Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

2017

Forthcoming Events

WEA Course

Thursdays 7.30 pm at the Observatory
2nd February – 9th March
(Enrolment necessary)

Public Open Evenings

Thursdays during summer school holidays
(27 July to 31 August)

Additional open evenings may be arranged for the spring and autumn.

Public Open Evenings will comprise a talk or film show, with a clear night for observation being a bonus!

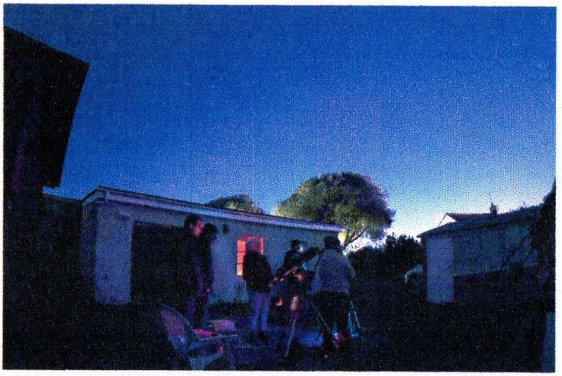
Inside

Section meetings

The Section meets at the Observatory every Tuesday evening at 8.00 pm, usually with a discussion topic at 9.00 pm.

Talks

Talks by invited speakers may be arranged during the year. Members and the media will be informed.



Astro-imaging at the Observatory, December 2016. (Trevor Mahy)

SECRETARY'S REPORT 2016

By Peter Langford, Astronomy Section Secretary

We held our annual business meeting on 2nd February. Frank Dowding, after serving as Secretary for five years and doing an excellent job, stood down, as he indicated he would the previous year. There were no volunteers to take over the position at the meeting but I subsequently agreed to take it on. Fortunately Frank was happy to continue the demanding task of organising and running the very many observatory group visits and open evenings and he took on the new post of Events Coordinator. The other officers were content to continue in their roles. A particularly important one for the Section is David Le Conte's role as Public Relations officer. David is often invited to give talks and he has been responsible for some excellent astronomy coverage in the local press and media which has benefitted the profile of the Section. He also keeps our website bang up to date.

The astronomical highlight of the year was the transit of Mercury (where Mercury crosses the disc of the Sun) on 9th May, Liberation Day. Though not as rare as a transit of Venus, a Mercury transit is still quite rare with only thirteen a century on average. The last one was on 8th November 2006, though that was not visible from Guernsey. This one was due to start just after midday and last for 7½ hours, though we would not be able to observe the last couple of hours as by then the Sun would be too low. We were understandably looking forward to the event and had prepared the heliostat to project an image onto a screen in the observatory meeting room and equipped the 11-inch Celestron telescope with its solar filter. Elaine Mahy brought along a home-made solar projection box which looked a bit Heath Robinson but she assured us it would produce a good image. Unfortunately it was cloudy. We were reduced to watching live-feed coverage of the event from other locations. We had advertised that we would be open to the public from 3 to 5pm and despite the cloud we had a steady stream of visitors, about forty in all. Around 5pm we decided to pack up and just as we were doing so the cloud thinned enough to get a view of the Sun. Elaine Mahy was the first to get an image in her projection box, which was as good as she had promised. The Sun was too low to use the heliostat but

we could use the Celestron. David Le Conte attached his camera and obtained some good images with it.

During the year we had a couple of incidents with our facilities and equipment. In April Colin Spicer and Jason Hill were setting up in the observatory building for a group visit from Nedbank when one of the observatory side panels (which normally remains closed) fell down with a crash. Fortunately the hinges did not break and Colin and Jason managed to get the panel back up and do a temporary fix. Afterwards Paul Gavey repaired it properly. Later in the year there was a problem with the declination drive on the Meade telescope. Fortunately Matt Skillett was able fix it.

Our educational activities continued during the year. Starting in February we once again ran the 6-week 'Stargazing' course for the WEA. The first course was in 2002 so 2016 represented the 15th time we had put on the course, with every year being fully subscribed. Unfortunately the weather this year did not permit a great deal of stargazing though it relented enough to allow a couple of observing sessions. David Le Conte, the course moderator, was away for a few of the weeks of the course. His spot was ably filled by Jason Hill. Although by day Jason works as a lawyer he is also a Fellow of the Royal Astronomical Society and I think a scientist at heart.

The observatory remains popular for group visits and we had many during the year, sometimes two in one week. The groups range from Scouts and Beavers, schools and WI to corporate and social. Frank Dowding coordinates the visits and is always there to give talks but he has the assistance of David Le Conte, Jason Hill, Geoff Falla and Colin Spicer to man the telescopes and help with the talks.

Our Open Evenings were also popular. We held one in April, seven during the school summer holidays and one more in November. If the weather is clear the events can draw a large crowd, resulting in queues to see through the telescopes. However, even if the weather is not clear there are still slide shows and talks to keep the visitors entertained.

In June there was a special event when we arranged for Dr Robin Catchpole of the Institute of Astronomy Cambridge to give a public talk at the Frossard Theatre, Candie Gardens. His talk was entitled "Black

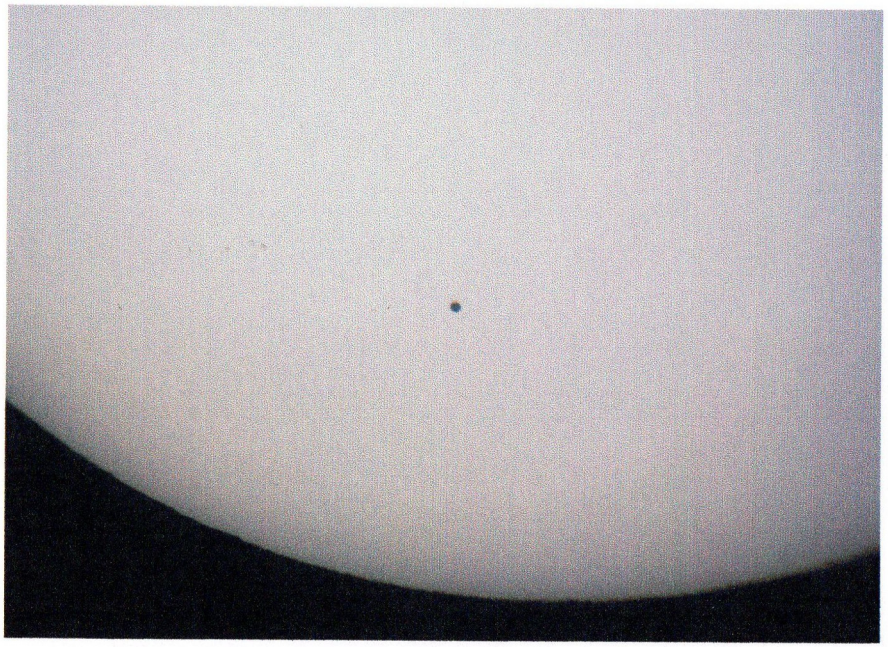
Holes, Dark Matter and Vacuum Energy". Unfortunately I was away from the Island at that time so I missed it. However, having heard Robin's presentation the previous year I knew that he was an excellent and extremely knowledgeable speaker and by all accounts his talk was again very well received.

As well as spreading the word about astronomy the WEA course, group visits and Open Evenings are an important source of donations to supplement members' subscriptions. They enable us to maintain the observatory and buy the equipment we need. Running these activities is also good for attracting new members. In fact this year has been a good year for new members with over a dozen joining during the year, a nice proportion of whom are younger members.

During his time as Secretary, Frank Dowding introduced question and answer sessions to our Tuesday evening meetings. I wanted to continue the idea but changed it slightly so that from March we have had discussion topics for most Tuesday evenings. Typically the discussion starts around 9pm with a presentation by someone who knows or has researched the topic. This has generally fallen to David Le Conte, Jason Hill, Frank Dowding or myself. I have tried to keep the topics varied and if you visit our website you can see the list, some 34 topics in all. I think the format worked reasonably well but if we continue it in 2017 finding new topics (and maybe new people to lead them) will be more of a challenge.

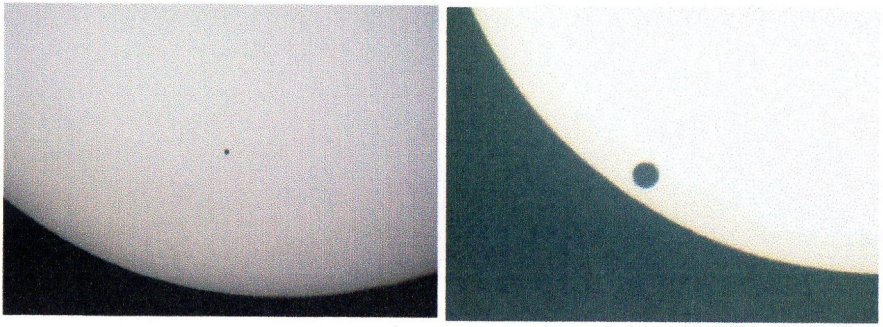
In August Jean Dean gave a talk about the Channel Islands Astrophotography Group (on Facebook) which she heads up. Jean has built up a comprehensive knowledge about how to acquire and process digital images and she has produced some stunning results. Her talk sparked an interest for a number of our members and she followed up with a presentation on DSLR astrophotography in November. On the 28th December, taking advantage of the clear weather, she held an imaging session at the observatory for those who were able to come along, either to participate or watch. I expect to see the interest in imaging continue in 2017.

Overall I think 2016 was a reasonably successful year for the Section thanks to the efforts and enthusiasm of the many people who are keen to promote an interest in astronomy in the Island.



The Transit of Mercury on 09 May 2016 (David Le Conte)

(11-inch Celestron with solar filter and Canon 600D camera, 1/45 second at ISO 100)



Transit of Mercury, 09 May 2016 (12" diameter)

Transit of Venus, 08 June 2004 (58" diameter)

Comparison (to same scale) of the transits of Mercury and Venus (David Le Conte)

OBSERVATORY VISITORS

By Frank Dowding, Events Coordinator

For many years the observatory has held 'Open Evenings' when members of the public are shown our large telescopes and view the heavens under the guidance of our volunteers. We have also held Group Bookings where a group of people say 10 to 20 or so, have an evening for themselves rather than the bustle of the popular Open Evenings.

This had worked very well and resulted in well over a hundred visitors on a clear night and a number of people joining our astronomy section of La Société Guerniaise. The only down side was the occasional cancellation or postponement of a Group due to bad weather on the evening chosen.

When I became secretary in 2011, I suggested that we move the Open Evenings and Group Visits away from our Tuesday Members' night to a separate evening. Also that when we advertise these evenings we should give equal billing to the illustrated talks that will take place along with the telescope viewing. So that even if the weather is cloudy or even raining we can still entertain our visitors by showing them the impressive telescopes before giving them illustrated talks of their choice.

Due to so many of our members giving up their time and particularly our Public Relations Officer David Le Conte for promoting the illustrated talk side of the evenings, it has been a success, we now have many more visitors on a cloudy evening and no cancellations.

It was becoming rather busy for me to handle the secretarial duties along with the Group Bookings, so at last February's AGM, after five years, I resigned as secretary but asked that I may become an 'Events Coordinator' so that I may continue to concentrate on organizing the Visitor evenings. I must stress here again that it is rare for David Le Conte to be not available to demonstrate the large telescopes always assisted by Geoff Falla.

I thank everyone who has been involved in making these evenings so successful. We have had visits from Schools, various levels of Guiding, Social Clubs and others and at our Open Evenings we also have many Visitors to Guernsey who often comment on our clearer and less polluted skies.

ASTRONOMICAL EVENTS IN 2017

as seen from Guernsey

By David Le Conte

A major solar eclipse in the USA on 21 August will result in a minor partial eclipse in Guernsey just before sunset. We should have some good views of the planets, and a few comets may be sufficiently bright to be seen in the Observatory telescopes or with binoculars, or perhaps in one or two cases with the naked eye.

The planets

Mercury will be visible in the periods around its greatest elongations:

Date	Elongation	Direction to look	Time
19 January	24° Western	Low in East	Before sunrise
01 April	19° Eastern	Low in West	After sunset (too low)
17 May	26° Western	Low in East	Before sunrise
30 July	27° Eastern	Low in West	After sunset
12 September	18° Western	Low in East	Before sunrise (too low)
24 November	22° Eastern	Low in west	After sunset

On 16 September Mercury will be within half a degree of Mars, low in the east before sunrise.

Venus is the "Evening Star" in the west from the beginning of the year, and reaches greatest eastern elongation on 12 January. It is at inferior conjunction on 25 March and reappears as the "Morning Star" in April in the eastern pre-dawn sky, and maximum western elongation on 03 June. The best views will be in September. Then it gets lower in the sky as it heads towards superior conjunction in early January 2018. It will appear close to Mars on 05 October, and to Jupiter on 13 November 2017.

Early in the year **Mars** is visible in the south-west evening sky. It will disappear in April as it heads towards superior conjunction on 27 July. It will reappear in October as a pre-dawn object in the east. Being then 2.5 AU from Earth it will be faint and tiny – less than 4

arc-seconds in size – with no surface detail apparent. We will have to wait for its next excellent opposition – on 27 July 2018.

At the beginning of the year **Jupiter** is a morning object, rising around 1.00 am. By March it will rise at 10.30 pm. It reaches opposition on 07 April in Virgo, and will remain an evening object until September. It will reach conjunction with the Sun on 26 October, and in mid-November it will reappear in the pre-dawn morning sky in the east.

During the summer we can again expect to see the four Galilean moons, atmospheric bands on the planet's disc, and the Great Red Spot. Transit, shadow and occultation events involving Jupiter's moons can be calculated using a Java script at http://www.skyandtelescope.com/wp-content/observing-tools/jupiter_moons/jupiter.html on the *Sky & Telescope* website (register at http://tinyurl.com/24kp25 and remember to enter the date in the US format: month/day/year). They can also be simulated on software such as StarryNight (http://www.starrynightstore.com/), and some of the many astronomy apps, including the *JupiterMoons* app by Sky & Telescope, which also gives the transit times of the Great Red Spot. The Spot's transit times are also available at http://www.skyandtelescope.com/observing/transit-times-of-jupiters-great-red-spot/.

Jupiter with Callisto (at top), and its shadow. Io is at bottom right.

(Matt Skillett, 17 March 2016)

Saturn starts the year as a morning object, rising in the east in the constellation Ophiuchus about 07.30 am, and rising earlier as the months go by. Opposition is on 15 June, the planet rising as the Sun sets, and visible all night. It will remain visible, progressively as an evening object, until October, reaching conjunction with the Sun on 21 December. Its declination is again low this year, so again it will remain at a low altitude. However, with the rings still at a good angle it will continue to present a beautiful sight in telescopes, and its brightest moons, especially Titan, should be visible.

Uranus will be at opposition in Pisces on 19 October, at around magnitude 6. **Neptune** will be at opposition in Aquarius on 05 September, at magnitude 8.

Supermoons

So-called 'supermoons' occur when the Full Moon happens to coincide with the Moon's closest approach to Earth ('perigee'), and therefore appear larger than usual. In 2016 there were three, but this year there will be just one – on 03 December.

Dwarf planets and asteroids

Pluto will reach opposition on 10 July in Sagittarius, at magnitude 14. **Ceres** does not reach opposition until January 2018. The other three dwarf planets (Eris, Makemake and Haumea) are too faint to be seen in most amateur telescopes.

The brightest asteroid, **Vesta** will reach opposition on 21 January 2017, when it will be magnitude 6 in Cancer. January and February will, therefore, be a good time to observe it.

Eclipses

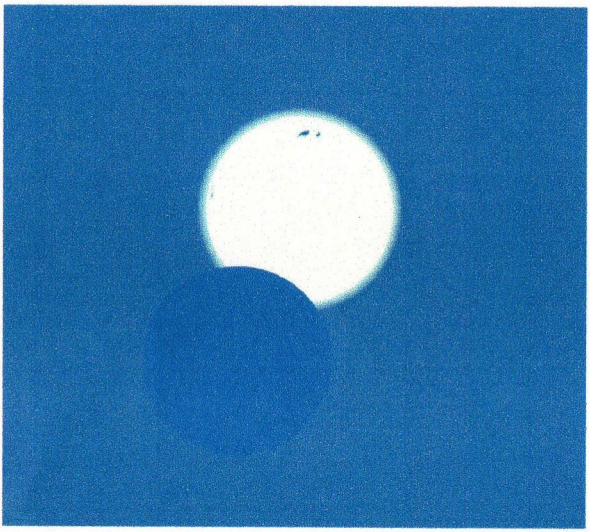
On 26 February an annular solar eclipse will be visible from South America and Africa.

On the night of 10/11 February a penumbral eclipse of the Moon will be entirely visible from Guernsey. It starts at 22.32 UT and ends at

02.55 UT, maximum eclipse being at 00.44 UT. The Moon will pass close to and within the lower edge of the Earth's shadow, so the dimming effect is unlikely to very marked.

A partial lunar eclipse on 7 August will be visible from Eastern Europe, Africa, Asia and Australia. In Guernsey none of the umbral phase will be visible, but the Moon will still be in the penumbra as it rises at 20.33 BST. The eclipse ends at 21.52 BST.

A major total solar eclipse, referred to as the Great American Eclipse, occurs on 21 August, the path of totality completely crossing the United States, and being visible, therefore, to many millions of people. In Guernsey it will be briefly visible (if you are quick!) as a minor partial eclipse, starting half an hour before sunset, at 19.41 BST. Maximum eclipse of just 13% is at 20.08, and the Sun sets at 20.12. To see it one will need a good view of the western horizon.



Simulation of the solar eclipse of 21 August from Guernsey (*StarryNight*)

The event may, however, provide good imaging opportunities, with some foreground objects providing added interest. Be sure to take precautions not to look at the Sun directly unless your eyes and/or telescope are properly protected by a specialist solar filter.

If you are really keen take a trip to the US there is lots of information about the eclipse at **http://eclipse2017.nasa.gov/** and **http://mreclipse.com/Special/SEnext.html**.

Occultations and conjunctions

There will be a grazing occultation of Aldebaran by the Moon on 05 February, at 23.30 UT. It will be 0.3° from the Moon on 5 March at 04.50 UT. Aldebaran will be totally occulted by the Moon on 31 December from 01.18 to 01.53 UT.

The best conjunctions between planets, with their positions and separations, are:

01 January	Mars and Neptune	Evening in the west	0.3°
13 January	Venus and Neptune	Evening in the west	0.9°
27 February	Mars and Uranus	Evening in the west	0.7°
16 September	Mercury and Mars	Morning in the east	0.5°
05 October	Venus and Mars	Morning in the east	0.3°
13 November	Venus and Jupiter	Morning in the east	0.3°

METEORS

The **Quadrantids** peak on the night of 03/04 January. The Moon will be a few days old, so the morning hours should be dark.

The **Perseids** peak on the night of 12/13 August, with up to 80 per hour. The waning gibbous Moon rises at 11.00 pm BST, affecting the visibility of the fainter morning meteors.

The richest annual shower, the **Geminids** peaks on the night of 13/14 December. The waning crescent Moon will not rise until 2.45 am UT, so most of the night should be favourable.

There are, of course, minor meteor showers during the year, and sporadics may be seen at any time.

Comets

Comet 45/P Honda-Mrkos-Pajdusakova has a perigee of 0.08 AU on 11 February, and could become a binocular object.

Comet 41/P Tuttle-Giacobini-Kresak will approach just 0.14 AU to the Earth in late March, shortly before it reaches perihelion on 11 April, and could well become a naked-eye circumpolar object at that

time, possibly even reaching 2nd magnitude. It may be a binocular object from March to June.

Comet 2/P Encke reaches perihelion on 10 March at 0.336 AU from the Sun. It will be best seen in February low in the west after dark, when it could reach magnitude 5.

Comet 96/P Machholz reaches perihelion on 28 October at 0.12 AU from the Sun and could reach magnitude 2.

Detailed comet predictions for 2017 are available on the website of the British Astronomical Association's Comet Section: http://www.ast.cam.ac.uk/~jds/preds17.pdf. Also check the Heavens-Above website (heavens-above.com) for star charts showing comet positions.

The Sun

We are now well past the maximum of the sunspot cycle in 2014, but there can still be outbursts of activity, with displays of the aurora borealis (and australis) at high latitudes. Details of sunspot numbers are at www.ips.gov.au/Solar/1/6, and real-time views of the Sun are at https://umbra.nascom.nasa.gov/newsite/images.html. Auroral alerts, with lots of other information, are at www.spaceweather.com.

Equinoxes and solstices

The following are the dates and times of the equinoxes and solstices in 2017:

Vernal Equinox	20 March	10.30 UT
Summer Solstice	21 June	05.25 BST
Autumnal Equinox	22 September	21.03 BST
Winter Solstice	21 December	16.29 UT

Satellites

The International Space Station (ISS) is regularly visible from Guernsey, looking like a very bright star crossing our skies from west to east. Also of interest are flashes from the Iridium satellites (which

occur virtually every night), and periodic launches of ISS servicing craft. 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 www.heavens-above.com, linked from our webpage www.astronomy.org.gg/iss.htm.

WEA course

The Astronomy Section's annual six-week WEA "Star Gazing" course at the Observatory will be run from 02 February to 09 March. It is usually over-subscribed, so early enrolment is recommended. See www.wea.org.gg, or telephone 237888.

Open days

The Observatory will be open to the public again for a number of evenings during the year, including weekly openings on Thursday during the summer school holidays (27 July to 31 August). Details will appear on our website and will be sent to the local media.

References

SkyMap Pro and *Starry Night Pro* software
http://www.seasky.org/astronomy/astronomy-calendar-2017.html
http://www.timeanddate.com/
RAS diary 2017

Calendar of astronomical events in 2017

Month	Date	Time	Event
January	01	Evening	Mars and Neptune conjunction (0.3°)
January	03/04		Quadrantid meteor shower (favourable)
January	04	14.18 UT	Earth at perihelion
January	12	Evening	Venus at greatest eastern elongation
January	13	Evening	Venus and Neptune conjunction (0.9°)
January	19	Before sunrise	Mercury at greatest western elongation
January	21	All night	Vesta at opposition (mag 6)
February	02	19.30 UT	WEA course starts at Observatory
February	05	23.30 UT	Grazing occultation of Aldebaran by Moon
February	10/11	22.32 – 02.55 UT	Penumbral lunar eclipse

February	11		Comet 45/P HMP at perigee
February	27	Evening	Mars and Uranus conjunction (0.7°)
March	09	19.30 UT	WEA course – final class
March	10		Comet 2/P Encke at perihelion
March	20	10.30 UT	Vernal Equinox
Late March			Comet 41P TGK at perigee
March	25		Venus at inferior conjunction
March	26	01.00 UT	BST starts
April	01	After sunset	Mercury at greatest eastern elongation
April	07	All night	Jupiter at opposition
May	17	Before sunrise	Mercury at greatest western elongation
June	03	Morning	Venus at maximum western elongation
June	15	All night	Saturn at opposition
June	21	05.25 BST	Summer Solstice
July	03	21.11 BST	Earth at aphelion
July	10	All night	Pluto at opposition (magnitude 14)
July	27	Evening	Observatory Open Evenings start -
July	30	After sunset	Mercury at greatest eastern elongation
August	07	Evening	Penumbral lunar eclipse
August	12/13		Perseid meteor shower
August	21	Before sunset	Partial solar eclipse (13%). Total in USA.
August	31	Evening	Observatory Open Days end
September	05	All night	Neptune at opposition (magnitude 8)
September	12	Before sunrise	Mercury at greatest western elongation
September	16	Before sunrise	Mercury and Mars conjunction (0.5°)
September	22	21.03 BST	Autumnal Equinox
October	05	Before sunrise	Venus and Mars conjunction (0.3°)
October	19	All night	Uranus at opposition (magnitude 6)
October	26		Jupiter conjunction with Sun
October	28		Comet 96/P Machholz at perihelion
October	29	02.00 BST	BST ends
November	13	Morning	Venus and Jupiter conjunction (0.3°)
November	24	After sunset	Mercury at greatest eastern elongation
December	03	All night	Supermoon
December	13/14		Geminid meteor shower (favourable)
December	21	16.29 UT	Winter Solstice
December	21		Saturn conjunction with Sun
December	31	01.18 – 01.53	Occultation of Aldebaran by Moon

THE SKY AT NIGHT

By Geoff Falla

Towards the end of the year, and continuing into the beginning of the New Year, one of the best constellations to be seen is Orion, the

Hunter. This prominent shape has some of the brightest stars in our winter sky. The constellation's main shape is a large upright rectangle of four bright stars, rising above the eastern horizon during the early evening. At the centre of the shape is the Hunter's Belt, a short line of three bright stars, making the main part of the constellation easier to identify.

Below Orion, and slightly to the east of this, Sirius, the Dog Star makes a very bright appearance as it rises above the southeast horizon. This is the brightest of the winter stars, but even brighter at this time is the planet Venus, quite high up in the southwest part of the sky after sunset. The brightness of Venus is not because of any self-luminous glow, but because it has a dense atmosphere of clouds which reflect much of the sunlight. Although Venus has a solid and rocky surface like our own planet, and is very similar in size, it is not considered practical to send spacecraft to landing missions there. This is because Venus is much closer to the Sun, and the extreme temperature has produced a very dense high pressure atmosphere.

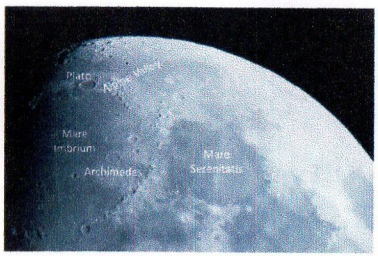
The favourable position of our own planet's orbit has placed it in the Sun's 'habitable zone' around it. This region is considered to be rather a rarity when it comes to finding planets in orbit around other stars beyond our own Sun. However, many other planets have already been identified in distant solar systems. The Kepler space telescope mission has confirmed the existence of many systems, with some of the planets comparing more closely with the Earth in size, likely composition, and environmental conditions.

Research as a result of the Rosetta spacecraft mission, with a remarkable landing on the comet's core, has provided evidence that cometary material contains some of the key components for the development of life.

The closest star to our own Sun is Proxima Centauri, a red dwarf star about four light years away from us. Observations of the star have revealed that Proxima Centauri has a planet, named Proxima b, which is about four million miles away from its star, a relatively close position which could also be favourable for the development of life.

Orion and Horsehead Nebulae
(Combination of images by Jean Dean and Chris Tostevin-Hall, December 2016)

International Space Station in front of the Moon
(David Le Conte, 16 February 2016)



The Moon (David Le Conte, 12 August 2016)

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