

Astronomical events in 2012

By David Le Conte

The main highlight this year will be the Transit of Venus on 06 June, albeit incomplete. Again there should be good views of Jupiter and Saturn, and we have an opposition of Mars to look forward to. Conditions appear to be favourable for several meteor showers.

VISIBILITY OF THE PLANETS

As in 2011, **Mercury** will be poorly placed for observation from Guernsey. The best time will be early March, after sunset in the west. It will be at greatest eastern elongation (18°) on 05 March. It will be fairly good in early December in the southeast before sunrise, greatest western elongation being on 04 December. It will then be below and to the left of Venus. Other, less favourable, elongations are listed in the table at the end of this article.

Venus continues as the 'Evening Star' until mid-May, greatest eastern elongation being on 27 March. At this time it will appear as a half-moon shape in telescopes. It will reach inferior conjunction on 05/06 June, and will reappear in July as the 'Morning Star' for the rest of the year. Greatest western elongation will be on 15 August.

Transit of Venus

In 2004 we had the first opportunity in over 120 years to see a transit of Venus across the disc of the Sun, and Guernsey was in a good position to do so. We were able to observe it for about two hours before fog rolled in. Transits of Venus take place in pairs, with eight years between them, but then more than 120 years before the next pair. 2012 will, therefore, see the second of the current pair of transits, and there will not be another opportunity until 2117.

Although we had (weather permitting) a view of the entire transit in 2004, this year we will see only a short part of it. To see the whole transit it will be necessary to travel to north-west Canada, Alaska, east and north Asia, east Australia, New Zealand, or the Western Pacific Ocean.

To see the transit from Guernsey a clear, unobstructed view of the north-east horizon will be essential. The transit lasts nearly 7 hours, but we will see only the last 50 minutes of it. It actually starts at 23.03 BST on 05 June – night-time in Guernsey – so the Sun will be well below our horizon. It will not start rising until 05.05 on 06 June, by which time the transit will be almost over. The planet will appear very near the top right of the Sun, so it will be visible as soon as the Sun starts rising. Its angular diameter will be $57.8''$ – about 3% that of the Sun. The Sun will take 5 minutes to rise, so by 05.10 it will be completely above the horizon. Over the next half hour the planet will gradually approach the limb of the Sun. Third contact (when it appears to touch the limb) will be at 05.36. Venus will take 18 minutes to cross the Sun's limb, fourth contact taking place at 05.54, when the Sun will still be only 5° above the horizon.

Then it will be all over until 11 December 2117. But that one will not be visible at all from Guernsey. The second one of that pair, on 08 December 2125, will be partially visible. The next one to be completely visible from Guernsey will be on 11 June 2247.

So let's just hope for clear skies for at least 50 minutes in the early morning of 06 June this year! A fuller account will be published in the next (April to June) newsletter, *Sagittarius*. In the meantime, information about the transit is available on a number of websites, including http://astro.ukho.gov.uk/nao/transit/V_2012/index.html.

A word of warning, however: observing the Sun with any optical aid is highly dangerous, unless the equipment with the necessary specialist filters. Even naked-eye observation is hazardous. I can provide filters to any member who desires them, and will give details of other safe methods of observing the event.

Mars starts the year rising at 10.00 pm in the east. It will reach opposition on 03 March, when it will be brighter than magnitude -1, at a distance of 64 million miles, and an angular diameter of 14". Not the best of oppositions by any means, but worth looking at, especially as its declination of +10° will put it at a respectable maximum altitude of 50° in Leo. It will remain visible in the evening until July.

Jupiter, which has been such a brilliant object in the last few months of 2011, will continue to be visible in the evening until April 2012. It will reappear in the eastern morning sky in July, and remains visible for the rest of the year, reaching opposition on 03 December. It should again provide good views of its moons, atmospheric bands on its disc, and the Great Red Spot. Transit, shadow and occultation events involving Jupiter's moons will be found at <http://www.skyandtelescope.com/observing/objects/planets/3307071.html?page=2&c=y>, or simulated on software such as StarryNight (<http://www.starrynightstore.com/>). The transit times of the Great Red Spot can be found at http://www.skyandtelescope.com/observing/objects/planets/Transit_Times_of_Jupiters_Red_Spot.html. They can also be seen on StarryNight, but remember to set the Jovian System longitude to the current value (173°).

At the start of the year **Saturn** will be visible in the morning sky. It will rise earlier and earlier, reaching opposition in Virgo on 15 April. Its rings will be magnificent. It will then be seen in the evening until August. It will reappear in the morning sky at the end of November.

Uranus will be at opposition in Pisces on 29 September at magnitude 5.7. **Neptune** will be at opposition in Aquarius on 24 August at magnitude 8.

DWARF PLANETS

Pluto will reach opposition on 29 June, at magnitude 14, very close to the M25 Open Cluster in Sagittarius. **Ceres** will reach opposition in December, in Taurus, at magnitude 6.6, and should be easily visible in telescopes. The other three dwarf planets (Eris, Makemake and Haumea) are too faint to be seen in most amateur telescopes.

ASTEROIDS

The brightest asteroid, **Vesta**, at magnitude 6.3, will be at opposition on 19 December in Taurus. It will appear not far from Ceres, which the Dawn spacecraft will be leaving in

July 2012 to continue its journey to Vesta, arriving in 2015. (For more information see <http://dawn.jpl.nasa.gov/>).

ECLIPSES

No eclipses will be visible from Guernsey this year, except for the tail end of a very insignificant penumbral eclipse of the Moon on 28 November. The Moon will be in the penumbral shadow of the Earth when it rises, at 16.19, and will leave the penumbra at 16.43, when it is just 4° above the horizon.

OCCULTATIONS AND CONJUNCTIONS

The Jupiter system will be occulted by the Moon on the night of 14/15 July, but only slightly. Nevertheless, this will be an interesting event, as not only the planet will be covered, but each of its moons in turn. It starts with an occultation of Europa at 02.48 BST, then Io three minutes later, at 02.51. The occultation of the planet itself starts a minute later, at 02.52, but it will take a further three minutes before the planet is completely covered by the Moon. Ganymede will be occulted at 02.58, and Callisto at 03.01.

They will re-emerge in the same order: Europa at 03.05, Io at 03.07, Jupiter at 03.08, Ganymede at 03.17, and Callisto at 03.22. The Moon will be a slender crescent, and Jupiter and its moons will be covered close to the upper cusp, re-emerging on the dark side of the Moon. This will be a good photo opportunity, provided it is sufficiently visible, as its altitude will be only 5° in the north-east.

Mercury will be occulted by the Moon on 14 November, after the Sun risen. It starts at 09.26, when Mercury will be 9° altitude in the south-east., and Mercury will re-emerge at 10.06. It is unlikely, however, that this will be visible, given the daylight and the fact that Mercury will be dim, at magnitude 3.

The following are the dates of planetary conjunctions, 3° or closer:

10 February	Venus and Uranus (0.6°)
13/14 March	Venus and Jupiter (3°)
01 June	Mercury and Venus (0.1°)
15 August	Saturn and Mars (2½°)
28 November	Venus and Saturn (<1°)

METEORS

The **Quadrantids** with up to 80 per hour, peak on the night of 03/04 January. The **Perseids** peak on the night of 11/12 August. The **Leonids** peak on 17/18 November. The Moon will not interfere much with any of these showers this year. The richest annual shower, the **Geminids**, with the possibility of over 100 per hour, peaks on 13 December, and coincides with the New Moon, so conditions are very favourable.

COMETS

We have had good views of Comet **Garradd** (2009 P1) in the last few months of 2011, and these should continue in the first couple of months of 2012, with the comet appearing at magnitude 7 in Hercules.

Another good one is Comet **Levy** (2006 T1), which will reach perihelion in January 2012, also at magnitude 7.

Comet predictions for 2012 are available at the excellent website of the British Astronomical Association's Comet Section (<http://www.ast.cam.ac.uk/~jds/preds12.pdf>).

Check the [Heavens-Above](#) website for star charts showing comet positions.

THE SUN

We are now rapidly approaching solar maximum, with increasing frequency of sunspots and auroral displays at high latitudes. During 2012 the sunspot number is predicted to increase from 73 to the maximum of 90 by December. Details are at www.ips.gov.au/Solar/1/6. Who knows, we might even see some aurorae from Guernsey.

EQUINOXES AND SOLSTICES

The following are the dates and times of the equinoxes and solstices in 2011:

Vernal Equinox	20 March	05.14 UT
Summer Solstice	21 June	00.08 BST
Autumnal Equinox	22 September	15.48 BST
Winter Solstice	21 December	11.11 UT

SATELLITES

The International Space Station is regularly visible from Guernsey. Also of interest are flashes from the Iridium satellites, and periodic launches of the Space Shuttle. Many other, fainter, satellites appear every night. Details of the times and directions of visibility (together with sky charts and much more) can be obtained from the [Heavens-Above](#) website.

WEA COURSE

The Astronomy Section is again running the annual six-week WEA "Star Gazing" course at the Observatory in February and March, starting on 09 February. However, it is again full, and, as usual, there is a lengthy waiting list. Enrolment for the 2012 course starts in August. See www.wea.org.gg or telephone WEA Guernsey at 237888.

OPEN DAYS

The Observatory will be open to the public again for a number of Thursday evenings during the year, including weekly openings during the summer holidays (26 July to 30 August). Details will appear in the Astronomy Section newsletters, on the [website](#), and in local media.

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REFERENCES

SkyMap Pro and *Starry Night Pro* software

RAS diary 2012

<http://www.astronomia.org/2012/fenogeoc.en.html>

<http://astro.ukho.gov.uk/nao/transit/>

CALENDAR OF ASTRONOMICAL EVENTS

Month	Date	Time	Event
Jan			Comet Levy at perihelion
Jan - Feb			Comet Garradd visible
Jan-Apr		Evening	Jupiter visible
Jan-May		Evening	Venus visible
Jan - Jul		Evening	Mars visible
Jan-August		Morning – Evening	Saturn visible
January	03/04		Quadrantid meteor shower
February	09	20.00 UT	WEA course starts
February	10	Evening	Uranus close to Venus
March	03	All night	Mars at opposition
March	05	After sunset	Mercury at greatest eastern elongation
March	13/14	Evening	Venus close to Jupiter
March	15	20.00 UT	WEA course – final class
March	20	05.14 UT	Vernal Equinox
March	25	01.00 UT	BST starts
March	27	Evening	Venus at greatest eastern elongation
April	15	All night	Saturn at opposition
April	18	Before sunrise	Mercury at greatest western elongation
June	01	Evening	Mercury close to Venus
June	05		Venus at inferior conjunction
June	06	Early morning	Transit of Venus
June	21	00.16 BST	Summer Solstice
June	29	All night	Pluto at opposition
July – Dec		Morning - Evening	Jupiter visible
July	01	After sunset	Mercury at greatest eastern elongation
July	26	Evening	Observatory Open Days start
August	11/12		Perseid meteor shower
August	15	Evening	Mars close to Saturn
August	15	Morning	Venus at greatest western elongation
August	16	Before sunrise	Mercury at greatest western elongation
August	24	All night	Neptune at opposition
August	30	Evening	Observatory Open Days end
September	22	15.48 BST	Autumnal Equinox
September	29	All night	Uranus at opposition
October	26	After sunset	Mercury at greatest eastern elongation
October	28	2.00 am	BST ends
Nov - Dec		Morning	Saturn visible
November	16/17		Leonid meteor shower
November	28	Morning	Saturn close to Venus
November	28	Evening	Penumbral eclipse of the Moon
December	03	All night	Jupiter at opposition
December	05	Before sunrise	Mercury at greatest western elongation

December	13		Geminid meteor shower (very favourable)
December	19		Vesta at opposition
December	21	11.11 UT	Winter Solstice