



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. 27, No. 1 January 2015

This Month's Meeting . . .

Thursday, January 8th, 2015 at 8:00 PM
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

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

Visual Observing of Variable Stars - An Addict's Story

This month's speaker will be one of our own, Glenn Chaple. He'll describe how he got involved in visual variable star work, provide a basic background on the nature of variable stars, include pointers on techniques for observing variable stars, and finish with a list of resources.

In Glenn's words... "I've been an avid amateur astronomer since the summer of 1963 when a high school friend showed me Saturn through his telescope. I received a BS degree in astronomy from UMass Amherst in 1969, and then worked for two years at the Alice G. Wallace Planetarium in Fitchburg, Mass. From 1974 until my retirement in 2006, I was a middle school science teacher in the Fitchburg and Groton-Dunstable school systems. I co-authored, with Terence Dickinson and Vic Costanzo, the *Edmund Mag 6 Star Atlas* and wrote the books *Exploring With a Telescope* (Franklin Watts - 1988) and *The Outer Planets* (Greenwood Press - 2009). I contributed chapters on double stars to David Eicher's *Deep-sky Observing With Small Telescopes* (Enslow Publishers - 1989) and James Muirden's *Sky Watchers Handbook* (W.H. Freeman - 1993). Between 1977 and 1987, I wrote a column on double stars for *Deep Sky Magazine*. From 1982 until 1994, I authored the "What's Up?" column for the children's astronomy magazine *Odyssey*. Since 2002, I've been writing the monthly "Observing Basics" column for *Astronomy* magazine. I've been a member of both the Amateur Telescope makers of Boston (currently Vice President) and the American Association of Variable Star Observers (AAVSO) since 1980. In 2006, I joined the

Astronomical League, and, in 2011, the Astronomy Outreach Foundation."

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

President's Message . . .

This month, I'd like to invite all folks who are interested in CCD image processing to an introductory course on Saturday, Feb 21, at 1 pm. It's likely to be held up at the Clubhouse, but please drop me a note at president@atmob.org if you'd like to come. (I need a head count to ensure we'll have enough space.)

I'll be covering the basics of what to do once you have captured some data, including:

- Initial image processing with CCDStack
- Deconvolution and DDP
- Techniques in Adobe Photoshop:
- Data optimization
- Selections and layers
- Sharpening
- Color balancing and adjustments
- Gradient control

On another note, I'd like to highlight to planetary observers some interesting events coming up:

Thursday–Monday, Jan 8–12, at dusk, Mercury will be within one degree of Venus for five days, making it easy to spot in evening twilight. Mars is also visible higher in the sky.

On Monday, Jan 19, again at dusk, Neptune and Mars will pass within 15 arc minutes of each other, a rare planetary conjunction.

On Friday–Saturday, Jan 23–24, 11:35pm–03:00am the shadows of Io, Europa, and Callisto will fall simultaneously on Jupiter; this is an extremely rare event, which will not occur again until 2032.

Regards...

~ Neil Fleming – President ~



Comet Lovejoy (C/2014 Q2), 12/26/2014 *

December Meeting Minutes . . .



Dr. Kelly Korreck *

Minutes of ATMob meeting held December 11, 2014.

Neil Fleming, President: called the meeting to order at 8:00 PM.

- The Secretary's Report of the November 13, 2014, meeting was given by Sidney Johnston, Secretary.
- Eileen Myer, Treasurer, gave the Treasurer's report.
- Neil Fleming, President, gave the Membership report.
- Glenn Chaple gave the Observing Committee report.
- Steve Clougherty gave the Clubhouse Committee report.
- Old Business: none.
- New Business: none.

President Neil Fleming introduced Dr. Kelly E. Korreck as the invited speaker. Dr. Korreck is the head of science operations for the Solar Wind Electrons, Alphas and Protons (SWEAP) plasma instrument suite aboard NASA's Solar Probe Plus mission that will enter the Sun's atmosphere. Dr. Korreck earned her B.S. in Physics, her M.S., and Ph.D. in Space Physics from the University of Michigan. She is currently an astrophysicist in the High Energy Astrophysics Division of the SAO. She is a researcher in the Solar and Stellar X-Ray Group, which serves as a major partner in the Atmospheric Imaging Assembly (AIA) investigation on the Solar Dynamics Observatory (SDO), the X-Ray Telescope aboard the Hinode solar mission, as well as the telescope for the Transition Region and Coronal Explorer (TRACE). Dr. Korreck was a Post-Doctoral Fellow at the SAO 2005-2006 and is an Astrophysicist at the SAO since 2006.

Dr. Korreck's research interests include: X-ray and Extreme UV processes in the Sun and Supernova remnants; Shocks from Coronal Mass Ejections and their effect on Space Weather; Solar and stellar wind source regions; Normal Incident High-Resolution Extreme Ultraviolet Telescopes; X-ray imaging instrumentation, including Next Generation X-ray optics, and CMOS devices; Particle detection instrumentation; and Electrostatic Analyzers such as a Faraday Cup detector.

Korreck's talk was entitled "Resolving the Sun's Hot Corona: High Resolution Solar Imaging in the Extreme Ultraviolet". She presented breathtaking images taken in the extreme ultraviolet and X-ray wavelengths of the Sun. The emitters in these very short wavelength ranges are mostly iron atoms heated to millions of degrees. Since the 1940s the emissions of these iron atoms have been identified with a green optical wavelength detected from Earth. Images that she presented were taken in space where the ultra violet and X-ray photons are not absorbed. It is necessary to have the cameras above the atmosphere in order to create high definition images produced by the iron atoms emitted by the Sun.

Images of the Sun's corona in X-ray wavelengths are produced by several space based telescopes such as the HINODE satellite observatory:

<http://www.cfa.harvard.edu/news/2008/su200801.html>

"The Hinode (Japanese for "sunrise") satellite was launched last September to study the sun's magnetic field, and how its explosive energy propagates through the different layers of the solar atmosphere. One of the three instruments on board Hinode is the X-Ray Telescope (XRT), developed and built by the SAO and the Japan Aerospace Exploration Agency. The sun's hot corona and magnetic fields power eruptions that hurl gases and energetic charged particles upwards. The particles reaching the earth can disrupt communications, cause power line surges, and create other disturbances."

As further stated at the web page <http://xrt.cfa.harvard.edu>.

"The Hinode X-Ray Telescope (XRT) is a high-resolution grazing-incidence telescope, which is a successor to the highly successful Yohkoh Soft X-Ray Telescope (SXT). A primary purpose of the Hinode XRT is to observe the generation, transport, and emergence of solar magnetic fields, as well as the ultimate dissipation of magnetic energy in forms such as flares and pico-flares, coronal heating, and coronal mass ejections. The XRT aboard Hinode observes the dissipation part of the life-cycle story of solar magnetic fields. High-resolution soft X-ray images reveal magnetic field configuration and its evolution, allowing us to observe the energy buildup, storage and release process in the corona for any transient event. One of the unique features of XRT is its wide temperature coverage to see all the coronal features that are not seen with any normal incidence telescope.

The XRT consists of the X-ray and visible light optics, focal plane mechanisms (filters and shutter), and the 2k x 2k CCD camera. The Mission Data Processor (MDP) also plays a vital role for XRT.

The XRT was designed and developed by the Japan-US collaboration between Smithsonian Astrophysical Observatory (SAO), NASA MSFC, JAXA, and NAOJ. The XRT telescope was tested and calibrated at the XRCF at MSFC, and the CCD camera was tested and calibrated in X-rays at the ATC of the NAOJ with JAXA."

A sounding rocket photographic system for X-ray images of the Sun with improved resolution is referred to as the High

Resolution Coronal Imager, or Hi-C developed by NASA, SAO, and others. The Hi-C telescope provides five times more detail than the next-best observations by NASA's Solar Dynamics Observatory. The Hi-C rides on a suborbital rocket and its flight lasts for just around 10 minutes. Of that time, only a few hundred seconds are spent taking data. Yet those images contain a wealth of new information.

As set out at the web page:

<http://www.cfa.harvard.edu/news/2012-21>, a flight of the Hi-C camera flown on July 11, 2012 is described as:

"The corona surrounds the visible surface of the Sun. It's filled with million-degree ionized gas, or plasma, so hot that the light it emits is mainly at X-ray and extreme-ultraviolet wavelengths. For decades, solar scientists have been trying to understand why the corona is so hot, and why it erupts in violent solar flares and related blasts known as "coronal mass ejections," which can produce harmful effects when they hit Earth. The Hi-C telescope was designed and built to see the extremely fine structures thought to be responsible for the Sun's dynamic behavior. . . . Hi-C focused on an active region on the Sun near sunspot NOAA 1520. The target, which was finalized on launch day, was selected specifically for its large size and active nature. The resulting high-resolution snapshots, at a wavelength of 19.3 nanometers (25 times shorter than the wavelength of visible light), reveal tangled magnetic fields channeling the solar plasma into a range of complex structures."

Dr. Korreck showed images of the Sun taken with the Hi-C imager. Trails of iron atoms are resolved in the images on trajectories aimed by the solar wind and bent by the solar magnetic fields. The objective of the X-ray images is to gain an understanding of the mechanisms which heat the corona to such high temperatures.

The meeting was adjourned at 9:25 PM

~ *Sidney Johnston, Secretary* ~

Clubhouse Report . . .



Dave Prowten working on the stairwell plaster wall.. *

DECEMBER 2014

A work party was held on Saturday, Dec. 6 and a total of fourteen members volunteered. The weather was poor which precluded any outdoor work; however, several indoor projects

were initiated. John Blomquist and Bruce Berger utilized the machine shop during the afternoon and completed machining the new wheel hubs for the ARIO dome. Testing of the new system will take place very soon.

Dave Prowten took the lead on a very messy, long overdue project which involved tearing out old horse-hair plaster on the stairwell leading to the second floor. Dave then added new sheetrock and finished a first skim coating on a 2 by 8 foot section. Two more skim coats will need to be applied and we will then be ready to have a crew paint the stairwell and second floor walls.

Al Takeda posted a list of loaner scopes which are now ready for members to use. All off-site loaner scopes are found in the second floor Telescope Room. The first floor Telescope room has been cleaned and organized under Al's leadership. Telescopes and other equipment housed in this room are for members use in the observing field (*Editor: except for equipment that is labeled "For evaluation" or "Under repair"*).

A new Clubhouse opening and closing procedure has been completed by Steve C. and Cheryl R. and has been posted in the Clubhouse. Revisions include opening and closing the observatories along with a red light policy for the observing field. All members are encouraged to familiarize themselves with these procedures.

Don and Steve Jaynes, formerly of Research Services, arrived at the Clubhouse in the afternoon and spent a couple of hours touring our facilities and inspecting the evaporator coating machine. They concluded that the machine needs a lot of work to bring it up to acceptable performance. Unfortunately many parts which are needed to fix this machine are very difficult to find and very expensive to acquire. The Clubhouse committee subsequently decided to recommend that the ATMob board offer the machine to Steve Jaynes, who will in return provide discount mirror coating services for any ATMob member. A price list for mirror coatings has been posted at the Clubhouse and generally only requires a one week turnaround time frame. Don Jaynes has a long history of involvement with many of our members over the past fifty years offering his services to various club projects.

Thanks to our members who prepared a wonderful lunch and stayed to help clean up as well.

The next work party will be held on Saturday, January 3rd. The following volunteers helped out during the December work party: Paul Courtemanche, Dick Koolish, John Blomquist, Dave Prowten, John Reed, Al Takeda, Bruce Berger, Paul Cicchetti, Jeffrey Dean, Karl Dean, Cheryl Rayner, Mike Mattei, Eileen Myers and Steve Clougherty.

~ *Clubhouse Committee Directors* ~

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

Clubhouse Saturday Schedule

January 10	Paul Cicchetti	John Reed
January 17	Jim Gettys	Phil Rounseville
January 24	Joe Henry	Cheryl Rayner
January 31	Eric Johansson	Bill Robinson
February 7	WORK PARTY # 2 John Small + John Panaswich	
February 14	Mike Hill	Bruce Berger
February 21	Glenn Meurer	Brian Maerz

Membership Report . . .

Editors Note: There is no update this month. The following is general information for the membership.

The membership renewal period began in June and ended on September 1st. Please contact me ASAP to renew your membership. If you are a new or returning member in the 2014 calendar year, renewal payment is not required. If you have questions regarding your membership status, please contact me.

A new class of membership is available this year. Consider a Family membership for yourself and direct family members.

The renewal process can be completed on-line using PayPal. No PayPal account is required. Follow the link below, login using your email address on record with the club. Direct PayPal payments can also be sent to membership@atmob.org. If you cannot gain access to the website, please contact me before renewing online.

<http://www.atmob.org/members/person.php?frid=renewals>

Renewal checks may also be mailed:

ATMoB
c/o Tom McDonagh
48 Mohawk Drive
Acton, MA 01720

The renewal form can be downloaded from the following link:
<http://www.atmob.org/about/join.php>

Contact me if you require a renewal form and do not have access to a computer / printer by phone (617-966-5221) or mail.

If for any reason you are not receiving the Star Fields newsletter, please do not hesitate to contact me.

Don't delay, renew today!

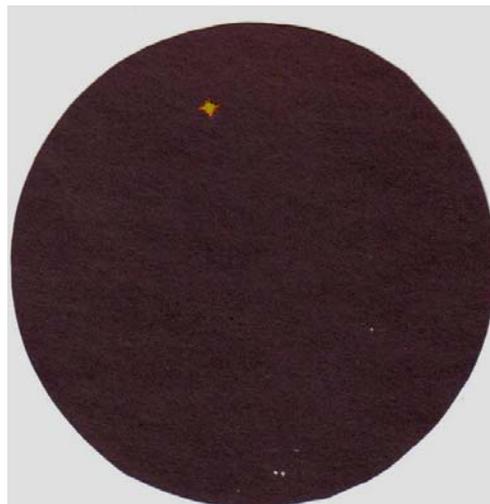
The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the fullest extent allowed by law. Consider making a tax-deductible contribution to the club during your estate and tax planning this year. Many companies make matching contributions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

~ Tom McDonagh – Membership Secretary ~

Sky Object of the Month . . .

January 2015

Struve 817 (STF 817, Σ817) – Double Star in Orion



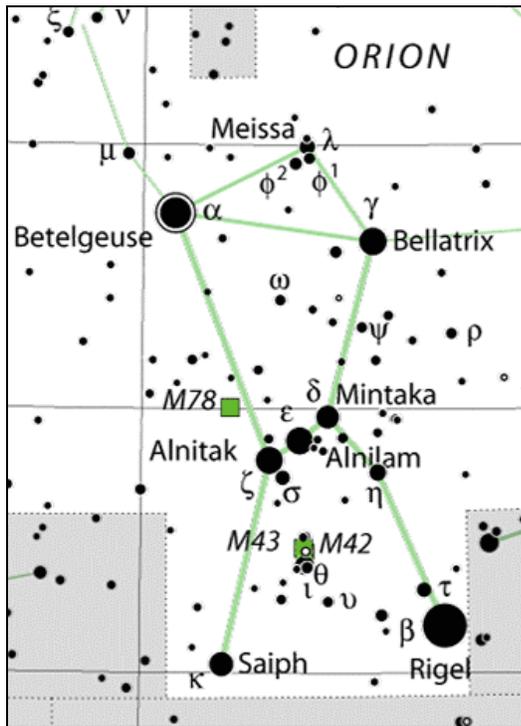
Betelgeuse and Struve 817. 3-inch f/10 reflector at 60X; ½ degree field.
Drawing by Glenn Chaple.

I'm a big fan of "off-the-beaten-path" sky objects. One of my favorites is the little-known double star, Struve 817 - the 817th double star catalogued by the German-born Russian astronomer F. G. W. Struve during a survey conducted between 1824 and 1827. I wrote about this little gem in my first "Object of the Month" column 5 years ago. It's time for a return visit!

According to a measure made in 2010 and posted in the Washington Double Star Catalog (available online at <http://www.usno.navy.mil/USNO/astrometry/optical-IR-prod/wds/WDS>), Struve 817 consists of near-twin magnitude 8.68 and 8.93 stars separated by 18.7 arc-seconds in a position angle (P.A.) of 73°. The separation and P.A. differ little from what Struve himself measured around the time of discovery. Astronomers describe stellar partnerships that show little orbital motion as being "relatively fixed." If the component stars of Struve 817 form a true binary pair, their orbital period must encompass many centuries.

What gives this relatively obscure double star a special allure is its location just 20 arc-minutes south of the red supergiant Betelgeuse. To find Struve 817, simply aim your telescope at Betelgeuse. A medium power eyepiece (75 to 100X works well) should capture this delicate pair shining just outside the dazzling rays of ruddy Betelgeuse. It's a startling sight. The Washington Catalog lists the spectra of Struve 817's components as A5 and K. Can you make out a color contrast between the two?

Some years ago, I wrote a four-part seasonal series for Deep Sky Magazine in which I introduced my favorite 100 double stars. Included with such celebrated pairs as Mizar, Albireo, and the "Double-double" epsilon Lyrae was Struve 817. On the next crisp winter night when Orion beckons you to visit his magnificent Nebula, take a minute to travel a road less taken and try for this delightful double star.



constellation-guide.com, courtesy IAU + Sky & Telescope

~ Glenn Chaple – Observing Committee and VP ~

Book Review . . .



This year I was given a very nice Christmas gift by a close friend of mine and I have to say it has become one of my favorite books that I now have in my collection. It is called *Deep-Sky Companions: Hidden Treasures* by Stephen James O'Meara, formally a long time member of our club and a very creative writer, I've discovered. The book lists 109 astronomical objects or should I say "Hidden Treasures" to be observed that are not part of the more well known Messier and Caldwell lists which many of us are so familiar with. Mr. O'Meara includes maps, pictures, directions on how to find each object and a very exhaustive description of each "treasure" from the point of view of when/how each was discovered, what to expect when observing the object and also pertinent physical parameters.

What makes the book so creative, however, is how the objects are presented. *Hidden Treasures* alludes to the search and discovery of well – "Hidden Treasures"! And his presentation is such that each can be treated as an individual treasure hunt. You start with a simply formatted yet informative list in the back of the book that is ordered by increasing RA so that you can decide, based on the season and the area of sky most visible to you, which objects to investigate. The presentation of each object, easily identified in the book by index number at the top of every page, follows the same format which is very intuitive and easy to navigate. He includes two finder charts, one wide field and one more detailed. These are of his own design and I think quite unique in their simplicity yet comprehensive coverage of necessary information. What I liked most, once I figured this out, was that the object of interest is never at the center of the wide field chart and is inconspicuously marked. So in effect you have to hunt for it right from the start, even on the chart. What this does is to help familiarize you with the field of view in such a way that will work to your benefit once out in the field. I found this quite enticing. I wasn't even observing yet but I was involved in the hunt.

As I said, the descriptions are exhaustive, almost too much so at first glance. Some objects take up to six pages to cover, but the writing is presented in a way that is fun as well as informative to read and digest. I found myself not wanting to put the book down for once I got into the description of my first object I found that the text just kept pulling me along to learn more. I won't go into the details of why this is so. You'll have to borrow or buy the book to find out for yourself. If you're looking for something different to add to your collection, I would certainly recommend this one.

~ Submitted by Mike Hill ~

Our New Year's Eve Party Thank You . . .



(L-R) Eileen Myers and Sai Vallabha



Many thanks go out to those who made this year's party so much fun!



Observing Bill Robinson!!! Observing!!! Image by Sai Vallabha

Thanks to John Maher, Manager of the Clamshell Observatory, and to Phil Rounseville with his scope, we enjoyed views of Comet Lovejoy C/2014 Q2. Comments ranged from "fantastic" to "all I see is just a grey blur" depending on each person's level of observing experience. It was an exciting and educational moment for all who went outside to look. Thanks to John and others for opening and giving tours of the club's observatories.



Music and dancing in the kitchen. *

Thanks to musicians Claude Galinsky (Guitar), Amy Colby (Five-String Violin), and Ed Los (Fiddle) for their lively music, a mix of New England Irish and French contra dance fiddle tunes.



Monique Reed and Eileen dancing with Claude Galinsky on guitar. *



The ATMoB Nightclub. Image by Sai Vallabha

Thanks to Julie Kaufmann, our Instructor-Supreme for line and swing dancing. Thanks to Al Takeda and his creativity in turning the clubhouse kitchen into a night club (thanks to Cheryl Rayner for the rotating color-changing light and to Al for the rotating mirror balls).



Yumm!!! Image by Sai Vallabha

The food was great! The desserts were hard to resist! We all had to try a taste of everything! Thank you to everyone who brought all of those tasty treats!



Irresistible desserts!!! Image by Sai Vallabha



Happy New Year. 2015!!! *

There were many interesting conversations going on. Topics were telescope construction plans, optics, cooking, requests for dancing lessons, medical devices, astrophotography techniques, latest equipment purchases, photos of grandchildren, etc.

This year's official list of those Trained and Certified for Pre-Party Cleaning and Decoration Set-Up, After Party Food Clean-Up, and Next Day Decoration Take-Down and Clean-Up includes John Blomquist, Julie Kaufmann, John Maher, Mike

Mattei, Eileen Myers, Cheryl Rayner, John & Monique Reed, Art Swedlow, Al Takeda, and Sai Vallabha. Thanks go to everyone else who helped out whenever help was needed.

We wish you and your families a Happy and Healthy 2015!

~ Eileen Myers and the 2015 New Year's Eve Revelers ~

Geminid Meteors . . .

On Saturday night, December 13th, ATMoB members were treated to clear skies to watch the annual Geminid meteor shower at the Clubhouse.

The Geminid's are a fairly reliable shower, typically producing 10-20 meteors per hour. The meteors are bits of rock and dust produced by the asteroid 3200 Phaethon which has a 1.4 year orbital period around the Sun. The radiant is in the constellation of Gemini near the star Castor.

This year the peak was a day before Last Quarter and the Moon rose at 23:18 EST, giving us at least 5 hours of darkness. The constellation would be on the eastern horizon at 18:00 EST and be high in the sky before the moonrise.

The excellent sky conditions allowed us to see at least a dozen meteors per hour. Most people observed the Geminids near the horizon rather than overhead near the radiant. The record is held by Cheryl Rayner who recorded 63 meteors that night.



Geminid meteor over the Clamshell Observatory. *

~ Submitted by Al Takeda ~

Editor: * Photos by Al Takeda unless otherwise noted.

February Star Fields DEADLINE
Sunday, January 25th

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed January 6, 2015

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

EXECUTIVE BOARD 2014-2015

PRESIDENT:	Neil Fleming	president@atmob.org
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	Steve Clougherty	(781) 784-3024
	David Prowten	(978) 369-1596
OBSERVING:	Bruce Berger	(978) 387-4189
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 8 Mercury and Venus are 1-deg. apart (evening dusk)
Jan 13 Last Quarter Moon (Moonrise at midnight)
Jan 14 Mercury at greatest eastern elongation, 19-deg. (evening)
Jan 20 New Moon
Jan 24 Triple Shadow Transit on Jupiter. 06:28 UT (01:28 EST)
Jan 26 First Quarter Moon (Moonset at midnight)
Jan 26 156 Xanthippe occults TYC 0593-00297-1, 23:04 UT (18:04 EST)
Feb 3 Full Moon