

The ASTERISM

as' ter ism ~ a recognizable pattern of stars
con stel la' tion ~ an internationally designated area of the sky

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Note: Use bookmark panel in Adobe Reader.

More Saturn from Cassini

From Earth, we usually see Saturn's rings from the same side of the ring plane that the Sun illuminates them -- one might call this the bright side. Geometrically, in the above picture taken in August by the robot Cassini spacecraft now orbiting Saturn, the Sun is behind the camera but on the *other side* of the ring plane. Such a vantage point gives a breathtaking views of the most splendid ring system in the Solar System. Strangely, the rings have similarities to a photographic negative of a front view. For example, the dark band in the middle is actually the normally bright B-ring. The ring brightness as recorded from different angles indicates ring thickness and particle density of ring particles. At the top left of the frame is Saturn's moon Tethys, which although harder to find, contains much more mass than the entire ring system.



Image courtesy of Cassini Imaging Team, SSI, JPL, ESA, NASA

GENERAL MEMBERSHIP MEETING

JANUARY 18, 2013

MAIN LECTURE HALL - UCC CAMPUS

8:00 p.m.



Getting the Most Out of a Black Hole

Dr. Alexander Tchekhovskoy,

Research Fellow,
Princeton University

particular, he will explain how the process of a black hole accreting the surrounding material makes them appear bright and how it is possible that some black holes are able to shoot out collimated jets of matter and fields straight at us and whether that should make us concerned. Dr. Tchekhovskoy will finish by reviewing the variety of ways scientists have devised to measure black holes.

We know that every large enough galaxy, including ours, hosts a super-massive black hole at its center, and we also know of many smaller black hole candidates in and around our Galaxy. Dr. Tchekhovskoy will explain what makes us think that the black holes are there, describe their origin and the various fireworks on the sky they produce. In

PLEASE JOIN US!!!

New Members

Amateur Astronomers, Inc. welcomes **Eric Morey** of **Murray Hill**, **Kevin Quizhpi** of **Elizabeth**, and **James Keane** of **Rahway**

We hope you enjoy using Sperry Observatory, know that as a member other opportunities are available such as seminars, lectures, training, observing, and research all at no or minimal cost. Our Qualified Observer course is a great place to start. It is equivalent to a college-level introduction to Astronomy, and it includes hands-on training on our 24-inch reflecting telescope. For all opportunities check the **Club Activities** section of the website.

Irene Greenstein, Membership Chair

**MEMBER ONLY STAR PARTY
JENNY JUMP STATE PARK
HOPE, NJ
SATURDAY FEB 9, 7:30PM**

**STAR PARTY
SPERRY OBSERVATORY
FRIDAY FEBRUARY 8
at 7:30 p.m.**

Just as I had a topic all set for this month, I learned that Sir Patrick Moore passed away on December 9th, at the age of 89. Though his demise received little if any notice in the American mainstream media, amateur astronomers in the United States as well as much of the western world knew Sir Patrick well through his many books and other astronomical works. This month's column will honor this major figure in the history of amateur astronomy.



Sir Patrick Moore (1923 – 2012)

(<http://www.banguniverse.com/wp-content/uploads/sir-patrick-moore1.jpg>)

Early Interests

Moore was born on March 4th, 1923 in Pinner, Middlesex, England. After moving a few times, the Moore family settled down in East Grinstead. His astronomical interest surfaced rather early at the age of six and it would set his destiny. Another profound event was a few years later when Moore received an old 1908 manual typewriter. That started Moore's interest in writing and he used that typewriter for many years to write his books, articles, and essays.

When he was 11, Moore joined the British Astronomical Association (BAA - <http://britastro.org/baa/>). BAA was then the main organization of amateur astronomy in Britain and it was the model for astronomy clubs throughout the world. Soon, his astronomical skills advanced to the point where he was asked to be the director of a small observatory in East Grinstead. Moore was 14 at the time. However, his tenure at the position was cut short by the forces of history.

The War Years

In September of 1939, Britain declared war on Nazi Germany. Showing patriotic devotion, Moore managed to enlist in the Royal Air Force (RAF) though he was only 16. His astronomical skills were soon put to use as a navigator on a Lancaster

bomber. Moore served with distinction and was promoted to flight lieutenant by the end of the war.

It was during the war years that Moore began to encounter notables from the worlds of flight and space science. While in Canada for RAF flight training, Moore visited the United States on a leave and managed to meet Orville Wright, one-half of the Wright brothers who invented the airplane. He also met Albert Einstein. His brushes with the history would continue throughout his life.

While Moore made it through the war without being shot down, he did suffer loss. A good number of his RAF comrades were killed or captured when their planes were shot down over Germany. Then there was a much more personal loss. In December of 1943, Moore's fiancée Lorna was working as an ambulance driver in London when a German bomb struck her ambulance during an air raid, killing her. This had a deep effect on Moore as he never had any romantic relationships for the rest of his life after that. He also harbored a lifelong hatred of Germany in general, the Nazis in particular, as a result of his wartime experiences.

Post-war Beginnings

After the war, Moore began his career. He worked as a schoolteacher in a number of schools. It was around this time that Moore began writing, publishing his first book "Guide to the Moon" in 1953. This was the first in a series of "Guide" books that Moore would write. It is through those books that most American amateurs know about Moore. His writings were not only astronomical as he also wrote several works of science fiction.

Also shortly after the war, Moore began extensive observations with his 12-1/2" reflector which was housed in a small observatory that Moore frequently mentioned in his books. He continued to use that telescope until declining health forced him to give up active observing. Though Moore observed many celestial objects, the Moon was his favorite. He made some important observations of Mare Orientale, a lunar feature that is seen only partially during favorable librations due to its location between the near and far side of the Moon. Moore also coined the term "transient lunar phenomena" to describe the unusual glows that people saw on the Moon from time to time.

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The Sky at Night

In the mid-1950s, Moore would find a whole new avenue for astronomy popularization – television. As a result of a UFO flap in Britain, the BBC decided to host a televised debate on the subject. Opposing the “UFOs as alien craft” side was none other than Moore. His performance so impressed the BBC that they asked him to host an astronomy program. It aired on April 24th, 1957 under the name “Sky Map”. After a change of title, it became “The Sky at Night”, the longest running TV program in BBC history. Moore also set another record on the show as he hosted every episode until his final illness except one – in 2004 when he got sick from eating some bad food. Part of the credit for the show’s longevity must go to Moore’s loyalty to the BBC. He turned down offers from other networks for the program.

“The Sky at Night” scored a major coup in 1959 when it became the first Western TV program to televise images from the Soviet Luna 3 probe, the first to show the far side of the Moon. The Soviets were so pleased that he was eventually invited to visit the Soviet Union. On that trip Moore met Yuri Gagarin, the first man to orbit the Earth – another brush with history.

The Trouble with The Troubles

Moore’s astronomical work was not only in television. In 1965, he was named director of Armagh Planetarium in Northern Ireland. While Moore greatly improved the planetarium and its capabilities, the political situation of the time (known as “the troubles”) distressed him considerably and prompted him to resign from the post in 1968 and return to England, settling in the town of Selsey where he would spend the rest of his life.

Covering the Moon and Beyond

Since Moore was established as a space expert by his work on “The Sky at Night”, he hosted the BBC’s coverage of the Apollo missions from Apollo 8 to Apollo 17. As a result of this, Moore would have another brush with history – meeting the late Neil Armstrong. He also hosted BBC coverage of the Pioneer and Voyager missions.

No man is perfect and that was the case with Moore. Back when Moore started out in astronomy, the prevailing view was that the lunar craters were mostly volcanic features. At the time, cosmic impacts were poorly understood (the work of Eugene Shoemaker would be in the future), so it seemed a natural

latched on to the idea. One of the findings of lunar research leading up to and including the Apollo missions was that volcanism as we know it on Earth played an insignificant role on the Moon and that the craters were the products of impacts. Moore stubbornly stuck to the volcanism belief even into the mid-1970s, though almost nobody else accepted it anymore.

Unexpected Places, Fans, and a Guitarist

Mainly through “The Sky at Night”, Moore became a fixture of British culture and made guest appearances on a number of shows, even programs that one would never expect an astronomer to appear on. He appeared on two episodes of the absurd British comedy show “The Goodies” as well as on an episode of “Doctor Who” (“The Eleventh Hour”). Moore also appeared as an alien known as “Oracle” on the “Kill Jill” episode of the straight-to-DVD British science fiction comedy series “Starhyke”.

In my travels, I have met two “Starhyke” cast members. Jeremy Bulloch, (better known for his portrayal of Boba Fett in “The Empire Strikes Back” and “Return of the Jedi”) was Dr. Yul Stryker. At a convention, I asked him what he thought about Moore. At first, Bulloch was surprised that I knew about Moore. Then I explained to him that almost all amateur astronomers in the United States know about him. He then said that Moore was nice to work with and had fun being on the show.

Another cast member was Claudia Christian, who portrayed Captain Belinda Blowhard, though she is better known for portraying Susan Ivanova on “Babylon 5”. Claudia does not seem to have an interest in space science, but when I asked about Moore, the first thing she brought up was “The Sky at Night.” Did Moore convert her?

Moore further cemented his place in British culture in 2001 when he was knighted by Queen Elizabeth II in recognition of his television work and long service to the cause of science education.

When Moore’s health began to decline, the BBC decided that it would be a good idea to add a co-host to “The Sky at Night.” The job went to British astronomer Chris Lintott, the man who came up with the idea of using volunteers to classify astronomical images on the Internet.

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A Guide to the Skies- 2013

by Alan P. Witzgall

At the behest of Mary Ducca, AAI's Displays & Presentations chair, I have presented over the past few years, a Powerpoint lecture as to what astronomical events are expected in the coming year. What follows is a summary of that information

We opened the New Year of 2013 with a bang - on **January 3-4**, one could have seen in awe and wonder the **Quadrantid Meteor Shower**.

The Quadrantids, named for an obsolete constellation, are a reliably active shower, with up to 40 meteors per hour.

We interrupt this article for an **Asteroid Alert!!** The Near Earth Asteroid **2012 DA₁₄** will make a very close pass near Earth on February 15, 2013. But before you start to panic, (especially since the doomsayers will undoubtedly lock on this as a 'sign from the heavens' now that the "Maya doomsday prophesy" has passed with no discernible effect, be aware that the asteroid will come to within approximately **16,000 miles of our planet** – much closer than the moon's orbit and closer than geosynchronous satellites. **But it will NOT hit Earth this year. Neither will it hit us on its next pass in 2020, nor at least up to 2069.** Are we all clear on this? OK, go get a cup of hot chocolate, sit back and relax and we'll move on.

Now for a **Possible bright comet!!** We've been waiting for a nice bright comet ever since Comet Hale-Bopp graced our Northern Hemisphere skies in 1997. The folks down under had Comets McNaught and Lovejoy to brag about, but now it looks like our turn. **Comet Pan-STARRS (C2011L4)** will be at closest approach to Earth on **March 5th, 2013, where it might reach magnitude 0.0** – about as bright as *Comet Hyakutake* in 1996. It reaches perihelion on March 10th, with best viewing from the 12th to the 24th, and may remain naked eye brightness through April. The Moon phase is last quarter on March 8th, 2013, so we're really anticipating a bright wonder from the darkness. Of course, I temper that with an oft-quoted caveat: Bet on a horse, not a comet when it comes to visibility! We'll see.

On March 20th, the Sun reaches the **Vernal Equinox**, going north of the celestial equator, so spring begins in the northern hemisphere at 4:02 AM EST.

We have another meteor shower on April 21-22, when the **Lyrid meteor shower** lights up the early morning skies. The Lyrids are a relatively small shower, usually producing about 20 meteors per hour at their peak. These meteors leave bright dust trails, and are their hallmark. Look for meteors radiating from the vicinity of the constellation Lyra after midnight.

Everyone's favorite planet, **Saturn, stands at opposition on April 28th**. The ringed planet will be at its closest approach to Earth at that time, fully illuminated as seen from our planet, and the ring system is getting better presented to our line of sight from Earth. *Get those webcams and DSLR's rocking, folks!*

A **Penumbral Lunar Eclipse** will occur on May 25th as the Moon slips through the outer shadow of the Earth. However, the southern part of the Moon just grazes the edge of the Earth's shadow, so it's almost a non-event. The eclipse will be visible throughout most of North America, South America, western Europe, and western Africa. Check out the NASA Eclipse homepage (www.mreclipse.com) for more information.

On **June 21, the Sun reaches its highest declination, as the Summer Solstice** occurs in the northern hemisphere at 01:04 AM EDT. It will be the longest day of the year on this, the first day of summer. Toward the end of June, keep an eye on the skies, as the daylight meteor shower, the **Beta Taurids**, may create a daytime bolide¹ overhead!
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¹ What is a bolide? There is no consensus on its definition, but the United States Geological Service (USGS) use it to mean an extraterrestrial body in the 1-10-km size range, which impacts the earth at velocities of literally faster than a speeding bullet (20-70 km/sec = Mach 75), explodes upon impact, and creates a large crater. "*Bolide*" is a generic term, used to imply that we do not know the precise nature of the impacting body . . . whether it is a rocky or metallic asteroid, or an icy comet, for example. Definition provided by the USGS.

<http://woodshole.er.usgs.gov/epubs/bolide/introduction.html>

A Guide to the Skies- 2013

by Alan P. Witzgall

In August, the famous **Perseid Meteor Shower** takes place under favorable conditions. The Perseids is one of the best meteor showers to observe, producing up to 60 meteors or more per hour at their peak. By the time the radiant (the point in the sky that the meteors seem to be coming from) rises after midnight, the waxing crescent moon will have set long before the show starts! The shower's peak usually occurs on the mornings of **August 13th & 14th** but you may be able to see some meteors any time from July 23 - August 22. The radiant point for this shower is in the constellation Perseus. Look to the northeast after midnight.

The planet Neptune is at opposition on August 27. The blue planet will be at its closest approach to Earth. This is the best time to view Neptune, although it will only appear as a tiny 7.8 magnitude blue star-like dot in all but the most powerful telescopes.

The **Autumnal Equinox** occurs in the northern hemisphere on September 22nd at 4:44 pm EDT. There will be equal amounts of day and night on this first day of fall.

Then, the first of the historically discovered planets, **Uranus, is at opposition on October 3rd.** The blue-green planet will be at its closest approach to Earth. This is the best time to view Uranus, although it will only appear as a tiny blue-green dot in all but the most powerful telescopes.

The Full Moon undergoes another Penumbral Lunar Eclipse on October 18th. The eclipse will be visible throughout most of the world except for Australia and extreme eastern Siberia. (check out [NASA's Eclipse Information](#) website for more details)

Another set of shooting stars, the **Orionids Meteor Shower takes place the morning of October 21st.** The Orionids average about 20 meteors per hour at their peak. This shower usually peaks on the 21st, but it is highly irregular. A really good show might happen on any morning from October 20th to 24th. As usual, best viewing will be to the east after midnight.

On November 17th -18th, the Leonid Meteor Shower, one of the more famous meteor showers to observe, will produce an average of 40 meteors per hour at their peak. The shower itself has a cyclic

peak year every 33 years where hundreds of meteors can be seen each hour. The last of these occurred in 1999, when my wife, Bonnie, and I watched from NJAA's observatory site and marveled that in **broad daylight** those bright 'shooting stars' could easily be seen storming into the blue morning sky!. The shower usually peaks on November 17 & 18, but you may see some meteors from November 13 - 20. Look for the shower radiating from the constellation Leo after midnight.

And now, we speak of another possibly bright comet! Comet ISON will reach perihelion on **November 28, 2013 at a distance of 0.012 AU from the surface of the Sun,** then come very rapidly away from our star for a **December 26th, 2013 close approach to Earth (about 0.4 AU).** It should be a brilliant object just after sunset in the western sky as it climbs up the Milky Way for at least several days if all goes as predicted. (Moon phase is last quarter on Dec. 25th)

On December 13th-14th, the **Geminids Meteor Shower will light up the evening and morning skies.** Yes. I said **evening.** This shower is not associated with a comet *per se*, but with asteroid 3200 Phaeton. That's why you can start watching for the shower as early as 9 pm! Considered by many to be the best meteor shower in the heavens, the Geminids are known for producing up to 60 multicolored meteors per hour at their peak. The peak of the shower usually occurs around December 13 & 14, although some meteors should be visible from December 6 - 19. The radiant point for this shower will be in the constellation Gemini. Best viewing is usually to the east after midnight.

The **Winter Solstice** occurs in the northern hemisphere December 21st at 17:11 UT. The Sun is at its lowest point in the sky and it will be the shortest day of the year. This is also the first day of winter.

One Last thing: **a HUGE Meteor Storm in 2014??!!**

Comet P209/LINEAR may create a major shower, if not a storm **the morning of May 24th, 2014 at about 2 to 3 am EDT.** We will run smack into the trails of dust the comet has left behind itself

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A Guide to the Skies- 2013

by Alan P. Witzgall

in its orbit between 1803 and 1924, so this might be worth watching. Best of all, the Eastern Seaboard is especially favored! The comet itself comes to perihelion_(or closest approach to the Sun) on May 6th, 2014. On May 29 the comet will pass 0.0554 AU 5 million miles from the Earth, but is predicted to brighten only to about eleventh magnitude.

So we're gonna be a bit busy in 2013! I hope to share many of these sights with both my fellow AAI members and our public visitors in the months to come. **Wishing you all clear skies for 2013!!**

Lunar calendar for 2013

The moon calendar dates and times are in UTC., which is 5 hours ahead of Eastern Standard Time, and 4 hours in Eastern Daylight Time.

| New Moon | First Quarter | Full Moon | Last Quarter |
|--|--|--|---|
| | | | 5 January 2013 03:59:00 |
| 11 January 2013 19:44:41 | 18 January 2013 23:46:11 | 27 January 2013 04:39:38 | 3 February 2013 13:57:30 |
| 10 February 2013 07:21:14 | 17 February 2013 20:31:44 | 25 February 2013 20:27:19 | 4 March 2013 21:53:55 |
| 11 March 2013 19:52:09 | 19 March 2013 17:27:49 | 27 March 2013 09:28:28 | 3 April 2013 04:37:40 |
| 10 April 2013 09:36:30 | 18 April 2013 12:32:12 | 25 April 2013 19:58:14 | 2 May 2013 11:15:16 |
| 10 May 2013 00:29:40 | 18 May 2013 04:35:49 | 25 May 2013 04:26:02 | 31 May 2013 18:59:14 |
| 8 June 2013 15:57:37 | 16 June 2013 17:25:01 | 23 June 2013 11:33:20 | 30 June 2013 04:54:42 |

| | | | |
|--|---|---|---|
| 8 July 2013 07:15:33 | 16 July 2013 03:19:35 | 22 July 2013 18:16:37 | 29 July 2013 17:44:34 |
| 6 August 2013 21:51:57 | 14 August 2013 10:57:12 | 21 August 2013 01:45:43 | 28 August 2013 09:36:12 |
| 5 September 2013 11:37:23 | 12 September 2013 17:09:36 | 19 September 2013 11:13:57 | 27 September 2013 03:56:45 |
| 5 October 2013 00:35:44 | 11 October 2013 23:03:29 | 18 October 2013 23:38:46 | 26 October 2013 23:41:44 |
| 3 November 2013 12:51:07 | 10 November 2013 05:58:17 | 17 November 2013 15:16:53 | 25 November 2013 19:29:00 |
| 3 December 2013 00:23:30 | 9 December 2013 15:12:56 | 17 December 2013 09:29:17 | 25 December 2013 13:49:01 |

Dates and times of beginning of the Earth's seasons for 2013
The dates and times of Earth's equinoxes and solstices are again given in UTC.

| Spring | Summer | Autumn | Winter |
|---|--|---|--|
| 20 March 2013 11:02:00 | 21 June 2013 05:04:00 | 22 September 2013 20:44:00 | 21 December 2013 17:11:00 |
| ☆☆☆ | | | |

Stewart's Skybox

by Stewart Meyers

(Continued from Page 4)

Lintott would also collaborate with Moore and Queen guitarist Brian May (May is an astronomer in his own right who specializes in interplanetary dust) on a book "Bang: The Complete History of the Universe." Lintott and May would prove to be very good friends to Moore, especially in his final days.

Though Moore is gone, his work remains. While some of the science may be a touch out of date, his many books convey the spirit of his dedication to astronomy. The records Moore kept over his long observing career are hopefully being properly

preserved so they can serve as a historical resource for the future. As for his TV program, at the time of this writing, it appears that the show will continue but there is some question as to who the new host will be. Some feel that it should be Chris Lintott, while others favor Brian May.

Those who wish to either view tributes or leave a tribute to Moore can visit:

<http://www.banguniverse.com/sirpatrickmoore/> .

☆☆☆

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MEMBERSHIP DUES

| | |
|--------------------------------|---------|
| Regular Membership: | \$21 |
| Sustaining Membership: | \$31 |
| Sponsoring Membership: | \$46 |
| Family Membership: | \$5 |
| First Time Application Fee: | \$3 |
| <i>Sky & Telescope:</i> | \$32.95 |
| <i>Astronomy</i> subscription: | \$34 |

(Subscription renewals to *S&T* can be done directly. See "Membership-Dues" on website for details.)

AAI Dues can be paid in person to our Membership Chair, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111

DOME DUTY

| | | |
|-----|----|--------|
| Jan | 18 | Team A |
| Jan | 25 | Team B |
| Feb | 1 | Team C |
| Feb | 8 | Team D |
| Feb | 15 | Team E |

FRIDAYS AT SPERRY

Jan 25, 2013

Solar Observing and Imaging
 Helder Jacinto

Feb 1, 2013

What's Up? A Down to Earth Sky Guide Kathy Vaccari
Space Missions Briefing
 Bill Whitehead

Feb 8, 2013

Exploring the Extreme Universe with the Fermi Gamma-Ray Space Telescope
 Dr. Al Gottlieb

Feb 22, 2013

Why the Universe Still Makes My Brain Hurt
 Aaron Zuckerman

All schedules above were accurate at time of publication. Please check www.asterism.org for latest information (click on "Club Activities")

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The next **General Membership Meeting** is the third **Friday, February 15, 2012**. Our speaker is Dr. Jenny Green, her topic is Exploding Black Holes.

Please join us.

Theaterⁱⁿthe Sky

by Ron Ruemmler

February 2013 throws its spotlight on **Mercury**. The smallest planet puts on its best evening show of the year, interacting with the **Moon**, **Mars**, and even **Neptune**!

Although **Mercury** does not reach its maximum elongation from the setting **Sun** until the middle of the month, it is much brighter before

that, as it moves up past the other objects. That's because **Mercury's** brightness is very dependent upon the phase it exhibits as seen from the **Earth**. At evening elongation it is roughly half illuminated and, in a telescope, looks like a tiny first quarter **Moon**. Seeing a Full **Mercury** would require looking through the **Sun** around superior conjunction, but we can still see a bright planet a week or so before elongation. All this geometry is reversed for morning observations, and **Mercury's** elliptical orbit produces exceptions now and then.

As **Mercury** passes **Mars** it is at minus 1.0 magnitude, which is 7.6 times as bright as **Mars**. At magnitude +1.2, the Red Planet may require binoculars in late twilight. **Mercury** is now 2.5 times as bright as -0.06

magnitude Arcturus, our second-brightest star. At -1.46 magnitude, Sirius is still the champ. By the time **Mercury** gets to elongation, it has fallen to -0.5 magnitude.

The best time to find all this is surely on the 11th when a tiny crescent **Moon** is nearby. **Mercury** may actually help you find the **Moon!** **Mars** is directly below **Mercury** on this date.

The close conjunction between the **Moon** and **Jupiter** we have come to expect over the past few months is missing this month as the **Moon** makes a big jump over the Giant Planet. The south coast of Australia gets the occultation. However, we see a nice lunar conjunction with Spica, the brightest star in Virgo, at the very last hour of February.

Venus is lost in bright morning twilight all month.

February (times are PM unless noted)

| | |
|----------------|--|
| 3 Sun 6:00 AM | Saturn upper right of Moon |
| 3 Sun 8:57 AM | Last Quarter Moon |
| 6 Wed 6:00 | Neptune 1/2 degree lower right of Mercury |
| 7 Thu 6:00 | Mars 2/3 degree upper left of Mercury |
| 8 Fri 6:00 | Mars 1/3 degree lower left of Mercury |
| 10 Sun 2:22 AM | New Moon |
| 11 Mon 6:15 | Very thin crescent Moon upper right of Mercury and Mars |
| 16 Sat 4:00 | Mercury at maximum elongation from the setting Sun |
| 17 Sun 3:30 | First Quarter Moon |
| 17 Sun 7:00 | Moon lower right of Jupiter |
| 18 Mon 7:00 | Moon left of Jupiter |
| 25 Mon 3:28 | Full Moon |
| 28 Thu 11:00 | Spica one degree left of Moon ; occultation from Latin America |

