



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. 5 May 2015

This Month's Meeting . . .

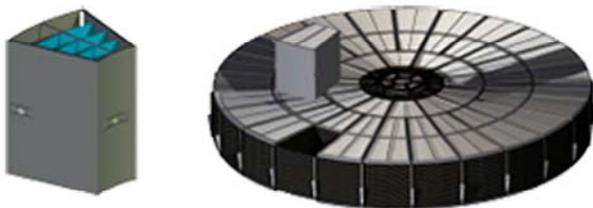
Thursday, May 14th, 2015 at 8:00 PM

Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

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

X-Ray Observatories & Optics



SMART X – Optics. Harvard-Smithsonian Center for Astrophysics

This month's speaker will be Dr. Ryan Allured, the Leon Van Speybroeck Fellow at the Harvard-Smithsonian Center for Astrophysics. His talk will be about X-Ray observatories and their optical design.

Since the 1970s, space-born X-ray observatories have shed light on a variety of exotic objects from neutron stars in our own Milky Way to supermassive black holes at the center of distant galaxies. With each new observatory, the field of X-ray instrumentation makes significant advances in both optics and detectors. In this talk, Dr. Allured will introduce the main components of an X-ray telescope. He will give an overview of the currently orbiting X-ray observatories, Chandra and XMM-Newton, with emphasis on their imaging optics. The concept for a successor to Chandra will be described, as well as the enabling technology: adjustable X-ray optics. Finally, he will present

recent laboratory developments in the adjustable X-ray optics program.

Dr. Allured did his undergraduate physics and mathematics degree at Illinois State University. He went on to earn his PhD in physics at the University of Iowa while working on the Gravity and Extreme Magnetism Small Explorer mission. After a brief postdoc period at the University of Iowa working on off-plane X-ray reflection gratings, he was awarded the Leon Van Speybroeck Fellowship in X-ray optics at the Smithsonian Astrophysical Observatory. He primarily works on adjustable X-ray optics, but is also heavily involved in the Arcus Small Explorer proposal and the recently approved MaGIXS X-ray spectrometer rocket.

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 . . .

It's time!...new web site time! A long time coming, the board has concluded that we need to shift over to a new facility. As President, I've commissioned a committee to:

Document information on our current web site and electronic storage and communications capabilities

Collect information on desired new capabilities

Determine possible alternatives to addressing the sum of our needs.

And finally, provide a recommended course of action for this project

Since I'm in this line of business, I'll be chairing this committee. If you would like to participate directly, please drop me a note. If you have input on desired features in our new web site, don't hesitate to pass those requests on to me.

Later, once we've determined the course of action, we'll set up a plan, then execute on that plan. At that point, we'll need help in moving over content, as well as (probably) on graphics design. Let me know if you'd like to help.

As always, let me know your thoughts...

~ Neil Fleming – President ~

Executive Board Meeting . . .

There will be a board meeting on Monday, June 1st at the Clubhouse in Westford. This will be the annual budget meeting and will begin at 7:00 pm. The meeting is open to the membership.

April Meeting Minutes . . .



Li Zeng *

Minutes of the ATMob meeting held on April 9, 2015 in the Phillips Auditorium of the Harvard-Smithsonian Center for Astrophysics.

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

- The Secretary's Report of the March 12, 2015 meeting was given by Sidney Johnston.
- Eileen Myers gave the Treasurer's report.
- Glenn Chaple gave the Observing Committee Report. Glenn mentioned many good viewing opportunities during the upcoming month:
 - Venus
 - Moon
 - Pleiades open star cluster
 - The bright star Aldebaran in the constellation of Taurus
 - Mercury at greatest evening (eastern) elongation on May 7;
 - Carbon stars and a good book about them published by The Astronomical League
 - The finest deep sky objects listed by Jim Mullaney
<http://www.skyandtelescope.com/wp-content/uploads/MullaneyDeepSky111.pdf>
- Other observing programs:
 - The "Sue French Fan Club" and the deep sky objects that she writes about in *Sky and Telescope* magazine
 - The "April Challenge" mentioned by www.astrosurf.com.
 - The "Sky Object of the Month", NGC 3115.
- Steve Clougherty gave the Clubhouse Report. Steve talked about the work that was completed during the April 4 work party. This included painting of the interior of the Clubhouse, and David Prowten and crew fixing the ceiling by installing sheetrock. Steve announced that there will be outdoor work parties on May 2 and May 30.
- The Membership Report was not given.
- Old Business: None

• New Business:

President Neil Fleming asked for nominations for the Nominating Committee to select a slate of officers for the annual election. A vote was held to elect members to this committee. The committee is comprised of Chairperson Glenn Chaple, Mario Motta, and Alan Sliski.

Neil Fleming introduced Li Zeng as the invited speaker. Zeng is an advanced graduate student and PhD candidate in Harvard University's Department of Astronomy. Li graduated from MIT with a Bachelor of Science degree in Physics.

Li Zeng's talk was entitled "Uncovering the Chemistry of Earth-Like Planets". Zeng works with a research group which uses evidence from our solar system to understand exoplanets, and in particular, to predict their surface chemistry and thereby the possibility of life. An Earth-like planet, born from the same nebula as its host star, is composed primarily of silicate rocks and an iron-nickel metal core, and is depleted in volatile content in a systematic manner. The more volatile (easier to vaporize or dissociate into gas form) a substance is in an Earthlike planet, the more depleted the element is compared to its host star. After depletion, an Earth-like planet would go through the process of core formation due to heat from radioactive decay and collisions. Core formation depletes a planet's rocky mantle of siderophile (iron-loving) elements, such as iridium or gold, that tend to bond with metallic iron. Also, volatile substances are depleted from near the surface during planet formation. The Earth's formation process is described at:

http://www.earth.ox.ac.uk/data/assets/pdf_file/0007/10006/KB1.pdf.

After the depletion events, Earth-like planets likely accreted some volatile-rich materials, called "late veneer". The "late veneer" could be essential to the origins of life on Earth and Earth-like planets. It delivers the volatiles such as nitrogen, sulfur, carbon and water to the planet's surface, which are crucial for life to occur. Plans are to build an integrative model of Earth-like planets from the bottom up and to infer their chemical compositions from their mass-radius relations and their host stars' elemental abundances. This will allow an understanding of the origins of volatile contents (especially water) on their surfaces, and thereby shed light on the origins of life on planets.

The radius of an exoplanet is generally measured by the transit method and the mass is measured through Doppler shift measurements of the host star. When a two layer model of a planet, in which the core and mantle compositions are assumed, and the measured radius and total mass is used, the radial dependence of interior pressure and density may be solved.

Models assuming that an exoplanet core be composed of Fe-MgSiO₃, or Fe-H₂O, or MgSiO₃-H₂O have been studied. Models of a planet are further discussed in the article by Li Zeng and Dr. Dimitar Sasselov located at:

https://www.cfa.harvard.edu/~lzeng/Paper1/Paper%28Zeng_Sasselov%29.pdf

Also, further details of temperature evolution of a planet are given in the article by Li Zeng and Dr. Dimitar Sasselov at the URL:

https://www.cfa.harvard.edu/~lzeng/Paper3/Paper3%28Zeng_Sasselov%29.pdf

How the core of a planet formed, how oxygen and water formed in a planet's atmosphere, and how the mass fraction of a planet's core developed can be explored by examining the chemistry of core formation. Questions raised in these considerations look at details of volatile depletion, core formation and late delivery processes.

"Volatile depletion" of volatile substances during an early very hot phase of planet formation is discussed in the book: *Exoplanets*, by Sara Seager, published by University of Arizona Press, 2010, and is listed in www.bookfinder.com.

"Late delivery" refers to a bombardment of Earth by the movements of Jupiter and Saturn in their orbits after formation of the planetary bodies. The hypothesis of a late heavy bombardment is further discussed at:

http://en.wikipedia.org/wiki/Late_Heavy_Bombardment

The distribution of elements in solid body planets is still a question of intense research. The materials in a heavy core, and the depletion of volatile elements from the surface of a cooling planet, and the introduction of volatile elements on a solid body planet after it has cooled by a late heavy bombardment are current topics of study.

The meeting was adjourned at 9:35 PM

~ *Sidney Johnston, Secretary* ~

Nominating Committee Selected . . .

This year's Nominating Committee has been selected for the annual elections.

Chair: Glenn Chaple,

Member: Mario Motta

Member: Alan Sliski.

If you wish to be nominated for a position on the Executive Board please contact the Nominating Committee by the May meeting (May 14, 2015).

Per Articles IX of the ATMoB Bylaws: Members shall have the right to offer additional nominations from the floor of the annual meeting, provided only that a suitable written notice, containing the name or names of the person or persons to be nominated from the floor at the annual meeting, and the signatures of at least Seven members, is filed with the Secretary not less than ten (10) days prior to the date of the annual meeting.

Clubhouse Report . . .



Glenn Chaple painting the 2nd floor walls *

April 2015 Clubhouse Report

Snow has departed and mud season is here. April 4th's work session started with sunny to partly cloudy skies with 50 degree temps and a brisk breeze. Twenty four members and guests gathered for our Full Moon Saturday effort. Thanks to Joshua Ashenberg, Bruce Berger, John Blomquist, Barbara Bosworth, Glenn Chaple, Paul Cicchetti, Steve Clougherty, Paul Courtemanche, Tony Costanza, Nina Craven, Eric Johansson, Dick Koolish, Ed Los, John Maher, Eileen Myers, Dave Prowten, Cheryl Raynor, John Reed, Phil Rounseville, Art Swedlow, Al Takeda, Sai Vallabha, Joe Wolfe and guest Lauren Wesley.

Painting of both stairway walls and ceiling up to the second floor continued. Two 4x8 ft sheets of wallboard were securely fastened to the upstairs south hall ceiling and primed.

Trim will be tackled next. Dave P., Steve C., Glenn C., Paul Courtemanche, Cheryl R. and Al T. worked this project.

The team composed of Joshua A., Paul Cicchetti and Sai V. cut out the emerging brush at the driveway entrance and along the road. Our debris pile keeps growing. The wet ground delayed tree trimming until next month.

The spring cleaning of the bluebird houses was accomplished by Phil R. and Sai V. They also inventoried and evaluated the bird house conditions and one needed a repair. This is part of our observing field mosquito control effort.

Clamshell observatory training session was provided by John M. The ATMoB Research and Imaging Observatory (ARIO) was attended to by Bruce B.

Later, Lauren Wesley photographed and interviewed several members with their telescopes for her Masters Degree project at the School of the Museum of Fine Arts (SMFA).

A lunch of burgers, "dogs", spaghetti, salad, garlic bread with all of the add-ons was prepared by Eileen M., Sai V., Eric J., Art S., Dick K., Barbara B. and Nina C. After lunch the crews continued with their work efforts. Solar hydrogen-alpha viewing by Paul Cicchetti. gave way to lunar, planetary, and general

observing at nightfall. Clubhouse duty members Glenn C. with Joe W. reported that the last observer left at 1:40 am. Next month (May) has two work parties on the 2nd & 30th, starting at 10 am. Join us for a cup of Clubhouse coffee and give us a hand up in Westford.

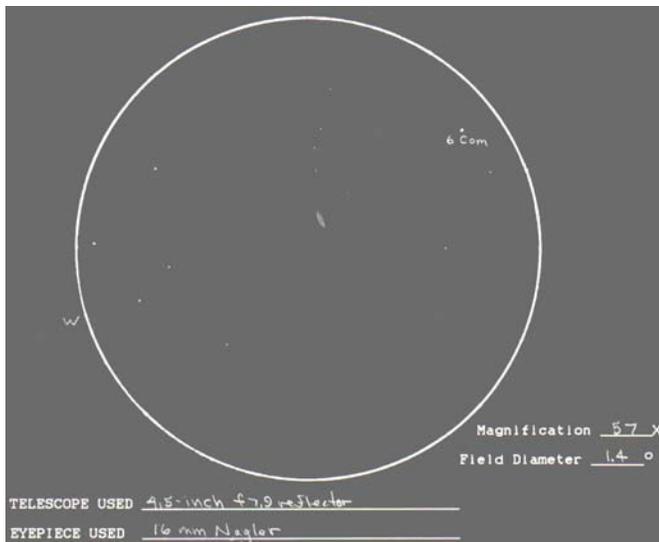
~ *Clubhouse Committee Directors* ~
 ~ *John Reed, Steve Clougherty and Dave Prowten* ~

Clubhouse Saturday Schedule		
May 9	Clay Center Astronomy Day CLOSED	
May 16	Eric Johansson	Tom Wolf
May 23	Paul Cicchetti	John Reed
May 30	WORK PARTY # 7 Nina Craven + Tom McDonagh	
June 6	Art Swedlow	Sai Vallabha
June 13	STARCONN Jim Gettys + Al Takeda	

Sky Object of the Month . . .

May 2015

Messier 98 (NGC 4192) – Spiral Galaxy in Coma Berenices



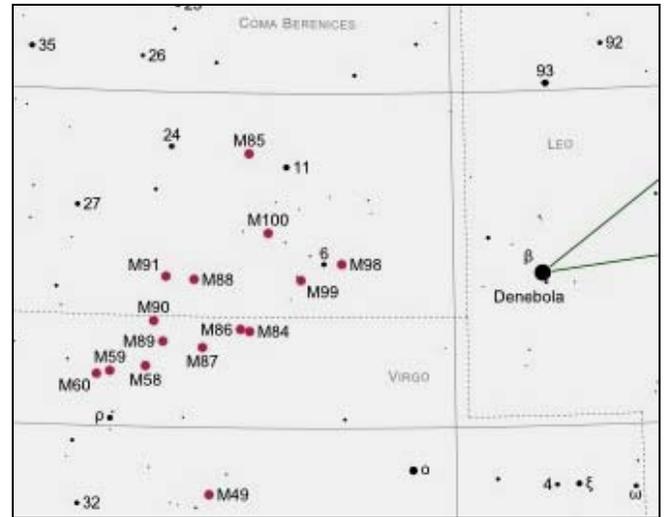
Sketch by the author

This month, we journey to the edge-on spiral Messier 98, located near the westerly border of the Coma-Virgo Galaxy Cluster. M 98 and its neighbor galaxies M 99 and M 100 were discovered by Pierre Mechain on the night of March 15, 1781 and confirmed by Messier a month later. While the latter two are roundish face-on spirals, M 98 is more edge-on with apparent dimensions of 9 by 3 arc-minutes. At magnitude 10.1, it's one of the fainter Messier objects, but is still visible with small-aperture scopes. The accompanying sketch shows its appearance through a 4.5-inch reflecting telescope on an evening when the limiting magnitude was 5.0. Patience and averted vision were requisite!

Finding galaxies in this part of the sky can be a daunting task, but M 98 is relatively easily picked up just one-half degree west of 6 Comae Berenices. This 5th magnitude star forms an

isosceles triangle with Denebola (beta Leonis) and omicron Virginis (see finder chart).

M 98 is somewhat of an oddball as galaxies go. While a vast majority of galaxies are moving away from us as the universe expands, this one is actually heading our way at a 125 mile per second clip. Don't expect M 98 to loom larger as the years go by. It's a whopping 55 million light-years away!



~ *Glenn Chaple – Observing Committee and VP* ~

Membership Report . . .

Membership count as of April 28, 2015 is at 311 individuals.

Membership Class Breakdown:

Class	% of total
General	60.7
Family	13.0
Seniors	23.7
Students	2.6

Please welcome our newest and returning members: Haares Mirzan and Jacob Siegel.

The club's fiscal year begins on June 1st. The membership renewal period begins at this time. Please mark your calendar and look out for renewal notices. New members as of 2015 are not required to renew at this time.

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. This is a simple way to make your donation go twice as far.

~ Tom McDonagh – Membership Secretary ~

Clay Center Family Night Under the Stars . . .

Saturday, May 9, 2015

THE EVENT WILL RUN RAIN OR SHINE.

Join astronomers from the Amateur Telescope Makers of Boston (ATMoB) and the Clay Center Observatory at the Dexter Southfield School.

- Telescopes and Observatory - see the Sun, Jupiter, Venus, and the stars, weather permitting.
- “Galileo” himself will present an entertaining show about telescopes.
- NASA/JPL Ambassadors will provide demonstrations of comets and meteorites.
- LASER Light Space Science Show by Prismatic Magic! Segway rides! R2D2 Robot! A Star Wars Wookiee!
- Kite flying on the ball field. Bring your own or buy one here.
- Events run from 5:00 - 8:00 p.m. (Telescopes until 9:00) Free admission. (Planetarium and LASER shows are \$5 per person.)
- Door prizes for children!

www.claycenter.org
<http://www.dextersouthfield.org/Page/ABOUT/Clay-Center/Family-Night-Under-The-Stars>

DEXTER SOUTHFIELD, 20 Newton St., Brookline, MA 02445

ATMoB members should arrive at 4:00 pm or earlier to set up.

Telescopes will be positioned outside along the embankment in front of the Clay Center entrance, or inside the lobby if the weather turns bad. Electricity will be available.

Parking will be by the flag pole for astronomers staying through the evening otherwise the staff will try to reserve spaces near the Clay Center.

BYO food if you have special dietary issues. There will be a Canteen Food Truck this year with discounts for meals but no free food as in the past.

~ Submitted by: Robert F. Phinney, Clay Center Director ~

Annual Acton 4th Grade Star Party Thank You . . .



Acton Star Party participants *

Despite the dreadful winter, 16 members braved the elements to put on the Annual Acton Star Party on Monday, March 2nd, at the Parker Damon School in Acton, Massachusetts. The 500+ attendees were treated to both indoor and outdoor presentations. There were telescope views of Jupiter with its 4 Galilean moons, the Orion nebula and other winter astronomical objects.

Thanks to our indoor presenters: Steve Feinstein, Bob Phinney, Cheryl Rayner, George Roberts, Ross Barros-Smith and Bruce Tinkler. Also, thanks to Alan MacRobert (*Sky & Telescope* magazine).

Thanks to the members that set up telescopes; Hugo Alvarez, Paul Benni, Bruce Berger, Neil Fleming, John Maher, Tom McDonagh, Eileen Myers, Phil Rounseville, Al Takeda, Bob Toop.

Thanks to Eileen Sullivan and the staff at the Parker Damon School.

My apologies if I missed anyone.

~ Submitted by Al Takeda ~

Harvard CfA Solar Star Party Thank You . . .



Dan Winchell (seated) showing the Sun. Image by Dick Koolish.

On Sunday, April 19th, ATMoB participated in the “Cambridge Explores the Universe Solar Star Party at the Harvard-Smithsonian Center for Astrophysics”. On the parking lot outside of the Phillips Auditorium, various solar telescopes and educational displays were set up. Guests were treated to views of sunspots using simple white light filters and Herschel wedge equipped scopes. A few hydrogen alpha filtered telescopes allowed people to see the prominences on the edge of the Sun and filaments and fibrils on its’ surface.



Nanette Benoit, Virginia Renehan and Dick Koolish. Image by Phil Levine



Julie Kaufman. Image by Phil Levine



More Solar Scopes. Image by Phil Levine

A big thank you to Ali Allison, Nanette Benoit, Anna Hillier, Julie Kaufman, Dick Koolish, Phil Levine, Virginia Renehan and Dan Winchell.

~ Submitted by Dick Koolish ~

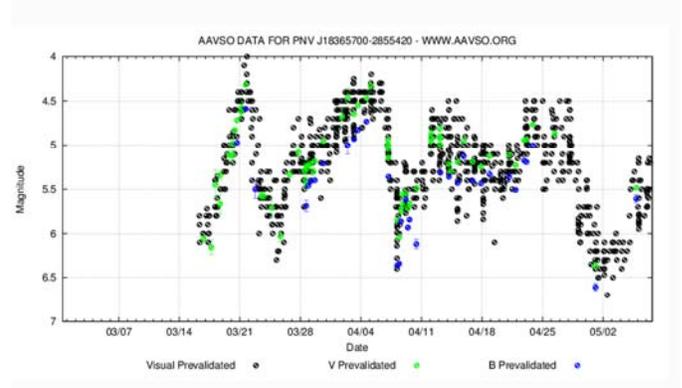
Nova Sagittarii 2015 No. 2 . . .



Canon 6D 70mm f8 ISO 3200 15sec

Nova Sagittarii 2015 No.2 (circled). Image by Peter Bealo. 4/13/2015

A classical novae has erupted to naked eye visibility in the constellation of Sagittarius in March. The initial outburst peaked at around 4th magnitude and soon dropped to magnitude 6.5. Normally these novae burst onto the scene and than fade away. However, this nova has brightened again.



Light curve for Nova Sagittarii 2015 No.2. Courtesy AAVSO

Nova Sagittarii No. 2 (PNV J18365700-2855420) continues to be an easy binocular object. The constellation of Sagittarius rises at midnight and is 17 degrees in altitude at 3:38 EDT (07:38 UT) when astronomical dawn is beginning (May 8, 2015). RA 18h 36m 56.8s, Dec. -28° 55' 40" (2000.0).

I observed the nova with a pair of 8.5 x 44 binoculars, just before astronomical dawn, over a month ago. It was very easy to see.

Get out there and observe this nova before it fades again!

~ Al Takeda – Newsletter Editor and Member at Large ~

For Sale . . .

4-1/2" binocular telescope.



Image by Gary Jacobson



Image by Gary Jacobson

- Twin Tasco f/8 Newtonian reflectors on a Dobsonian style mount.
- Interocular adjustment mechanism.
- Comes with 20 mm and 6 mm eyepieces and includes a Telrad mounting base.



Image by Gary Jacobson

This is a project scope and currently is fitted for .965" eyepieces. The idea was to modify it for 1-1/4" eyepieces, but that has not yet been done.

\$100

Contact Gary Jacobson at gdjacobson@verizon.net

Maker of Galaxies . . .



Dick Koolish's Galactic Necklace. *

Many of the members know that Dick Koolish has many astronomical talents. He has now broadened his scope to include the making of galaxies.

One of Dick's hobbies is the forging of iron tools and other implements. He showed off one of his galactic creations at ATMoB's April meeting at the CfA.

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

June Star Fields DEADLINE
Sunday, May 24th

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed May 9, 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

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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 Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.

May 11 Last Quarter Moon (Moonrise at midnight)
May 15 Uranus 0.2-deg N. of Moon
May 18 New Moon
May 21 Double Shadow Transit on Jupiter
May 25 First Quarter Moon (Moonset at midnight)
Jun 2 Full Moon
Jun 6 Venus at greatest eastern elongation (evening)
Jun 9 Last Quarter Moon (Moonrise at midnight)