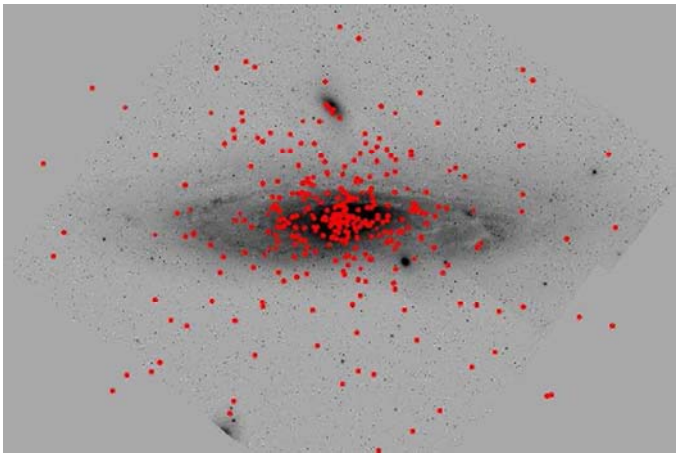
STAR FIELDS

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. 11 December 2013

This Month's Meeting…

Thursday, December 12th, 2013 at 8:00 PM
Phillips Auditorium
Harvard-Smithsonian Center for Astrophysics
Parking at the CfA is allowed for the duration of the meeting



M31 and Old Clusters. Caldwell et al. 2011

A Multi-Color Examination of the Andromeda Galaxy

This month's speaker will be Dr. Nelson Caldwell of the Harvard Smithsonian CfA. Dr Caldwell is a member of the Optical and Infrared Astronomy Division which focuses on extragalactic and galactic astronomy emphasizing studies of the large-scale structure of the universe, clusters of stars and of galaxies. He will talk about two large observing projects which seek to understand the constituent stars and star clusters of the Andromeda galaxy (M31). The first is a Hubble study where he and his team have collected new images of about 1/3 of the galaxy's disk in six different colors thus providing astronomers with the largest high resolution image of a nearby galaxy. The second is a project using the multi fiber spectrograph mounted on the MMT telescope in Arizona. More than 5000 spectra taken of stars and star clusters have allowed them to discover patterns of age and motion in these objects.

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…

First Telescope. Image courtesy of Mike Hill

Christmas; the Holidays; giving and receiving. That's what it's all about! Isn't it?? Well for a youngster, having been brought up in the tradition of giving and receiving (with my own emphasis on receiving), that was the context in which was born the idea that it was the ideal time for me to ask for a telescope! I'd been thinking about this for some time while perusing my *Sky and Telescopes* given to me by one of my early mentors. The likes of Unitron, Questar, Astrola were gleaming in my eyes; what I wouldn't do for one of those works of art and science . . . Ah, but reality does not escape a fourteen year old. No way were my parents going to spring for one of those. There was just no way.

So with reality came a reduction of my aspirations and surprisingly a new more exciting option – that of building my own. The advertisements for "parts" abounded in the backs of my magazines. Mirrors, mirror cells, diagonals and diagonal holders; eyepiece and eyepiece holders, finders and tubes. My favorite source was Edmund Scientific and from there I selected a list of parts and they, inevitably, became my Christmas present. Was I surprised? Sure. It wasn't a sure thing but asking for something reasonable made it so much more of a possibility. I was so excited on getting my parts that I built the first incarnation of the telescope using just the cardboard tube that the aluminum tube came in. It was simple but it worked and it was all the telescope that I needed. Of course that thrill, like a pretty sunset, was momentary and I've been building better and bigger telescopes ever since.

When it comes to making your own, try to keep things in perspective. It's easy to get taken away with the idea of making some complex equatorially, clock driven, and large telescope right off the bat. Or to make a large, deep, short f/ratio mirror for the first attempt at mirror making. But this can be a mistake. One should not try to go so far forward without taking the smaller steps first that come with building a modest, more manageable

project. If you're going to build, build small, learn what it takes with something that won't tax your budget, or your patience.

And when it comes to giving, to your child, your spouse, your significant other, or yourself for that matter, remember that simple is better in the beginning phases. A pair of binoculars or a small telescope will be just as enjoyable as a glamorous 10" Dob. A good planisphere and simple star atlas will give more depth of understanding to the major constellations and the motions across the sky than an iPad with a star chart app. I always loved my Nortons Star Atlas but a newer one, the *Sky and Telescope's* "Pocket Sky Atlas" is such a handy one that I find myself using it more often out in the field. Between the two I have a wealth of information and quite sufficiently detailed maps to allow me to get around the sky with ease. And they are both fun to peruse on a cold cloudy night like I used to do with my old *Sky and Telescope* mags.

So as we enter this season of giving (yes now that I'm older it is more about giving) think small. Think simple. A simple gift that encourages thoughtful exploration will go a long way down the road.

~ Michael Hill – President ~

November Meeting Minutes . . .

Dr. Thomas Dame. *

MEETING REPORT

Minutes of ATMoB meeting held November 14, 2013.

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

Mike Hill, President: called the meeting to order at 8:30 PM.

- The Secretary's Report of the October 2013 meeting was given by Sidney Johnston.
- Nanette Benoit gave the Treasurer's report.
- Tom McDonagh gave the Membership Report.
- Glenn Chaple gave the Observing Committee Report. Glenn reviewed several viewing opportunities in the coming month for near conjunctions of the Moon, planets, and comets.
- Steve Clougherty gave the Clubhouse Report. The Clubhouse committee has agreed to de-commission the 20-inch telescope in the Ed Knight Observatory, and to put the 20-inch on display in the second floor of the Clubhouse. Much was accomplished at the recent work party.
- Mike Hill reviewed the Board Meeting held on November 5, 2013. 52 telescopes have been identified in storage in the Clubhouse. It was agreed to not keep 17 of the telescopes, some to be used for parts during telescope building projects and some to be given away to interested parties. Pictures of all of the telescopes were examined by the Board in the decision making, and Al Takeda, John Maher, and Neil Fleming are thanked for conducting the survey.
- Mario Motta discussed plans for observing the total solar eclipse on the 21st of August 2017 that will be visible from the United States. Greatest eclipse occurs at Latitude 36 degrees 58.0 minutes; Longitude West 87 degrees 37.7 minutes, according to NASA Reference Publication 1178, "Fifty Year Canon of Solar Eclipses 1986-2035". The location of greatest eclipse is in Kentucky, a few miles North of Interstate 24, and North-West of Hopkinsville, KY, all in Western Kentucky. Several locations at state parks, etc. were discussed, along with travel routes in case of cloudy weather.
- Old Business: None
- New Business: None

President Mike Hill introduced Dr. Thomas Dame from the Harvard-Smithsonian Center for Astrophysics as the invited speaker. Dr. Dame's talk was entitled "Big Science with 'Mini' Telescopes: Mapping the Galaxy from NYC, Cambridge, and Chile". He discussed mapping the sky at molecular emission frequencies in the microwave radio frequency range, especially at the 1.2 millimeter wavelength of the molecular carbon monoxide emission, with a radio telescope of 1.5 meters in diameter.

A single telescope was used to map the Milky Way Galaxy CO (carbon monoxide) distribution in the Northern Hemisphere. With a similar telescope in Chile, the Southern sky was mapped. With a 1.5-meter diameter telescope at a wavelength of 1.2 millimeter wavelength, the angular resolution in radians is: 1.2 mm /1,500 mm = 0.0008 radians;

and the 300 meter radio telescope at the National Radio Astronomy Observatory in Greenbank, WV working at the 21 centimeter wavelength has an angular resolution of:

0.21 m /300 m = 0.0007 radians. Accordingly, the angular resolution for CO obtained by Dr. Dame with a 1.5-meter diameter telescope is about the same as that obtained by the 300 meter telescope for hydrogen emission at the 21 centimeter wavelength.

The sky is scanned with a single pixel by allowing the daily rotation of the Earth to sweep the sky. The 1.5-meter telescope is mounted on the roof of the Center for Astrophysics (CfA) and provides the single pixel for developing an image of the Northern CO radio sky, as does the telescope in Chile for the Southern radio sky. A previous telescope was used at Columbia University in New York, NY. The project to map the galaxy content of carbon monoxide has required about 35 years, with some projects at other molecular emission wavelengths slipped in.

The telescope uses a radio detector cooled by liquid helium in order to reduce detector thermal noise. Liquid helium boils at atmospheric pressure at about 4 Kelvin, and the temperature is maintained low in order to reduce electronic noise introduced by the radio detector circuits.

The carbon monoxide occurs near the edges of dust lanes where carbon and carbon monoxide from the dust is excited by starlight impinging from the non-opaque regions of nebulae. There is not enough of the molecular species to block emitted molecular emissions and so the CO radiation penetrates the dust lanes. So, an image made from CO emissions permits mapping of the Milky Way galaxy from regions of the Milky Way invisible to other techniques. In this way, spiral arms of the Milky Way which are not visible from other techniques have been mapped by the molecular emission method.

Discoveries made by mapping the Milky Way carbon monoxide content include: mapping approximately 150 molecular species; obtaining clear pictures of several of the spiral arms of the Milky Way galaxy; defining star formation regions of the galaxy; defining distribution of molecular hydrogen H2 which is otherwise hard to detect, etc. Spiral arms which were not resolved by other observational methods are being clarified by observations of molecular cloud emissions, and in particular sections of spiral arms of the Milky Way which were thought to be disjointed are being shown by the present observations to be connected. These conclusions result from penetration of the dust lanes by the radio waves of the present molecular cloud studies.

Observations of the spectrum of the detected radio frequencies are made. Doppler shift of the emission radiation produces a radio frequency spectrum. This spectrum is observed by using a radio spectrometer. The velocity of the molecular clouds both toward Earth (blue shift) and away from Earth (red shift) is determined, as well as the intensity of the received radio signal. So, density profiles and motion of the molecular clouds can be determined.

As a side benefit, during a day of observation, velocity profiles of galaxy structures can be determined along the directions observed that day. Velocity of galaxy rotation can then be determined along lines in the galaxy. Graduate students can then determine the galaxy rotation curve from the observations. It is reported that the rotation curve is basically flat from the center to the outer edges of the galaxy. The flat rotation curve means dark matter, and so the observations permit preparation of maps of dark matter within the Milky Way galaxy.

The meeting was adjourned at 10:00 PM

~ Sidney Johnston, Secretary ~

Membership Report . . .

Membership count as of November 27, 2013 is at 258 individuals. This is one more member than at the same time last year.

I get numerous calls and emails each month regarding *Sky & Telescope* subscription renewal notices. While I enjoy speaking with fellow club members, I do sense the frustration many feel in receiving these notices. I understand the main reason for this occurrence is that *S&T* prints shipping labels two months in advance. If your membership renewal occurred during this period, you may receive these notices. If you have recently renewed your subscription through the club, it can take from two to three months for renewal notices to stop. Please ignore these notices. You can contact *S&T* directly at 1-800-253-0245 with questions regarding your subscription. The responding representatives are helpful and have up to date information regarding subscriptions.

Please do contact me if you have not received your monthly issue. As a reference point, I received my *S&T* issue yesterday, the 26th of November. Nanette, our treasurer, is very diligent and responsive in paying out subscription payments as they arrive and it is very rare for a delay in delivery that can be attributed to club related processing.

I do try to email all new members directly with useful information related to club activities in the near future. I may have inadvertently stated in recent emails that monthly club meetings occur on the first Thursday of the month. This was erroneous as the club officially meets in Cambridge on the 2nd Thursday of each month excluding August. Accurate and up to date information can be found on your ATMoB website. Please contact me if you require assistance in logging onto the site.

www.atmob.org

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

Charlie Hoey Bonnie Erskine

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 ~

Dave Prowten replacing the broken drain valve. *

Clubhouse Report . . .

November 2013

The monthly full moon work party took place on Saturday, November 16. Work started early by continuing the relocation of supplies in the barn and house attics started last month. Twenty seven members and five student volunteers signed in the log book. It seems that several others could have forgotten to do so, for a great deal was accomplished.

- The electrical work in the bathroom and composting chamber was completed by John S. assisted by Glenn M. and Mark O. New thermostats were installed so that the two unit temperatures can be set independently. The lower thermostat must keep the chamber constantly warm for composting and the upper room can now be set for human comfort.
- Earlier, Glenn C., Joshua A., Dave W., and Bill T. assisted Mike H. in relocating equipment and supplies from the barn loft to the house attic.
- Donations of books and charts by long time member Carl Hein were brought to the Clubhouse by Eileen M. and displayed for members present to choose and use in their pursuit of our astronomical hobby. Some books will be added to the Clubhouse library collection. Thank you Carl for your generosity! It is greatly appreciated.
- Chase G. removed the huge over-growth of invasive plant species at the observing field edge. Bill T. along with his students Joe B., Sam M., Ben K., Tom H., and Leeanne M., removed invasive vines from trees, pulled the vine roots, and removed saplings to prepare the ground behind the far barn for grass seed next spring. This was those students' community volunteer activity.
- The Shapley 20" folded Newtonian, on the new dob mount, was removed from the Knight Observatory and relocated into the barn loft to allow for rebuild/refurbishment during the next seasons. This work will allow this 20" to achieve its full potential.
- Dave P. completed the rework of the water supply drain valve system. The system was installed in the pump room 20 years ago, and the turn on valve was replaced after 10 years of use. So now the new brass valve will give us filtered water for mirror polishing for many years to come. After this effort, Paul C. continued to remove the old linoleum substrate from the evaporator room floor. Next we will be the cleaning the bare floor with muriatic acid, repair as necessary, and apply new floor tiles.
- Lunch consisting of fresh roasted capon chicken, baked BBQ chicken, Bailey Hill spaghetti, garlic bread, Sai's salad, cookies and soft drinks was prepared by Eric J., Sai V., Cheryl R., Art S., Eileen M., and Nina C.. Cleanup was successful.
- After dark, the observing field was very active. Eric J. and a new member used the Schupmann 6" for Moon and Jupiter photography. Bill T.'s five students used the club's field scope (Ed.: Televue 85 refractor), modified earlier by John B. and Al T. The students searched for and photographed a series of Messier objects to post on their websites. Al T. then assisted them in processing their M27 image. Eric J. checked out Jack W. on the 17" dob. Phil R. showed members many objects through his 6" and assisted members with their scope operation. A good evening followed a productive day.
- A big thank you goes out to.....Joshua Ashenberg, John Blomquist, Glenn Chaple, Paul Cicchetti, Steve Clougherty, Nina Craven, Chase Green, Mike Hill, Anna Hillier (thanks for the donuts!), Eric Johansson, Glenn Meurer, Eileen Myers, Mark Olson, George Paquin, Dave Prowten, Cheryl Rayner, John Reed, Bill Robinson, Phil Rounseville, John Small, Art Swedlow, Al Takeda, Bill Toomey (and Bill's students: Joe Bernardo, Sam Martin, Ben Kleschinsky, Tommy Hall, Leeanne McDonald), Sai Vallabha, Jack Whipple, Dave Wolfendale, and Joe Wolfe. One name signed could not be read, sorry; but we thank you. If you forgot to sign in, thank you too.

The next work session will be held on the Saturday closest to the December full moon: December 14th starting at 10 am. If you arrive early please consider walking the grounds to check if we have missed considering something that needs attention; and let us know. If anyone receives a certificate for a discount on donuts, please remember the next work party would be enhanced by your generosity.

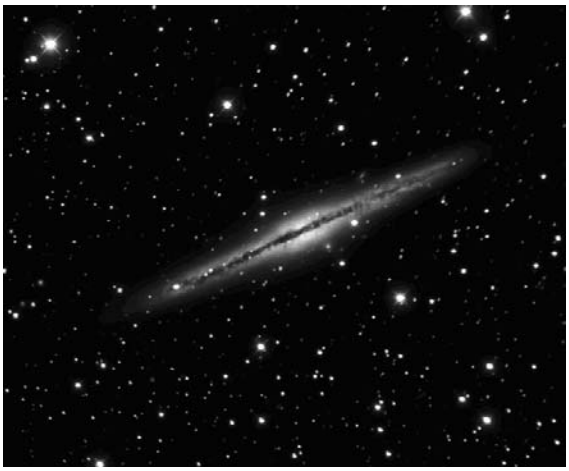
~ Clubhouse Committee Directors ~
~ John Reed, Steve Clougherty and Dave Prowten ~

Clubhouse Saturday Schedule

December 14	Steve Clougherty + Al Takeda **WORKPARTY # 12**	
December 21	Eric Johansson	John Reed
December 28	Clubhouse Closed	
December 31	**New Year's Eve Party**	
January 4	Paul Cicchetti	John Reed
January 11	Brian Leacu	Phil Rounseville

Sky Object of the Month . . .

December 2013
NGC 891– Spiral Galaxy in Andromeda



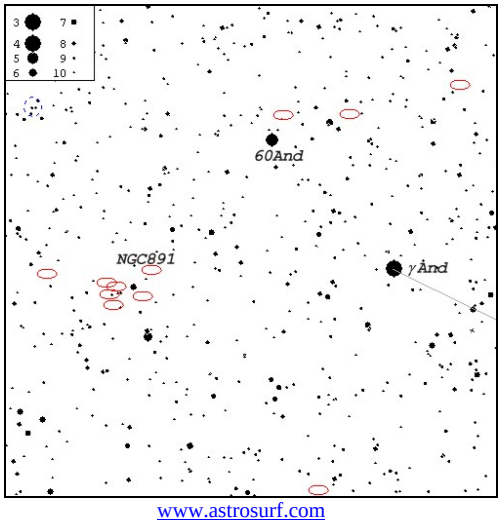
NGC 891. Photo by Mario Motta M.D.

Last month, we turned our attention to the spiral galaxy NGC 7331 to get an idea what the Andromeda Galaxy (which is similar in size and structure) might look like were it 20 times

more distant. From its new location, this naked eye object would now be a 9th magnitude "faint fuzzy," visible only with the aid of telescope or large binocular.

How might our Milky Way Galaxy appear to eyes gazing our way from an extragalactic perspective? From a distance of 30 million light years and angled edge-on to the observer's line of sight, it would appear very much like NGC 891 in Andromeda. Discovered by William Herschel's sister Caroline in 1784 and located 3 ½ degrees east of the colorful double star Almach (gamma [γ] Andromedae), NGC 891 is essentially a twin to the Milky Way.

A 10th magnitude sliver 13 arc-minutes long and 3 arc-minutes wide, NGC 891 is an elusive target. A dark dust lane that runs its length greatly diminishes its overall brightness. Just to glimpse NGC 891 with small aperture telescope is a challenging task. The dust lane doesn't really come into view until an 8 to 10 inch scope is used. The real grandeur of NGC 891 begins to unfold under the scrutiny of large Dobsonian-mounted reflectors. Whatever telescope you use, your quest for NGC 891 should be made from a dark-sky location with a magnification in excess of 100X. Its dim appearance is a sobering reminder that our mighty Milky Way isn't so mighty in the cosmic scheme of things.



www.astrosurf.com

~ Glenn Chaple – Member at Large ~

New Year's Eve Party . . .

Tuesday, December 31st starting at 6:30 PM at the ATMoB Clubhouse, Westford, MA

At last! A moonless New Year's Eve! Eating and other festivities will start at 6:30 PM on Tuesday, December 31st and will continue past midnight. Arrive at any time since there will be 8 opportunities in all to welcome 2014 and shout "Happy New Year" as the New Year crosses the time zones, starting with Greenwich Mean Time (7 PM local time) and continuing hour after hour through Eastern Standard Time (midnight local time), with a couple of half hour celebrations in between.

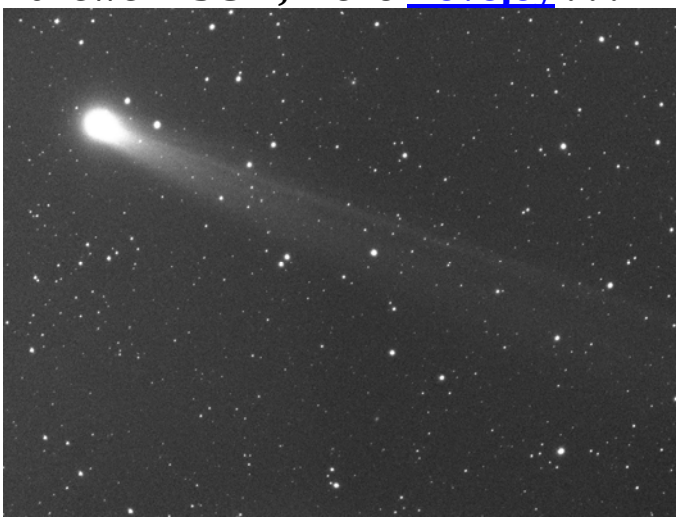
Stop by with your family and friends - an RSVP is not needed. Please bring something tasty to share. Entrée type dishes are always very welcome since folks arrive and leave all evening and the party seems to start again with each new group. There will be plenty of non-alcoholic beverages. The clubhouse will be warm and the party is on regardless of the weather. Don't forget your warm observing clothes and boots, and bring a telescope and camera if you like. The club's observatories will be open for observing too. There should be celebratory Jupiter, Uranus and deep sky gazing depending on the weather. We will also have indoor games, songs, dancing and PRIZES so do join us to welcome in 2014 together.

Any party suggestions or questions are welcome, so please email them to Eileen at starleen@charter.net or call at 978-501-6342 (day) or 978-456-3937 (evening). For one set of directions to the ATMoB Clubhouse in Westford, see the last page of the ATMoB newsletter, or at www.atmob.org and click on ATMoB Club House at the bottom of the Home page. There are of course many other routes that may be shorter for you.

~ Organized by the Special Events Committee Julie Kaufman, Nina Craven and Eileen Myers, and Co-Hosts, Clubhouse Committee Members John Reed, Al Takeda, Sai Vallabha, John Blomquist, John Maher, Cheryl Rayner, Art Swedlow, Eric Johannson, and special guest visitor Julia Foden from Clonakilty, County Cork, Ireland ~

~ Eileen Myers - Chair of the Special Events Committee ~

Farewell ISON, Hello Lovejoy . . .


C/2013 R1, Comet Lovejoy. 30 Nov 2013.*

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

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January *Star Fields* DEADLINE
Sunday, Dec. 22th

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 December 11, 2013

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

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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.

Heads Up For The Month . . .

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

Dec 14 Geminid Meteor Shower peaks
Dec 17 Full Moon.
Dec 21 Winter Solstice
Dec 25 Last Quarter Moon (Moonrise at midnight)
Dec 28 Saturn 0.9-deg. N. of Moon (morning occultation)
Jan 1 New Moon
Jan 4 Quadrantid Meteor Shower peaks
Jan 5 Jupiter at opposition
Jan 7 First Quarter Moon (Moonset at midnight)