveP., JoshuaA., SergioS., SteveC., EricJ., and DrewP. The sidewalk concrete pour outside did not prevent water from migrating under the sill at the old ground hog hole, so it was taken out by sledge and

pick axe. A pressure treated fitted piece of wood was sealed in place and covered with flashing and clapboards for a weather tight seal until work resumes at the next work party.

Work continued in the Home Dome building (ARIO) on tweaking the software and researching the necessary procedures to build an operating manual without glitches. BruceB. was assisted by EileenM. in this effort. Other members were brought up to date on recent improvements.

The design concept for the basement French drain was reviewed by a team of SteveC., JohnR., DaveW., and JoshuaA. This project, stopped by outside projects over recent years, can use materials on hand to provide a layout pattern with which to proceed under Paul Cicchetti's lead at the next work party.

The electrical repairs by National Grid before the expected storm were completed before our 11AM delayed opening. A jug of Java provided the coffee to go with JohnB.'s donuts. Lunch prep began immediately by SaiV., JohnR., EileenM., ArtS., and MikeM. Mike brought his special spaghetti/chili sauce to supplement the Bailey Hill spaghetti, garlic bread, Sai's salad, and baked chicken, with cookies and munchkins for dessert. Delicious Indeed. Clean up by Eileen and Sai. The hike up the hill helped with digestion. Work continued until after dark since the precip held off. Light snow overnight was added to on Sunday. JohnB. again followed Legacy's truck Sunday afternoon.

Please mark your calendar for the March 30th Clubhouse's next work session beginning at 10AM. Check your email or the ATMoB website for any last minute changes in starting time due to unforeseen weather or electrical or other problems that might arise. We'd enjoy your company at the clubhouse.

***~ Clubhouse Committee Directors ~***
***~ John Reed, Steve Clougherty and Dave Prowten ~***

**Clubhouse Saturday Schedule**

| | | |
|---|---|---|
| Mar 16 | Art Swedlow | Sai Vallabha |
| Mar 23 | George Paquin | Tom Wolf |
| Mar 30 | Henry Hopkinson + Dave Prowten **WORKPARTY #3** | |
| Apr 6 | John Maher | Tom McDonagh |
| Apr 13 | Al Takeda | Bill Toomey |
| Apr 20 | **CLUBHOUSE CLOSED - NEAF** | |
| Apr 27 | Dave Siegrist + Sonawane **WORKPARTY #4** | |
| May 4 | Steve Clougherty | Neil Fleming |

# Astronomy Day 2013 . . .

**May 18 – Save the Date!**

Join us at the Clay Center Observatory with a telescope outside or a science exhibit inside. Outdoor events 4-10 pm. Indoor exhibits 5-8:30 pm.

***~ Submitted by Bob Phinney ~***

# Membership Report . . .

Please take the time to seek out and welcome our new and returning club members:

Bob Familiar
Sameer Marathe
Sharon Kabelitz
Rick Breen
Ali Allison
Phil Papadopoulos
Michael Kathe

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization.

Consider making a year-end donation to the club, as these are tax deductible to the fullest extent allowed by law.

membership@atmob.org

***~ Tom McDonagh – Membership Secretary ~***

# Executive Board Meeting...

There will be an Executive Board Meeting on Tuesday, March 19th at 7:30 p.m. at the Clubhouse in Westford. The meeting is open to the membership.

# Mirror Making at the Clubhouse . . .

Thursday nights at the Clubhouse is focused on mirror making and telescope making. We continue to have a good crowd of members working on various projects. Mirrors from 3-inch all the way up to 12½-inch are currently being worked on. Pictured below is George Paquin polishing his 12½-inch mirror. The lap was made with the help of Phil Rounseville, who is our resident optical expert who is available to assist those just starting out with the mirror making process.

George Paquin polishing his 12.5-inch mirror. Image by Mike Hill

***~Mike Hill – President ~***

# Sky Object of the Month . . .

**Mar. 2013 - Messier 78 – Reflection Nebula in Orion**

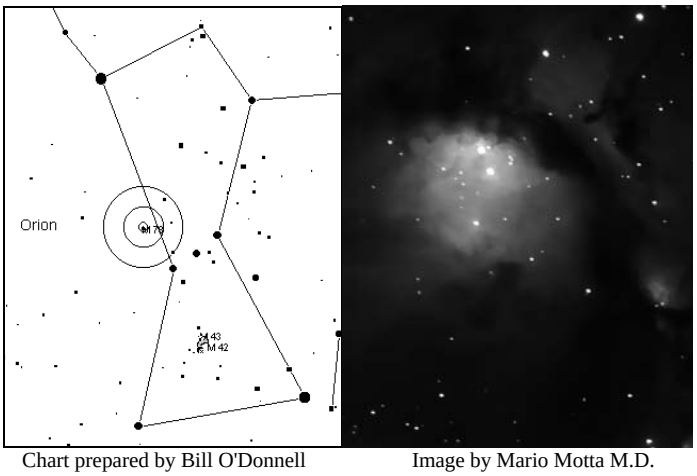



Chart prepared by Bill O'Donnell Image by Mario Motta M.D.
www.star-shine.ch/astro/messiercharts/m078

In his guidebook The Messier Objects, author Stephen James O'Meara confides, "Before beginning this book, I had looked at M78 only once." Yours truly hasn't fared much better. Prior to writing this column, I had seen M78 on three occasions –first in the late 1970s when I viewed all of the Messier objects with a 3-inch reflector, and more recently during two Messier Marathons.

It's understandable that M78 should be overlooked by backyard astronomers. Not far away is the much brighter, much more easily found, and much, much more spectacular M42 - the Orion Nebula. This deep-sky masterpiece was spectacular even through the eyepiece of my 3-inch scope. M78, on the other hand, was a faint blob that seemed to sport an off-center nucleus.

At a recent star party, I had the opportunity to look at M78 with a 16-inch Dobonian-mounted reflector. The view was amazing! Two "eyes" (a pair of 10th magnitude stars that illuminate the nebula) peering out of a misty patch of light took on the ominous form of a cosmic ghost! The eerie visual effect was repeated when I made a follow-up observation with my 10-inch scope.

The accompanying finder chart shows the location of M78 relative to Orion's Belt. At 8th magnitude, it covers an area 6' by 8' and is best seen with magnifications of 100X or more. A scan of the immediate area will pick up several other nebulas, including NGC 2071 situated 15' NNE of M78. M78 was discovered by Pierre Mechain early in 1780. He was the first to see it – why not be the latest?

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

***~ Glenn Chaple – Member at Large ~***

# 2013 Tenth Annual - NEAF Solar Star Party (NSSP) . . .

April 20-21. Sponsored by The Rockland Astronomy Club
*Northeast Astronomical Forum (NEAF)
Rockland Community College, Suffern, NY

NEAF attendees are invited to observe the Sun with attitude in different wavelengths, through a variety of solar filters and spectroscopes.

Join us, for two days of solar observing at NEAF 2013. No star party entrance fee, or registration required (NSSP only).

Bring a piece of clear sky to share with vendors and fellow photon-deprived amateur astronomers.

For further information, please visit our website:
http://www.neafsolar.com/

**Editor: The 2013 Northeast Astronomy Forum & Telescope Show (NEAF) has more than 110 on-site equipment vendors & exhibitors, world-renowned speakers, daily solar observing, STARLAB planetarium shows, Getting Started Classes for beginners, space & astronomy events for kids, and great raffle prizes. April 20-21, Rockland Community College, Suffern, NY.*

***~ Submitted by Barlow Bob ~***

# Mirror Making Demo . . .

Dave Siegrist was on hand to demonstrate mirror grinding at the Model Engineering Show at the Charles River Museum in Waltham, Massachusetts on February 16th. Dick Koolish would like to thank Dave for volunteering to show the attendees the craft of telescope making.

Dave Siegrist demonstates nirror grinding. Image by Dick Koolish

***~ Submitted by Dick Koolish ~***

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**April *Star Fields* DEADLINE**
**Sunday, March 24th**

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

**Articles from members are always welcome.**
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**POSTMASTER NOTE:** First Class Postage Mailed Mar. 9th, 2013

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

**EXECUTIVE BOARD 2012-2013**

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| NEWSLETTER | Al Takeda | newsletter@atmob.org |

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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 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.

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# Heads Up For The Month . . .

***To calculate Eastern Standard Time (EST) from Universal Time (UT) subtract 5 from UT. (Daylight Saving Time – Subtract 4-hr)***

Mar 11 New Moon
Mar 12 Comet C/2011 L4 PanSTARRS – Sunset, Western Horizon
Mar 17 Jupiter is 1.5-deg. North of the Moon
Mar 19 First Quarter Moon (Moonset at midnight)
Mar 20 Vernal Equinox
Mar 27 Full Moon
Apr 3 Last Quarter Moon (Moonrise at midnight)