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. 26, No. 10 November 2014

This Month's Meeting . . .

Thursday, November 13th, 2014 at 8:00 PM
Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics
Parking at the CfA is allowed for the duration of the meeting

Variable Star Observing

This month's speaker will be Dr. Arne Henden, Director of the American Association of Variable Star Observers (AAVSO). While taking deep-sky images or observing double stars through the eyepiece can be fulfilling, the universe is dynamic and constantly changing - never more obviously seen than with variable stars. These come in many flavors, from stars with easily-visible variations in a few minutes, to slowly evolving stars where variations take many lifetimes. The AAVSO monitors all variability, and is a great resource if you want to do something different with your telescope. He will talk about some of the exotic things "Up There", how easy it is to get involved, and give you some resources for further information.

Arne Henden is the Director of the American Association of Variable Star Observers. He received his PhD from Indiana University in 1985, and has since led a career as a research scientist and instrument developer. At the AAVSO he has modernized the data collection methods, developed the AAVSOnet network of telescopes set up for the use of AAVSO members (the telescopes are robotically controlled, automatically queued, located in remote areas world wide, active and taking data), and led the APASS all-sky photometric calibration project.

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 . . .

How did you get into, or back into, our hobby?

If you're like me, many years ago (during the Apollo era), I got quite enthused about astronomy. Along with a buddy of mine, we spent a lot of hours at the eyepiece of a 4" Tasco Newtonian mounted on a German equatorial mount (GEM). We even got to the point where we could mount a camera on the optical tube assembly (OTA), and "autoguide" manually on a guide star to take a few pics (slide film rather than regular film, if I recall correctly). We had a lot of fun, but we eventually hit the limits of that type of equipment. Then we hit high school and things got busy, so I dropped out of the hobby.

Not much happened with respect to me and astronomy until late 2005. I was shopping at BJ's Wholesale and happened to look down while walking through one of the toy aisles. Lo and behold there was an inexpensive refractor with an alt-az mount, but it was computerized! Ah, the wonders of modern technology. I knew, even at that point, that it was not going to be a quality investment, but picked it up for my kids anyhow.

That purchase got me thinking. If a cheap $200 scope was computerized, what equipment was now available to the serious amateur community?

So, I started doing some research and did some phoning around. I believe my first call was to Company 7: "What is the best gear available?" I asked. "Meade or Celestron?" (There's that carry-over again from my Apollo-era days…) The sales rep hemmed and hawed for a while and eventually said, "Celestron, but…" I then got an introduction to some of the other brands available today, and the confusion mounted. After joining and browsing many of the Yahoo Groups, I settled on a Televue NP-127 on a TAK (Takahashi) NJP mount. That setup served me well enough to get into the astrophotography part of the hobby and gave me years of enjoyment.

I've swapped gear many times since then, all in furtherance of astrophotography. But I still have that original Tasco newt, and remember those days fondly.

What's your story?

~ Neil Fleming – President ~

Clay Center Astronomy Day Scopes *

September Meeting Minutes . . .

Dr. Peter Fritschel *

Meeting held in Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics.
Neil Fleming, President: called the meeting to order at 8:00 PM.

- The Secretary's Report of the September 10, 2014 meeting was given by Sidney Johnston.

- Eileen Myers gave the Treasurer's report.
  She also announced two donations given to the Club at our annual picnic:
  Collapsible shelter tent by Steve Clougherty.
  Celestron Deluxe Compact Weather Station from Tony Costanzo (Astronomy Shoppe).

- Tom McDonagh gave the Membership Report.

- Glenn Chaple gave the Observing Committee Report.
  He mentioned several interesting observing and other astronomy opportunities. It was noted that the Astronomical League has a number of observing programs. Glenn proposed using a list of finest deep sky objects, observing carbon stars, using a list of double stars, participating in the worldwide star counts for measuring light pollution levels, and other sources of ideas as projects for observing.

- Bruce Berger mentioned that he made a video of the occultation of the star SAO159034 by Saturn's moon Rhea.

- Steve Clougherty gave the Clubhouse Report. Steve mentioned that GFCI electric outlets have been installed in the observing field. A work party is scheduled for the coming Saturday. New furnace repairs have been completed under the manufacturer's warranty. Eileen Myers announced that the Royal Astronomical Society of Canada *2015 Observers Handbook* would be available at the next meeting at the club discount.

- Old Business: none

- New Business: none

President Neil Fleming introduced Dr. Peter Fritschel of MIT as the invited speaker. Dr. Fritschel described gravitational wave detectors that have been deployed and the plans for improvement in sensitivity now being implemented.

Dr. Fritschel is a physicist and a Senior Research Scientist at M.I.T., and is a member of the MIT LIGO group. LIGO is an acronym for the Laser Interferometer Gravitational Wave Observatory.

As set out in the NASA web page at:
https://science.jpl.nasa.gov/projects/LIGO/
"The Laser Interferometer Gravitational-Wave Observatory (LIGO) is a facility dedicated to the detection of cosmic gravitational waves and the measurement of these waves for scientific research. It consists of two widely separated installations within the United States, operated in unison as a single observatory. This observatory is available for use by the world scientific community, and is a vital member in a developing global network of gravitational wave observatories.

Funded by the National Science Foundation (NSF), LIGO was designed and constructed by a team of scientists from the California Institute of Technology, the Massachusetts Institute of Technology, and by industrial contractors. Construction of the facilities was completed in 1999. Initial operation of the detectors began in 2001.

LIGO will be used to delve into the fundamental nature of gravity, and as such will throw open an entirely new window onto the universe. Its observations will cross many borders and it will serve as an investigational tool for both physics and astronomy."

Most of our knowledge of the universe comes from detecting electromagnetic waves. When viewing the stars and planets we see light waves, and light waves are created by electric and magnetic phenomena. Using light waves the positions of the planets were accurately observed and these observations led to the sun centered universe with the planets, including the Earth, circling the Sun in orbits determined by gravity. Also, radio waves, infrared waves, ultraviolet waves, x-rays, and gamma rays are electromagnetic waves.

Isaac Newton discovered the inverse square action of the gravitational interaction. Einstein extended the theory of gravity by considering gravity produced by mass to be a bending of space-time. In Einstein's theory of gravity mass tells space how to bend, and space tells mass how to move. These are complicated relationships and comprise the theory of General Relativity.

A consequence of Einstein's theory of gravity is that bodies with mass produce gravitational waves as ripples in space and time. The gravitational waves are believed to propagate throughout space, but with a dimming in amplitude as the distance from the source increases. The gravitational waves are separate and distinct phenomena from electromagnetic waves such as light.

Gravitational waves have been detected indirectly by timing pulsars. Pulsars are modeled as two massive objects orbiting about each other with periods that can be as short as milliseconds. As the massive bodies orbit about each other, the bending of space-time detaches from the bodies and travels outward as gravitational waves. The Nobel Prize was awarded to Russell Hulse and Joseph Taylor in 1993 for indirectly detecting gravitational waves. Two massive bodies rapidly revolving in orbit about each other can produce electromagnetic waves in the radio spectrum range of wavelength. Hulse and Taylor detected radio waves coming from such a system, and the system is referred to as a "pulsar". The pulsar is thought to be a binary pair of astronomical bodies, often one of the bodies is thought to be a black hole. Hulse and Taylor measured the slowing down of the rotation rate of the binary pair. The rate of energy loss measured due to the slowing down was compared with the energy loss expected from gravitational radiation according to Einstein's General Relativity. The measured slowing down of the pulsar rate agreed to within measurement error with that predicted by General Relativity. This measurement is said to be an indirect detection of gravitational waves.

No direct detection of gravitational waves has been accomplished.

Efforts to directly detect gravitational waves trace back to before 1987 by Joseph Weber. In an attempt to build an antenna to detect gravitational waves Weber used an aluminum cylinder 2 meters in length and 1 meter in diameter. No reproducible detections of gravitational waves were observed. http://en.wikipedia.org/wiki/Weber_bar . As set out in the Wikipedia article, Weber started in the 1960s working on his experiments.

The Light Interferometer Gravitational Observatory (LIGO) uses an optical interferometer with legs about 4 kilometers in length to detect gravitational waves. The LIGO Observatory had a number of science runs from about the year 2000 through 2007.

LIGO consists of an observatory in Washington State and in Louisiana. Also, a similar observatory named "VIRGO", a French-Italian collaboration, is located in Italy at Cascina. http://www.ligo.caltech.edu/LIGO_web/0307news/0307one.html .

No gravitational waves were detected by early science runs of the LIGO observatories.

"Advanced LIGO" is presently under construction. Improvements in the interferometer are expected to increase the sensitivity of the LIGO detectors so that a coalesce of a neutron star and a black hole, or of two neutron stars, will be detectable by the detection of gravitational waves emitted as the astronomical bodies collide. Advanced LIGO is expected to begin operation in 2015.

Astronomical events which can produce gravitational waves strong enough to be detected by LIGO include: Compact Binary coalescence from the inspiral and merger of black holes and neutron stars; Short Bursts from supernovas and perhaps other transient sources; continuous sources such as spinning neutron stars; and stochastic sources such as gravitational waves which are background from the big bang.

By having at least three LIGO observatories such as the two in the United States and one in Italy, if one detects a gravitational wave hopefully the other two will also. Also, a LIGO observatory is under construction in India. A simultaneous detection will increase the probability that a gravitational wave was detected above background noise.

The meeting was adjourned at 10:00 PM

~ Sidney Johnston, Secretary ~

Clubhouse Report . . .

(L-R) Dave Prowten and Steve Clougherty working on the 25-inch Dob *

OCTOBER 2014

During the work party held on the Columbus Day weekend of October 11 there were a total of 17 volunteers on hand at the Clubhouse. Unfortunately a steady rain prevented us from working outdoors. The final coat of stain to the West side of the clubhouse will have to wait until spring.

Thanks to John Blomquist for finishing the final mowing of the season later that week.

Volunteers tackled the annual cleaning of the composting toilet. The heating element was rewired last year and the composting system is working well.

A group of helpers with strong backs assisted with the 25-inch Dobsonian altitude bearing work. The telescope had to be lifted off its ground board so that Dave Prowten could reset the altitude bearing pads for improved stiction. Field testing performed after the work certainly show improved performance in the motions of the telescope.

Al Takeda took the lead in reorganizing the upstairs telescope room where the club loaner scopes are housed. A list of available telescopes to loan to members will be posted in the near future. The downstairs telescope room has several telescopes and eyepiece kits available for member use in the observing field.

Two surplus telescopes were picked up during the work party and many thanks to Bernie Kosicki and Tom McDonough for organizing our surplus equipment project.

Many thanks to Sai Vallabha for keeping the fridge stocked with snacks and sodas, including handling the coffee fund. Lunch was provided by our kitchen crew for all of those who volunteered for this work party.

We would like to thank Dick Koolish for donating a much needed table lamp for the front room. The Clubhouse directors are in the process of updating the ATMoB Clubhouse committee list and the Clubhouse opening and closing procedures.

The next work party will be held on Saturday, November 8. The following will be on Saturday, December 8.

Thanks to the following volunteers who helped out so much during the month of October: Al Takeda, Daniel Count, Bernie Kosicki, Cheryl Rayner, Steve Clougherty, Bill Twomey, Gary Phillips, Alia Phillips, Art Swedlow, Eric Johannsen, Bruce Berger, John Blomquist, John Maher, Jim Gettys, Charlie Gettys, Mike Mattei, Eileen Myers and Sergio Simuvovic

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

Clubhouse Saturday Schedule

November 8	John Reed and John Small **WORK PARTY # 10**	
November 15	Bill Robinson	N & S Sonawan
November 22	George Paquin	Dave Prowten
November 29	Art Swedlow	Sai Vallabha
December 6	Paul Cicchetti and Tom McDonagh **WORK PARTY # 12**	
December 13	Eric Johansson	John Reed
December 20	Steve Clougherty	Al Takeda
December 27	**CLOSED**	

Membership Report . . .

Membership count as of October 31, 2014 is at 232 individuals. This number is low due to the large number of delinquent membership accounts. The membership renewal period ended September 1st. **Please renew today as time has run out!**

Many members' subscriptions to S&T and Astronomy magazine are tied to their last renewal date. You can avoid interruption of subscription delivery by renewing now! Instructions for renewing are outlined in the August Star Fields Newsletter. A membership renewal form has been included in the mailed version of the newsletter for member reference. An electronic copy of the membership renewal form can be downloaded at: **www.atmob.org/about/join.php**

New members on record in 2014 are not required to renew at this time.

Please welcome our newest and returning members, Gilbert Gagne and Joseph Soydan.

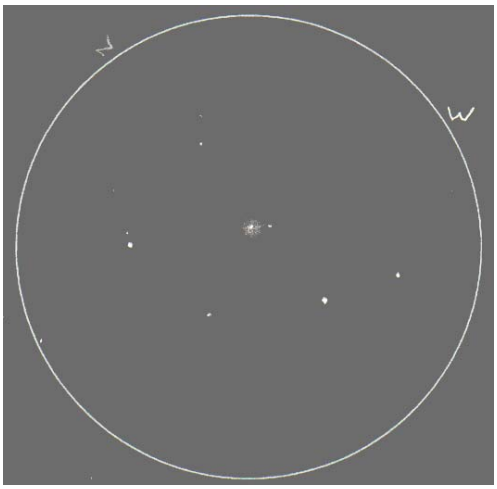
Our communication lifeline includes the ATMOB-Announce and ATMOB-Discuss mailing lists as well as our fantastic newsletter. Please refer to these tools for up to date information on club openings, events and interesting astronomy related discussions. Contact me with questions regarding accessing these options at membership@atmob.org.

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the fullest extent allowed by law. Consider making a tax-deductible contribution to the club during your estate and tax planning this year. Many companies make matching contributions at an employee's request. It is a simple way to make your donation go twice as far.

~ Tom McDonagh – Membership Secretary ~

Sky Object of the Month . . .

November 2014
NGC 40 – Planetary Nebula in Cepheus



Sketch by author on 12/3/2012, using 10" f/5 reflector at 208X

Our November deep-sky target, NGC 40, could be featured any month of the year. Just 17.5 degrees from the North Celestial Pole, it is circumpolar from mid-northern latitudes. But during mid autumn, NGC 40's parent constellation, Cepheus, rides highest above the northern horizon after sunset.

NGC 40 was discovered by Sir William Herschel on November 25, 1788, and bears the Herschel Catalog designation H IV-58 (his 58th Class IV [Planetary Nebulae] entry). A more recent designation, C2, reflects its inclusion in Sir Patrick Caldwell-Moore's 1995 Caldwell Catalog – his compilation of the finest 109 non-Messier deep-sky objects. NGC 40 is also nick-named the Bow-Tie Nebula, a moniker it shares with the planetary nebula NGC 2440 in Puppis and the Hubble-imaged protoplanetary nebula PGC 3074547 in Centaurus.

Finding NGC 40 is problematic, as it lies in a star-poor region of Cepheus. The accompanying Telrad chart shows its location

about one-third of the way from gamma (γ) Cephei (labeled Errai) to kappa (κ) Cassiopeiae. Center your finderscope on the area and begin a low-power search (about 50X should suffice) until you come to what looks like an out-of-focus 12th magnitude star midway between and slightly west of a pair of 9th magnitude stars. NGC 40 can be glimpsed with a 4-inch scope under dark skies, but you'll need twice that aperture to capture significant detail. Magnifications of 150X and up will reveal a slightly oval 35 X 38 arc second haze surrounding a star of 11.6 magnitude.

If you gaze at NGC 40's central star, the surrounding nebulosity seems to disappear. Look to the side, and the nebulosity pops into view. The effect mirrors that of NGC 6826, the "Blinking Planetary" in Cygnus. At a distance of 3500 light years, NGC 40 is about one light year in diameter.

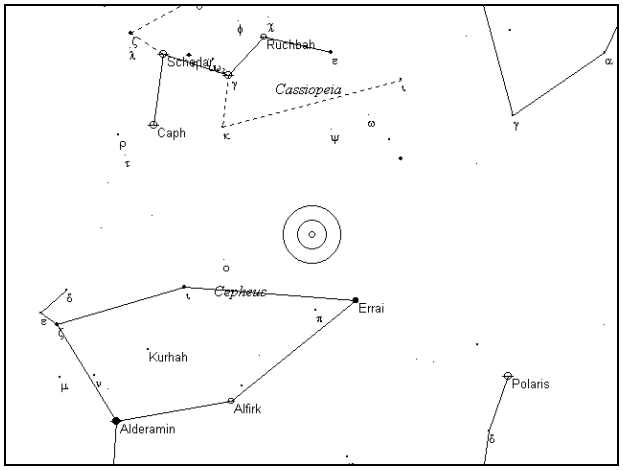


Chart prepared by D. Parkin (www.astrosurf.com/dgilbert/outils/divers/Caldwell)

~ Glenn Chaple – Observing Committee and VP ~

Mario on an AAS Subcommittee . . .

I been asked by the American Astronomical Society (AAS) to be part of a small subcommittee (probably for the medical end) to help guide observing for the 2017 eclipse for a group of 10 (mostly astronomers). The following is an excerpt from the charge of the main committee of the AAS Solar Eclipse Task Force:

Charge to the AAS Solar Eclipse Task Force

On 21 August 2017 a total eclipse of the sun will cross the United States from coast to coast, giving tens of millions of people in a 70-mile path from Oregon to South Carolina a chance to see the solar corona and experience "darkness at midday." Outside the path of totality, all of North America will experience a partial eclipse. This event, the first total solar eclipse to touch the US mainland since 1979 and the first to span the continent since 1918, presents a unique opportunity to excite people about science and connect them personally to the cosmos. Yet it also presents a challenge: a half billion citizens and visitors need to learn how to view the eclipse safely. To help address this opportunity and challenge, the American Astronomical Society – the major organization of professional astronomers in North America – has established the AAS Solar Eclipse Task Force to function as a think tank, coordinating body, and communication gateway/hub.

~ Submitted by Mario Motta ~

2015 RASC Observer's Handbook . . .

The 2015 RASC *Observer's Handbook* will be sold at the monthly meeting in November. Handbooks are $20 each – a bargain price since single copies cost $38.95, including S&H, if purchased individually online. Please have $20 in cash or check payable to Eileen Myers since I will be purchasing them.

This 352-page handbook is published annually by The Royal Astronomical Society of Canada (RASC). It is very readable. It puts all sorts of astronomical data and reference information at your fingertips in one small book. There is also a 24-page section called "The Sky Month By Month", which gives an extensive listing of events for each month so you won't miss any of them. See http://www.rasc.ca/observers-handbook for more details.

~ Submitted by Eileen Myers, Treasurer ~

Comet Jacques (C/2014 E2) and the Coathanger. 9/29/2014. *

*Editor: * Photos by Al Takeda unless otherwise noted.*

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December *Star Fields* DEADLINE
Sunday, November 23rd

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 November 11, 2014

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

EXECUTIVE BOARD 2014-2015

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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.

Nov 6 Full Moon
Nov 14 Last Quarter Moon (Moonrise at midnight)
Nov 17 Leonid meteors peak
Nov 22 New Moon
Nov 24 Asteroid 139 Juewa occults 2UCAC 45480722 (6:58 UT)
Nov 29 First Quarter Moon (Moonset at midnight)
Dec 6 Full Moon, Aldebaran 1.4-deg S. of Moon
Dec14 Last Quarter Moon (Moonrise at midnight), Geminid meteors peak