



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

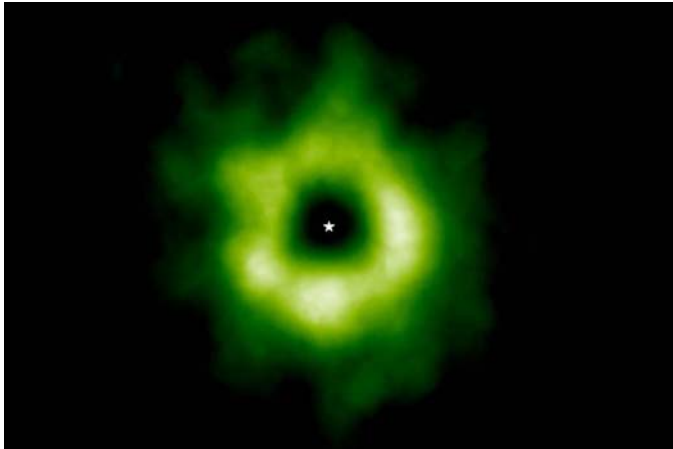
Vol. 26, No. 1 January 2014

This Month's Meeting...

Thursday, January 9th, 2014 at 8:00 PM
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

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



ALMA image of CO snow line. Karin Öberg, Harvard/University of Virginia

Icy Origins: Snowlines During Star and Planet Formation

This month's speaker will be Professor Karin Öberg from the Harvard Smithsonian CfA. Professor Öberg joined the Harvard faculty as an assistant professor in 2013 and also works in the Radio and Geoastronomy division of the CfA with a current focus on star and planet formation. In the cold and dense stages of star and planet formation, volatile molecules condense out on interstellar grains forming icy mantles. This condensation process results in a series of snowlines, or condensation fronts, whose exact locations are set by a combination of thermal and non-thermal processes. The nature of these snowlines in protoplanetary disks are predicted to have large impacts on planet formation efficiencies, on the bulk compositions of the forming planets, and on the amount of prebiotic material available on planet surfaces. Professor Öberg will discuss the results of her

research into these mechanisms using a combination of IR and millimeter observations, theory, and laboratory experiments.

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...

As I write this message the people of China are experiencing a thrill that many of us can fondly remember from days long ago. That is the thrill and sense of pride as their country has successfully placed a lander and rover on the moon. The space probe named Chang'e 3 touched down on December 14th and the next day the rover named Yutu, which is translated to "Jade Rabbit", made tracks on the moon thus making China the 3rd country to do so. This follows 37 years after the last soft landing on the moon made by Russia's Luna-24 probe and 41 years after the last Apollo mission.

There have been other rovers on the moon. Most notably the Lunar Roving Vehicles or LRVs in NASA-Speak from the days of Apollo 15, 16, and 17 and these by far are special unto themselves as they carried men across the moon in what seemed an effortless, happy go-lucky Sunday drive. That's what we saw and sensed but clearly there was so much technology there that was cutting edge and surely a sense of grave danger as the astronauts ventured further and further from the safety of the lunar lander. What pride we Americans had then. It was certainly the icing on the cake to the act of just getting there and landing on the surface. To cap it off we had carried the iconic American symbol of freedom and were driving around the surface of the moon.

The first rovers on the moon were not American however. That distinction belongs to the other space power – Russia. In November of 1970 the rover Lunakhod-I was placed on the moon and it operated successfully for almost a year, traveling 6.5 miles and returning a good deal of science data including 20,000 images and the results of 25 lunar soil samples. This was followed in 1973 by Lunakhod-II which lasted only 4 months but nevertheless returned a good deal of science data as well.

The future looks bright for lunar rovers. There is the Google Lunar-X prize which offers a total of \$30 million in prizes to the first privately funded team to land a rover on the Moon that successfully travels more than 500 meters and transmits back high definition images and video of the surface. There are currently over 20 contenders, two of which have plans for 2015. Also in 2015, China has plans for a second lander/rover mission called Chang-e 4 and in 2017 India will try to be the fourth country to place a rover on the Moon with its Chandrayaan-II mission. The U.S. is not sitting idle. Although there are no concrete missions planned, there is significant development going on concerning Lunar Rovers. The ones planned are bigger and more sophisticated than the Apollo era LRV's, however that heritage is the basis for their design concepts.

I wish China good luck with their space program and look forward to watching other groups and countries put wheels on the Moon. I especially hope the United States gets back into the action. Watching from the distant sidelines is not at much fun as being on the forefront.

~ Mike Hill – President ~

December Meeting Minutes . . .



Dr. Nelson Caldwell.*

Minutes of ATMob meeting held December 12, 2013.

Meeting held in Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics.

Mike Hill, President: called the meeting to order at 8:00 PM.

- The Secretary's Report of the November 2013 meeting was given by Sidney Johnston.
- Mike Hill gave the Treasurer's report which was prepared by Nanette Benoit.
- Tom McDonagh gave the Membership Secretary's Report. Tom thanked Steve Clougherty for providing an excellent evening of observing at a recent observing session.
- Glenn Chaple gave part of the Observing Committee Report. Glenn mentioned several notable astronomical events, including the apparent "eating" of Comet ISON by the Sun during its passage through perihelion, Comet Lovejoy, the January 3rd Quadrantid meteor shower (which will radiate near the handle of the Big Dipper), and the expected occultation of a named star by an asteroid on January 4.
- Bruce Berger gave a part of the Observing Committee Report. Bruce thanked a group of members for helping set up member Chuck Evans' dome and telescope for use in photography. Bruce thanked member Fred Ward for donating three sets of Craftsman tools to the club, including an assortment of power tools, wrenches, and so forth.
- Steve Clougherty gave the Clubhouse Report. Steve thanked John Small for doing some electrical work. The 20-inch Shapley telescope is now in the near barn where members can examine it. Work on the evaporator room was done during the last work party. Steve thanked all members who helped during the recent work party.
- Mike Hill read a thank you letter from a member who had borrowed a telescope for a month. Mike also mentioned the New Year's Eve party to be held at the Clubhouse.

- Tom McDonagh mentioned that the Acton star party had been very good.
- Old Business: None
- New Business: None

President Mike Hill introduced Dr. Nelson Caldwell of the Harvard Smithsonian CfA. as the invited speaker. Dr Caldwell is a member of the Optical and Infrared Astronomy Division. The division focuses on extragalactic and galactic astronomy emphasizing studies of the large-scale structure of the universe, clusters of stars and of galaxies.

Dr. Caldwell's talk was entitled "A Multi-Color Examination of the Andromeda Galaxy". In his talk he described the Andromeda Galaxy (M31) star clusters as revealed in many spectra taken over about four years. A major goal of the study was to understand galaxy structure by learning the distribution and composition of star clusters and especially globular clusters in M31.

For example, in the Milky Way galaxy the newer clusters are distributed near the center of the Milky Way and in the plane of the Milky Way, and older globular clusters are distributed in a halo around the center of the galaxy but at considerable distance from the galactic plane of the Milky Way.

The age of a cluster is determined from the spectra of the cluster. Older globular clusters have a higher metallicity showing in their spectra as heavier elements are synthesized by fusion in the stars of the clusters. Newer globular clusters have a weaker showing of metallicity lines in their spectra as the hydrogen and helium spectra dominate the measured spectrum. However, older stars may blow away the heavier elements and so the spectra must be carefully interpreted.

The age of the newer clusters located within the plane of the Milky Way is around 100 million years. In contrast, the age of the globular clusters distributed in the Milky Way galaxy halo is around 3 billion years.

A question motivating the study of star clusters in M31 is to determine if star clusters in M31 have the same type of distribution as do the clusters of the Milky Way. If the distributions are either similar or not similar in M31 and the Milky Way, then something has been learned about galaxy structure.

The instrument used in the ground based observations used optical fibers to guide light from the focal plane of the telescope to a high resolution spectrometer. The spectra indicate the metallicity and composition of the cluster whose light is observed. The cluster's light is kept separate from other light from M31 by placing optical fibers at the location of the image of the cluster, and observing the spectra of just the light from the particular cluster as transmitted by the optical fiber to the spectrometer.

A brief history of using optical fibers to guide light from a particular astronomical object to a spectrometer follows.

Probes holding dozens of fibers (“fishermen around a pond”) were introduced in Arizona in 1985 and in Cerro Tololo in 1990.

Probes holding more fibers through holes drilled in a plate in a plug board arrangement were introduced at Kitt Peak in 1985 – 2000. The fibers had to be placed manually in the holes in the plate.

A technique where about a hundred fibers are held on a metal plate with magnets (Autofib) were introduced in Australia/UK in 1987. The fibers are set in place by a robot moving along an XY stage to place the magnets.

A machine designed by Dan Fabricant at the Center for Astrophysics can place about 300 fibers with magnets on a plate by use of a robot moving on an XY stage. This machine was used in the present study. With this instrument about 300 astronomical objects may have their spectra simultaneously recorded on a high resolution spectrometer mounted away from the telescope.

Results of the study include the following.

More than three thousand (3,000) spectra of individual objects in M31 were taken over a period of four years. The objects included young and old clusters, planetary nebulae, and individual stars.

The study used both the Hubble Space Telescope and ground based telescopes equipped with optical fibers leading from the focal plane of the telescope to a high resolution spectrograph mounted as a stationary instrument. The study was granted about 900 orbits of the Hubble over the four year period of the study, where ordinary Hubble studies are usually granted only about 5 to 10 orbits. Telescope time on the Hubble is measured by the number of Hubble orbits granted.

Filters in the Hubble were used to classify spectra in Hubble images.

Line of sight velocities of objects in M31 were determined by red shift and blue shift. The spectra show rotation of the young star clusters, ages < 2 billion years, within the plane of M31 and around the center of M31.

A result of the study of M31 star clusters is that the distribution of star clusters in M31 is similar to the distribution in the Milky Way.

A comparison between M31 clusters and the Milky Way clusters shows that both galaxies have new star clusters in their galaxy plane, and old globular star clusters distributed in a halo around the center of the galaxy.

The meeting was adjourned at 9:30 PM.

~ *Sidney Johnston, Secretary* ~

Clubhouse Report . . .

December 2013



Glenn Meurer replacing the heater thermostat.*

- The last Work Session of 2013 was held on Saturday, December 14th. At 10AM the temperature was 12 deg. F. In spite of the brisk weather, both indoor and outside projects were undertaken by 25 members and friends who signed the log book.
- The thermostat on the baseboard electric heater behind the computer in the meeting room was found defective. It was replaced with a new thermostat by Glenn M. It was discovered that the power panel circuit identifiers are in need of upgrade/completing. We need to agree on location identifiers that are obvious to a user to prevent problems. This effort will start at the next work party. The new thermostat is turned to the mid-mild setting. Note: CW= Hotter and CCW= Colder.
- In spite of the cold conditions outside, a team comprising of Bill T., Julia F., with Bill’s students Joe B. and Ben K., continued to clear the overgrowth west of the barn. The pile of collected debris is approaching ginormous. It is encouraging to see this area approaching a condition to allow us to sow grass seed next spring.
- The evaporator room floor was scraped, muriatic acid applied and removed, rinsed with water, then vacuum dried. The floor temperature was too cold to repair the cracks in the concrete floor this session. This effort will continue next month by Paul C. and John R.
- The possible replacement telescope in the Knight roll-off observatory was test fitted in the removed 20” location. A list of floor modifications and operating restrictions are being formulated to implement this plan. This effort led by Steve C. and Dave P. will continue next month.



Test fitting the telescope in the Ed Knight Observatory.*

- The oil tank reads just over one-half tank full. Now that winter is here we need to review the furnace operating procedures. The furnace thermostat on the grinding room front wall is lowered to 42 deg. F. before closing. The furnace red plate shut off switch, next to the thermostat, is left ON at all times. The furnace must turn off automatically before closing the clubhouse. It may cycle on-off several times before heat in the burn chamber is dissipated. Winter procedures include leaving the two doors (East & West) of the Grinding room OPEN to allow the temperature to stay above freezing at the refrigerator. Please, no more phone calls that it is below freezing in the house...LEAVE THOSE 2 DOORS OPEN! Thank you.
- The food prep team provided a high protein hot lunch that was much appreciated.
- While it was too cold in the barn to start the 20" rebuild, supplies were replaced in the metal shed and Grinding room. The 2 PM temperature read 20 deg. By 4:30 PM the forecast snow was starting to accumulate on the road and the Clubhouse was closed.

Later the timer was repaired and porch lights set for winter on-off times by Eric J. Verizon was contacted by John R. regarding the downed phone line at the driveway pole; after a day of phone contacts, the telephone service was restored. John B. plowed after both Dec. snow storms.

Thanks go to John Blomquist, Paul Cicchetti, Steve Clougherty, Karl & Jeffrey Dean, Julia Foden, Charlee & Jim Gettys, Joe Henry, Eric Johansson, Dick Koolish, John Maher, Glenn Meurer, Eileen Myers, Dave Prowten, Cheryl Rayner, John Reed, Art Swedlow, Al Takeda, Bill Toomey w/students Joe Bernardo, Ben Kleschinsky & a mystery student, Sai Vallabha and Bruce Berger for making this day possible.

Plans are underway for the Clubhouse New Year's Eve party/observing night.

The next work party will be held on Full Moon Saturday, January 18th starting at 10AM.

Please consider joining us in our efforts to keep our Clubhouse in good condition. Thanks.

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

Clubhouse Saturday Schedule

January 11	Brian Leacu	Phil Rounseville
January 18	Joe Henry and Tom Lumenello WORKPARTY # 1	
January 25	Bill Robinson	Eric Johansson
February 1	John Panaswich	John Small
February 8	Bruce Berger	Mike Hill
February 15	Brian Maerz and Glenn Meurer WORKPARTY # 2	
February 22	Eileen Myers	Rich Nugent
March 1	Steve Clougherty + Neil Fleming Messier Marathon #1	



Fred Ward's tool set donations for the Clubhouse. *

Membership Report . . .

Membership count as of December 23, 2013 is at 269 individuals. At the peak, club membership stood at 329 members in 2013.

Please seek out and welcome our new club members:

Sheila Hoffman and Nelson Caldwell

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 2014

Gamma (γ) Ceti– Double Star in Cetus

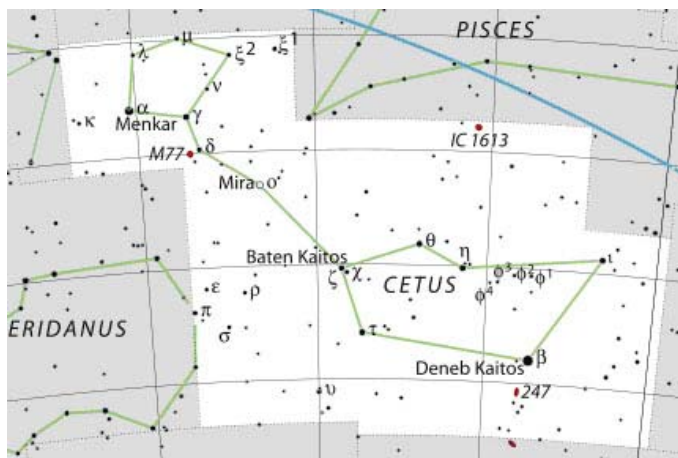
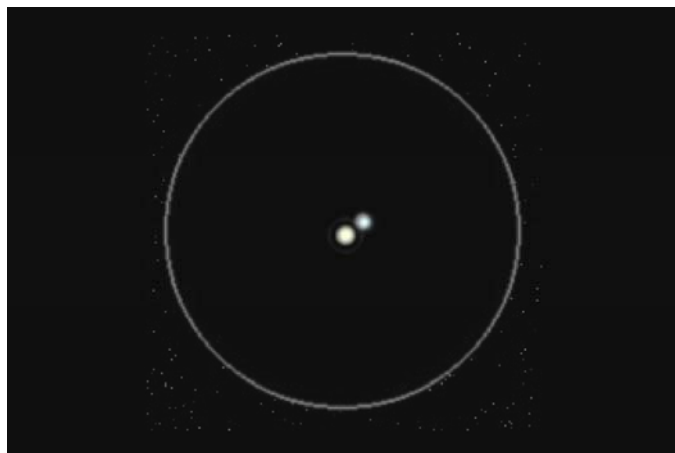


Chart from IAU and *Sky and Telescope*. North at the top and West to the right.

We open the new year with a double star that's as easy to split as it is to pronounce its Arabic name, Kaffaljdhma. We'll simply refer to it by the Bayer designation, gamma (γ) Ceti. Discovered by the German-Russian astronomer F. G. W. Struve in 1825 (it bears the Struve Catalog identity $\Sigma 299$), gamma Ceti is the southernmost member of a circlet of stars that forms the head of the celestial Whale.

Gamma Ceti's component stars are separated by 2.3 arcseconds, putting them at the resolution limit of a 2-inch scope. However, the primary is 9 times brighter than its partner (magnitudes 3.6 and 6.2), making them a challenge for telescopes with twice the aperture, even under ideal seeing conditions. My first split of gamma Ceti was accomplished with a 5-inch f/12 Maksutov-Cassegrain and a magnifying power of 250X. The companion appeared as a bump on the primary diffraction ring of the main star.



Sketch by J. Anway (doublestarobserver.com). N. at the top and W. to the right.

There's an interesting twist to the colors observers report when viewing gamma Ceti. Most note colors of yellowish and blue – the opposite of what you'd expect for a pair whose spectral classes are A3 and F3. These impressions are likely illusory - a

result of a contrast effect between a bright primary and fainter companion.

As they say in the TV ads, "But wait, There's more!" A 10th magnitude K-type dwarf situated 14 arcminutes to the northwest shares the same proper motion as the main pair. All three lie about 80 light years away.

Gamma Ceti is just 3 degrees north of the M77. If you happen to be visiting this galaxy and the seeing conditions are favorable, don't depart without giving Kaffal-whatchamacallit a try.

~ Glenn Chaple – Member at Large ~

Journal of Cancer on LP effects . . .

I have been informed that my article in *Journal of Cancer (CA: A Cancer Journal for Clinicians)* has been released. Mostly written by Richard Stevens from the University of Connecticut, but I am very happy to be in the author title list. This article is a full review of the world's best literature on the subject of cancer increase from melatonin suppression by light at night.

The *JOC* accepted the article for publication, (late in January in print), but felt it an important article so... released it online for all to read!

The Journal is the most read oncology journal in the world (cancer specialists), so... I am hoping this makes an impact on the science involved.

The title is:

"Breast cancer and circadian disruption from electric lighting in the modern world"

As it is now released, I can now share. You can see it at the link:

<http://onlinelibrary.wiley.com/doi/10.3322/caac.21218/full>

Or, download from the ATMob site as a PDF:

<http://atmob.org/library/resources.php>

On our ATMob site, I also have posted my September 2013 article that is in the *Journal of Preventive Medicine*, that summarizes the AMA monograph on Light Pollution health effects, **"Adverse Health Effects of Night Time Lighting"** as well as the original AMA monograph (June 2012) by the same name.

The *Journal of Cancer* article is heavy in the science (has 150 peer reviewed references at the end, that alone is a gold mine for information), but I am sure you can read and absorb the info. It will give you a firm understanding of the science involved regarding the effect of excess nighttime lighting on hormonally induced cancers (eg, breast and prostate), and has much info you can use in the LP battle.

~ Submitted by Dr. Mario Motta ~

ATMoB Celebrates the Arrival of 2014 . . .



New Year's Eve is not so much a celebration of the New Year as it is a reward for surviving the last 364 days. Congratulations! You made it! And for those of us who were at the Clubhouse on New Year's Eve, it was a no pressure opportunity to eat, be entertained, dance, enjoy a good conversation, and have a good laugh.

Highlights:

- Having fun with funny hats. The latest addition to the collection was an astronaut helmet, much enjoyed by all who wore it.
- Getting to know some of the other people and giving them a chance to catch up on what's happening with you. We had some out-of-town visitors from Ireland and Pennsylvania to meet too.
- Tasting some of the food: home roast turkey with fantastic stuffing and gravy, ham, chicken, salmon, pasta with Bailey Hill Sauce, deviled eggs, cheese and crackers, fruit salad, veggie salad, chips and dips, homemade pies, cookies, brownies, cake and more. (I know I am missing some of the items brought since they were eaten before I had a chance to see them!)



New Year's Celebration. (L-R) Phil R., Marsha B., Joe W. and Dave W.*



Too many choices and not enough time.*

- Enjoying the lively music performed by musicians Claude Galinsky (Guitar), Amy Colby (Five-String Violin), and Ed Los (Fiddle). Their music was a mix of New England Irish and French contra dance fiddle tunes, and the Clubhouse kitchen became a dance floor. Line dancing (especially the Wobble), swing dancing, Two-Step, Cha Cha, and other dances.



(L-R) Musicians: Claude Galinsky, Amy Colby, and Ed Los.*

- Smiling and posing for Al. Takeda, Joseph Wolfe, and anyone else who took photos and recorded videos of all of the goings-on.

- Experiencing something completely new by viewing faces and motion using an infrared viewer.
- Night sky viewing through Phil's telescope and the Schupmann. The skies were clear, temperature around 18-degrees. Thanks go out to Phil Rounseville, John Maher and Bill Robinson for checking the observatories and setting up. Thank you to John Blomquist for previous plowings of the observing field and parking areas so that these fields were accessible.



Observing with Phil Rounseville's scope. (L-R) Joe W., Phil R. And Vlad V. *



Schupmann observing. (L-R) Eric J., Joe W. And Phil R.*

The alphabetical Set-Up, Clean-Up and Break-Down *Thank You List* grows longer every year. Thanks go out to Nina Craven, Julie Kaufmann, Eileen Myers, Cheryl Rayner, John & Monique Reed, Bill Robinson, Art Swedlow and Al Takeda. Having this team makes all the difference.

Happy New Year!



John Reed and Party Hats.*



Dancing in the Kitchen.*



Welcoming 2014 at the Clubhouse.*

~ Eileen Myers – Chair of the New Year's Eve Committee ~

Editor: * Photos by Al Takeda unless otherwise noted.

**February Star Fields DEADLINE
Sunday, Jan. 26th**

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

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed January 8, 2014

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

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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.

Heads Up For The Month . . .

To calculate Eastern Standard Time (EST) from Universal Time (UT) subtract 5 from UT.

Jan 11 Venus in inferior conjunction
Jan 15 Full Moon. Moon at apogee.
Jan 24 Last Quarter Moon (Moonrise at midnight)
Jan 25 Saturn 0.6 deg. north of Moon
Jan 28 Venus 2 deg. north of Moon
Jan 30 New Moon. Moon at perigee.
Jan 31 Mercury at greatest eastern elongation (18 deg), evening
Feb 6 First Quarter Moon (Moonset at midnight)
Feb 14 Full Moon