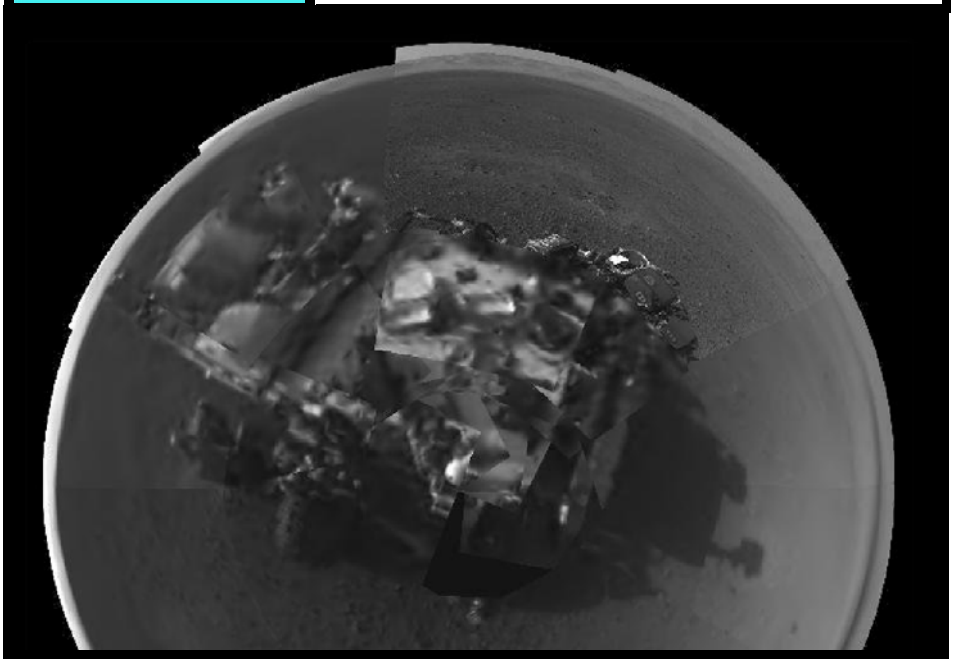
NEWSLETTER

September - November 2012 Issue 160



This Picasso-like self portrait of NASA's Curiosity rover was taken by its Navigation cameras, located on the now-upright mast.

Photo NASA/JPL

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Editorial — Ian Davies

Hi All. This being the first newsletter of a new season I would normally tell you how great the coming season is going to be. This year, however, our Chairman has ably done that job in his "Chairman's Welcome" on the page to the right.

As a result I thought that I would talk a little about various Mars probes over the years. Mars it has been said is a bit of a Bermuda Triangle for space probes. Let's start with the raw figures for all nations that have sent probes towards Mars. There have been a total of 52 Orbiters and Landers sent. Of these 26 have failed and 26 have either succeeded or been partially successful. Breaking this down by nation we find the USA (NASA) has a better record than the Russians. Of NASA's 25 missions they have lost 7 of them, whereas Russia/USSR have lost 16 of their 22 missions. There have also been 5 missions from other space faring countries, with 3 failures and 2 successes. This of course includes the 2003 failure of the UK's Beadle 2 lander.

NASA are now getting pretty good at getting probes successfully to and in operation at Mars, the latest Curiosity rover brings the total of success to 7 since their last failure in 1999. The Russians have all but given up on their efforts though.

Wishing you dark skies - Ian.

Publication Dates

The CAS newsletter is published at the first society meeting of September, December, March and June. The deadline for submissions is 4 weeks before the publication date (deadline for Issue 161 is 15th November).

Visit CAS on the web @

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Remember as a CAS member you can use the Members' Area of the web site. You will need you password to access this area. If you don't know your password it is your surname followed by your membership number.

CAS is now on twitter, to follow us, follow **CardiffAS**

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Chairman's Welcome

A very warm welcome to all members of Cardiff Astronomical Society at the beginning of it's 38th year ! Whether you are new to the society or have been a member for some time, it is your membership that helps make CAS the largest amateur astronomical society in the UK.

Whether you are a beginner (and we all were once) or more advanced, we have many opportunities for you to get involved and to develop your understanding of the cosmos. Once again, our Secretary, Dave Powell has put together a superb programme of talks on alternate Thursdays at Cardiff University. The wide range of subjects has something for everyone and ranges from practical observing advice to the latest research and the speakers are eminent academics and amateur enthusiasts from all over the UK. In addition there is a schedule of Observing Sessions to take advantage of the dark skies when they return. The Observers' Club will meet on the last Friday of the month at the Black Cock Inn near Caerphilly. Theresa Cooper, our Events Organiser, has arranged another busy programme of outreach events around the South Wales area. These are very rewarding and you would be most welcome to participate. May 2013 sees our immensely popular biennial AstroFest at the National Museum of Wales in Cardiff with a full day's activities, based around the Sun. The committee are in the advanced stages of planning regular club meetings for our junior members and practical training sessions for all members at our observatory site at Dyffryn Gardens. Do check our comprehensive website regularly as it contains all the latest information on our activities and also useful links to assist your enjoyment of astronomy. And if you have any further suggestions, please use the suggestion box at a Thursday meeting or contact any committee member via email.

I urge you to take full advantage of your membership by participating in our many activities and hope you derive enjoyment from developing your hobby of astronomy.

Wishing you 'Dark (and cloud-free) Skies'.

Dave's Star Parties David Powell

Now we have the Observatory up and running, it's vital we make full use of the facilities.

With this in mind I have decided to hold some special events, once a month to encourage observing. These “Dave's Star Parties” will be ideal for our junior members and anyone else who wants to learn their way around the night sky. Each event will start with a general sky tour.

I can't make most of the weekend sessions run by our observing team so these will take place in addition to the usual sessions and most of them will be held on the alternate Thursday evenings to our meetings.

I will not be concentrating on faint fuzzies, but the brighter Messier objects, the Moon and bright planets. I will try and show you how to observe and what little tricks I use to help me locate things. You may learn something, you may not, but I promise they will be light hearted and fun.

In the meantime, suggestions for future meetings are very welcome.

The Parties will run from 7.30pm to 9.30pm. The first few of these will be on Thursday October 11th, Thursday November 8th and Friday December 14th (Hopefully in December we may see some Gemini Meteors).

The Fool on the Hill Roger Butler

“Last chance to see” and “the opportunity of a lifetime” proclaimed the media about the Transit of Venus on June 5th this year. There usually followed a confused paragraph explaining this was an astronomical event concerning the Sun which was an absolute 'must-see' but please don't look at the Sun ! Readers of the The Sun were told it was happening in the sky (and not on Sky!) and was a different kind of Transit to the one rusting in the front garden. Some searched in vain for a photograph of Venus on page 3.

Well certainly it was a last chance for all of us, since no one alive

today would still be around to see the next event in 105 years' time. But many of us recall vividly the previous Transit in June 2004. That was truly spectacular and the whole spectacle was visible from start to finish from the UK and ending just before noon. I projected an image of the Sun with my telescope onto the wall of the lounge and took some photographs of that. Not the most sophisticated of astroimaging techniques but it turned out rather well.

The circumstances of the 2012 Transit were very different. By the time the Sun had emerged above the horizon it would be almost over. At best, Venus would be seen exiting the disc of the Sun, very low in the sky, at dawn. So most people would not stand a chance unless they made the effort to get up somewhere high with a very low horizon. After a little research with an OS map, I decided Caerphilly Mountain would be my best bet and Ian confirmed that the nearest obstruction facing North East was 8 miles away and only 50 feet higher.

Then there were the seeing conditions. The beginning of June was no better than the washout that followed and the 'old enemy', clouds, were the order of the day. However, since observing is the triumph of optimism over experience, I was determined to give it a go. No point complaining if you missed it and, like the transport system, there would be a long wait for the next one. Several others vowed to join me at 4.30am at the trig point on Caerphilly Mountain and the rest was left to fate.

For me, the most striking difference between the 2004 and 2012 events was the use of the Internet. In eight short years it has pretty much changed the way almost all of us access information and exchange communications. And the development of podcasts and video streaming means that all sorts of events and images can be spread around the Earth pretty instantly. So this time round, the Transit of Venus was visible on the web from every corner of the world. There were literally hundreds of video streams from professional observatories and amateur astronomers. No need to miss a single second of the event. No potential danger to eyesight. No need to get up and go out at a hideously early hour in the morning. And yet...

I settled down to watch 3 streams: from Hawaii, Mexico City, New Delhi. I selected these as having the best images. Elsewhere there seemed to be a massive problem with cloud. People everywhere were complaining on blogs and fora of the sudden appearance of cloud. Christchurch, NZ, Kuala Lumpur, Moscow, Boston, Baltimore – it was everywhere. It was almost as if the permanent and total cloud cover on Venus, which prevents the penetration of our telescopes, was calling her sister clouds on Earth to further preserve her modesty. A huge outpouring of disappointment and frustration was posted onto the web.

Another feature of web posting is the extremely low level of education that is revealed. I am not referring to spelling and grammar – most posts were from countries where English is not fluent - but the utter worldwide ignorance of any basic science. And the shameless parading of this ignorance as if it were a status symbol. Some of the comments simply beggared belief. And the totally uneducated were actually seeking information from the equally uneducated. Even a quick google search or even wikipedia would have answered all their questions. But no, that was not the preferred solution. So I became quickly disenchanted with this profile of my fellow humans and a world chock-full of accessible information without the education to process it meaningfully. At 2.30am I logged off, set my phone alarm for 4am (was it worth it ?) and settled down for a snooze.

At 4.30am, I was awoken by my phone – not the alarm ring, but my son in law to say he was at the top of Caerphilly Mountain and where was I ! My alarm had failed to go off at the due time. Furthermore in trying to take the phone call discretely, I accidentally set off the burglar alarm. So in attempting not to disturb the household, I had now succeeded in waking the whole street ! A truly 'Frank Spencer' moment. The burglar alarm was soon silenced and I was not too concerned as most neighbours would conclude it was just next door's Volvo, which frequently gets lonely in the night and cries wolf.

Almost immediately I was using all my rallying skills on the narrow lane from Castell Coch to Caerphilly Mountain and soon arrived at

the car park. There were more cars than I had expected and even a coach. Yes, the students from the university had chartered a coach. Hurrying up the path with all my gear, I soon met a party of familiar faces, lurking in the murk. I hadn't noticed the conditions before but looking upwards now, it was not a hopeful sight. Nevertheless we continued trekking up the path to the trig point were a larger group had gathered.

And there we stood, - like a scene from 'Close Encounters', 'ET' or 'Independence Day' – gazing up in the direction of the rising Sun. Intent, optimistic, philosophical, stoic, even cheerful. Surrounded by dark grey clouds, we could just about confirm that the Sun was rising above the horizon by a patch of light grey clouds. Occasionally the shifting layers of cloud revealed a brief patch of blue sky before closing ranks again. Alas, none of these managed to align with the Sun. In fact conditions were getting worse: a glance in the other direction revealed that the cloud that had been perched on top of Garth Hill (Mountain ? - well, you saw the film !) was rolling over the edge and about to engulf the village of Gwaelod y Garth, before heading our way.

The technophiles among us had been keeping in touch with realtime images from worldwide locations via their Androids and iPhones and very soon announced that it was all over. There was a momentary pause before we each headed off down the track to our vehicles and back to our normal routines. But there was a sense of something very special had actually occurred even though we had not physically seen it at first hand. We had been a part of an event

causing millions of people all over the globe to stand still and stare, all at the very same time, and to acknowledge our collective role in the cosmos. Julius Caesar might have remarked “I came, I didn't see and I was defeated.” But Max Boyce would have been more in keeping with the spirit, with “I was there !” Perhaps The Beatles came closest:

But the fool on the hill
Sees the sun ~~going down~~ coming up
And the eyes in his head
See the world spinning around.

Annular Solar Eclipse Santa Fe New Mexico USA, 20th May 2012

Colin Young

I had the pleasure of observing the annular solar eclipse, while staying with some wonderful friends at the foot of the Rocky Mountains, just above Santa Fe, New Mexico, at about 8,500 feet, right in the path of annularity.

I expect all readers know that a total eclipse of the sun occurs when the moon passes directly in the line of sight, between the sun and the earth. The Sun is approximately 93 million miles (150 million kilometres) away from earth, the moon about 250,000 miles (380,000 kilometres). The Sun is however, about 400 times bigger than the Moon, and thus they appear to have roughly the same size of disc in the sky. However, when as in this case, the Moon is at the furthest point from the Earth in its orbit (apogee occurred on 19th May 2012), its apparent disc diameter is not sufficient to cover the sun at totality, and thus a ring of sunlight - annularity, persists at maximum eclipse.

I obtained information about the eclipse from the NASA web-site: http://eclipse.gsfc.nasa.gov/OH/OH2012.html#SE2012May20

The annular eclipse started at sunrise in southern China, marking out a wide path of annularity across the Pacific Ocean, traversing east to west. The annular path hit the US coast in Northern California, traversing the stunning landscapes of the wild west – Monument Valley in Utah, the Grand Canyon in Arizona, and ending at sunset at the Texas Panhandle. I used my favoured method of observing eclipses – projection of an image through binoculars, onto a white card, resulting in an image large enough for all our friends to look at the progress of the eclipse at the same time.

I clocked "first contact" – of the moon's disc across the sun at 00.28 Universal Time (6.28 pm local [Mountain] time). Gradually, the moon's disc traversed across a sun low in the sky. I then impressed our friends with the "colander trick!" Take any colander – it does not have to be a Jamie Oliver special! – hold it up to the sun, allowing the shadow to be cast on a white surface. Projected on the ground are lots of pinhole images of the partially eclipsed sun – quite impressive!

We then moved to a higher spot, to observe the eclipsed, setting sun – the top of a hill above our friend's house. The predicted length of annularity was 3m 33s at Santa Fe, with the altitude of the sun around 5 degrees above the horizon (the duration of annularity on the central line, even at this stage of the eclipse was still relatively long - for instance, nearly 4 and a half minutes in Albuquerque, New Mexico). We observed some interesting effects. It was near sunset, and at a high elevation, the shadows were very long, but

also “fuzzy” around the edges – really extraordinary! I had witnessed a total solar eclipse in Turkey in 2006, and had not seen this effect.

I also obtained a beautiful picture of the annularity before a single cloud managed to strategically place itself in front of the Sun for the rest of the total phase - oh the joys of astronomy!

We then all went back to our friends’ house, for a lovely meal, to celebrate the day. I rounded it off, with some of the most amazingly clear views of the sky I have ever had in my life! The clarity of sky was superb. I observed star clouds at the centre of the Milky Way, and star clusters in the constellations of Scorpio and Sagittarius - too low to be seen properly from the UK. For instance, I had the most beautiful view through binoculars of M6 – an open cluster “like a butterfly with open wings”, my (very old) copy of Norton’s star atlas describes it. A perfect end to a most amazing day and a beautiful experience!

A Busy Summer in Space John Richards

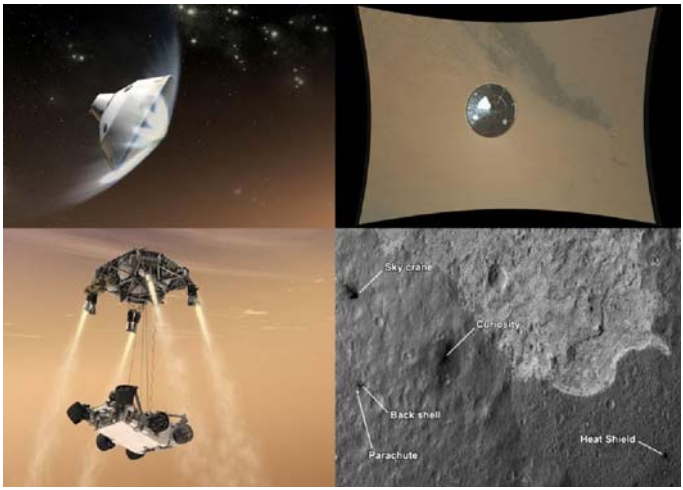
Its been another busy 3 months in space, with rocket launches by SpaceX and the Chinese and spectacular landings by NASA on the Red Planet.

Mars Curiosity

If you were a Martian quietly tilling the land in the Gale Crater on August 5th 2012 (or whatever the equivalent date in the Martian calendar) you would have witnessed a truly spectacular sight.

At 3pm local Mars time (06:17 BST) the Mars curiosity lander, originally launched via an Atlas V rocket from Cape Canaveral on 26th November 2011, appeared on the horizon and within a few minutes had landed on the Martian surface. It is the heaviest probe ever to land on Mars. The lander alone weighs almost a tonne. Due to the weight and others factors such as the thinness of the Martian atmosphere the landing employed a dizzying collection of technologies, some familiar like parachutes and heat shields but also untried technologies such sky cranes and autonomous landing capabilities.

The journey from interstellar space, where entry interface occurred, to actual touch down on the Martian surface took 7 minutes. It has been dubbed “7 minutes of terror” by various NASA engineers. The craft slowed from 14,000 mph to zero in 7 minutes. During the descent, the parachute was deployed at more than Mach 2.4, the craft experienced temperatures of 3,800 degrees centigrade and the craft experienced G-forces of between 11-12.



Charlie Bolden, NASA administrator compared the deceleration of the rover to a car travelling at 70mph and stopping dead in 2 seconds, and the passengers getting out alive with no damage.

What made the landing even more remarkable was that it couldn't be fully tested beforehand.

Remarkably, within 20 minutes of launch the first small thumbnail images (measuring 64 x 64) were transmitted to Earth. Within half an hour, larger images measuring 256 x 256 were received.

This was truly NASA at its very best. Over the next few days, various cameras (there are 17 in total) were activated and sent back stunning images in colour and 3D. The combined mass of the science instruments on MSL (75Kg) is more than 7 times the combined mass of the instruments on Spirit and Opportunity.

As well as 17 cameras MSL contains a laser capable of zapping rocks and soil 23 feet away. A spectrum camera then takes an image to determine the composition of the rock. It is hoped the probe will provide evidence of whether Mars was habitable in the past. The mission is due to last around 1 Martian year (98 weeks). The top speed of the rover in motion is around 4cm per second. To watch an animation showing the landing technique, go to http://www.youtube.com/watch?v=xqqBy7C8gyU

Dragon docks with ISS

There's finally a new player in town. A Dragon space capsule, operated by the SpaceX corporation became the first privately funded spacecraft to launch, dock and undock to the International Space station (#ISS) in late May.

Carrying more than 300 Kgs of cargo,mainly food, the Falcon 9 rocket left Cape Canaveral Air Force Station on 22nd May. The mission performed flawlessly. After a journey of more than 2 days to catch up to the ISS, Don Pettit grabbed the capsule and docked it to the Harmony module. The Russians are reluctant to allow any spacecraft other than the Progress, Soyuz and ATV (ESA's Automated Transfer Vehicle) to automatically dock to the ISS, so its closest unassisted approach to the station was approximately 10 metres.

The SpaceX Dragon capsule was docked to the ISS for 6 days and returned to Earth carrying 650 Kgs of cargo, including redundant equipment and scientific experiments. Since the US space Shuttle was retired, this is now the only vehicle capable of returning cargo to Earth from the ISS. This is because ESA's ATV, Japan's ATV and Russian progress craft burn up on re-entry. The manned Soyuz craft only just has enough room for the returning crew.

China

Shenzhou 9, carrying China's first female taikonaut was launched from the Jiuquan spaceport, located around 1,000 miles from Beijing. Ms Liu and her two male colleagues, Jing Haipeng and Liu Wang, docked with the Tiangong orbital platform to complete China's first manned docking mission. While the Tiangong orbital platform is very small, compared, to say, the ISS, this mission provided a major fillip to the Chinese space program. They remained docked for 13 days, and all 3 returned safely to Earth on the 29th June.

Farnborough 2012

The Farnborough international airshow occurs on a bi-annual basis and was held this year between 9-15 July.

As well as being one of the world's primary showcases for military and commercial jets, helicopters etc, the space and satellite industry is playing an increasing role at the show. It is estimated that the UK space industry has grown by 7.5% in the last 2 years and now contributes more than £9 billion to the UK economy. The government's objective is that by 2030 the UK will grow its share of the global market to 10% of the world total.

The **Space Zone** section at Farnborough has more than doubled its size from 2010, and was attended by most major space agencies and companies including UK Space Agency, ESA, EADS/Astrium, Roscosmos, Surrey satellite technology and Virgin Galactic. In fact pride of place at the Virgin exhibition stand was a full scale replica of spaceship 2. Having stood quite close to the craft, it is an elegant thing of beauty, but smaller than I anticipated.

During the show it was announced that:

Reaction Engines announced the successful completion of their latest series of tests of a key component for a new engine, SABRE, that will enable aircraft to fly anywhere on Earth in under 4 hours, or directly into space and back to deliver satellites and other cargo.

Surrey Satellite Technology Ltd signed a contract worth €80M with OHB for the construction of a further eight navigation payloads for the European Galileo programme.

The Satellite Catapult, a centre for technology and innovation for space is to be located at the Harwell Science Park in Oxfordshire. Up to £10 million has been allocated by the Technology strategy Board to speed up innovation in space over the coming financial year.

Virgin Galactic and SSTL have signed a collaborative agreement aimed at developing a comprehensive launch package for small satellites weighing up to 225kg. The LauncherOne system if designed to take advantage of the WhiteKnightTwo system to reach high altitudes before separating and delivering its payloads to low earth orbit.

UK based **Avanti communications** Hylas satellite broadband system was endorsed by NATO.

UK based **ABSL Space Products** signed a contract for over £1M to supply a second round of batteries to the Galileo constellation programme. OHB-System, the builders of the first 14 spacecraft for the European satellite navigation system, is continuing their

successful partnership with ABSL following the supply and integration of an initial set of batteries for Galileo.

The **International Space Innovation Centre** (ISIC) and the Russian centre for space research and innovation, Skolkovo signed a memorandum of understanding to promote cooperative research and technology development between the two organisations.

Behind the Scenes — David Powell

We have completed the observatory and carried out all work required by Dyffryn. The last few tons of gravel were laid down recently and I must say a big thank you to the stalwarts who wheeled their wheelbarrows without letting heavy rain, high winds, and the cold stand in their way...

We are now able to offer members a chance to use the Faulkes Telescope. This is open to all, but would especially suit junior members because it is set up so schools can use it. So we have the account details and password; come and see me please.

The 2013 one-day Cardiff Astronomy Festival takes place on Saturday May 11th. I already have the three speakers booked. The theme for the day is “The Sun”. We will also have solar scopes working if the Sun plays ball. I am arranging the trade stands and we will have the use of an inflatable planetarium. It takes place at the National Museum of Wales Cardiff and is free.

We are still in talks with Dyffryn Gardens about how we fit in with their future policy. You may be aware the National Trust is taking over and they will be our landlords. CAS see this in a very positive light as NT want to increase the number of paying customers by a huge number and want as many attractions as possible.

We now have a new Solar Telescope. We do many outreach events and it’s a big draw for us. It’s kept at our observatory.

We are trying to sort out events for juniors. We have more than

ever, and feel we must cater for them. Planning is at an early stage but by the time you read this all juniors should have been contacted.

Whenever we see great astro images taken by the likes of Nick Hart, some of us wish we could do something like that. Well, again, we are trying to get started with some astro imaging training. Most likely this would take place on a Saturday morning in the Cory Centre at Dyffryn. We may very well have to charge a small fee to cover expenses, so who would be interested and would like to know more? And who can help us teach this?

We have attended a meeting at the BBC Llandaff to discuss next year's “Star gazing Live”. We are positive it will be even better than last year and CAS will have a big role to play.

The first edition of the newsletter distributed electronically appears to have been well received. This year’s subscription form has a box to tick for those willing to accept future editions this way. But for those who still prefer paper copies, this is not a problem.

I am going to introduce some extra observing sessions on the alternate Thursday evenings. They will take place at Dyffryn and suit the beginners. I intend to give sky talks and use the equipment on site to view the brighter objects.

Some of you may have noticed the library is now tucked away in the corner of our room. We are sorry for any inconvenience this may cause but you can still access it; in fact if you don’t, Joan will want to know why!

We do our best as a committee but we are always open to new suggestions and ideas, so please keep them coming. You can use the suggestion box or approach any member of committee, anytime.

We are a busy society and we will always need more volunteers than we have, so please help us to continue our outreach events. Any volunteer will be given a very warm welcome indeed. Your society needs you.

I do hope that by the next edition Rosa is back from Italy and this column will be back in her capable hands.

Up-coming CAS Public Events

Date	Time	Event	Venue
15th & 16th Sept.	10:00am to 4:00pm	SAFE solar viewing at the European Heritage Weekend	Dyffryn Gardens
22nd Sept.	Evening	Stargazing at St. Fagans	St. Fagans: National History Museum
20th Oct	7:00pm to 9:00pm	Stargazing from a Dark Site	Brecon Beacons National Park Visitor Centre
3rd Nov	6:30pm to 9:00pm	Star Gazers Evening	Dyffryn Gardens
13th Nov	Evening	Brownies Evening	Techniquest
17th Nov	7:00pm to 9:00pm	Stargazing from a Dark Site	Cwmcarn Forest Drive and Visitor Centre
24th Nov	Day Time	Telescope Workshop	National Museum Cardiff
27th Nov	Evening	Cubs Evening	Techniquest

CAS Lectures September to December

Date	Title	Lecturer
6th Sept	Lunar Reconnaissance Orbiter - The Moon Close Up.	Dr Peter Cadogan, Cotswold Astronomical Society.
20th Sept	Johannes Hevelius 1611-1687, The First Telescopic Astronomer.	Dr. Allan Chapman, Oxford.
4th Oct	The Ancestors of Visible Galaxies, They Have Disappeared?. What the H*** is Going on?	Prof Mike Disney, Cardiff University.
18th Oct	Would You Believe - We Put a Man on the Moon?	Jerry Stone, Hertfordshire.
1st Nov	The 50 Greatest Astronomical Images Ever.	Prof Mike Edmunds, Cardiff University.
15th Nov	A Star is Born.	Ciara Quinn, Cardiff University.
29th Nov	A Tail of Two Comets.	Nick Howes, London.
13th Dec	A Starry Night to Remember - Astronomy and the Titanic.	Andy Lound, Birmingham.

Dave's Star Parties

Date	Day	Time	Venue
11th October	Thur	19:30 - 21:30 BST	Dyffryn Gardans/Observatory
8th November	Thur	19:30 - 21:30 GMT	Dyffryn Gardans/Observatory
14th December	Fri	19:30 - 21:30 GMT	Dyffryn Gardans/Observatory

Almanac Compiled by Ian Davies

Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
01st September	03:20	05:25	18:59	21:04
08th September	03:36	05:36	18:44	20:44
15th September	03:51	05:47	18:28	20:24
22nd September	04:04	05:58	18:11	20:05
29th September	04:18	06:10	17:55	19:47
01st October	04:21	06:13	17:51	19:43
08th October	04:33	06:24	17:35	19:26
15th October	04:45	06:36	17:20	19:11
22nd October	04:57	06:48	17:05	18:57
29th October	05:08	07:00	16:51	18:44
01st November	05:12	07:06	16:46	18:39
08th November	05:23	07:18	16:34	18:29
15th November	05:33	07:30	16:23	18:20
22nd November	05:43	07:42	16:15	18:14
29th November	05:52	07:53	16:08	18:09

Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
08th September	Piscids	00h36m	+07°	10
21st September	Piscids	00h24m	+00°	5
13th October	Piscids	01h44m	+14°	??
22nd October	Orionids	06h24m	+15°	25
03rd November	Taurids	03h44m	+14°	8
18th November	Leonids	10h08m	+22°	10

Observers Club Meetings

Date	Day	Time	Venue
28th September	Fri	20:00 - 22:00 BST	Black Cock Inn
26th October	Fri	20:00 - 22:00 BST	Black Cock Inn
30th November	Fri	20:00 - 22:00 GMT	Black Cock Inn

Observing Sessions

Date	Day	Time	Venue
7th or 8th September	Fri or Sat	20:30 - 24:00 BST	Dyffryn Gardens
21st September	Fri	20:00 - 24:00 BST	Castle Heights Golf Course*
5th or 6th October	Fri or Sat	20:00 - 24:00 BST	Dyffryn Gardens
19th or 20th October	Fri or Sat	20:00 - 24:00 BST	Castle Heights Golf Course*
9th or 10th November	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
7th or 8th December	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
21nd or 22nd December	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*

NOTE Where two dates are given we will attempt to hold the session on the first date, weather permitting, otherwise we will try again on the subsequent date. All dates are subject to weather conditions. For confirmation of any session please check on the CAS Web site or the CAS Observing line 07817 723 883 for more information.

* Due to the current situation at Castle Height Golf Club the venue for the observing Sessions at Castle Height Golf Club are provisional and may be changed if circumstances require.

Almanac September

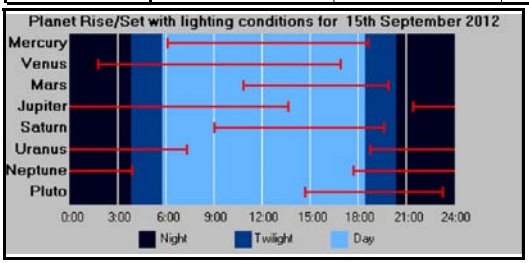
New MOON
16

First Quarter
22

30
Full Moon

8
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Virgo	11h49m09s	+02°38'01"	06:05	18:37	-1.3
Venus	Cancer	08h45m28s	+17°04'03"	01:44	16:52	-4.2
Mars	Libra	14h48m06s	-16°53'18"	10:46	19:53	+1.2
Jupiter	Taurus	04h58m31s	+21°52'27"	21:23	13:36	-2.4
Saturn	Virgo	13h45m58s	-08°30'19"	08:58	19:37	+0.5
Uranus	Cetus	00h27m20s	+02°08'09"	18:44	07:15	+5.7
Neptune	Aquarius	22h22m34s	-10°47'47"	17:45	04:04	+8.0
Pluto (Dwarf)	Sagittarius	18h28m42s	-19°37'50"	14:46	23:21	+15.0



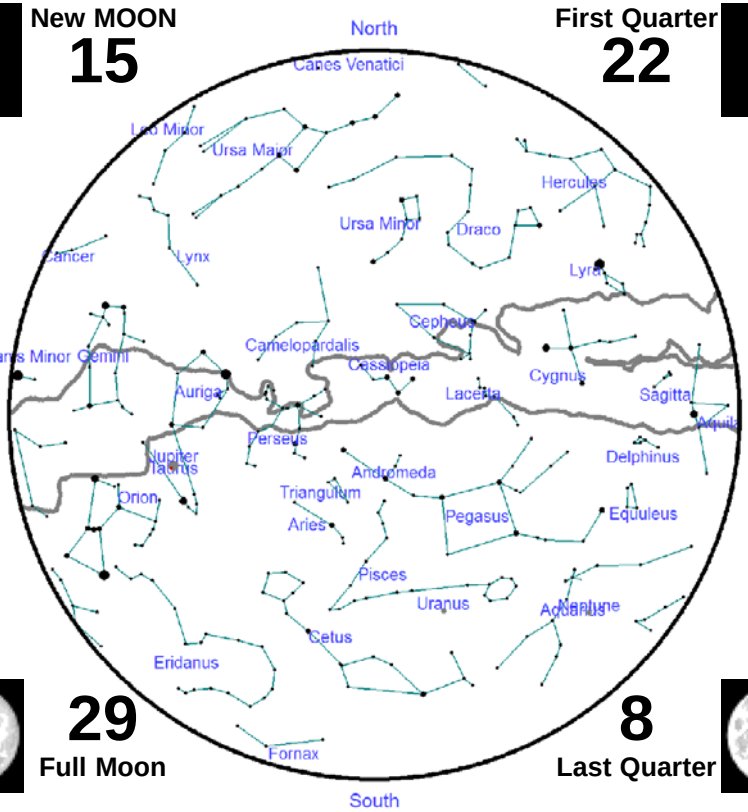
Planet Events

10th Mercury at Superior Conjunction
29th Uranus at Opposition

The data presented here is for the 15th September, positional data is at 00:00 GMT/UT

Almanac October

New MOON
15

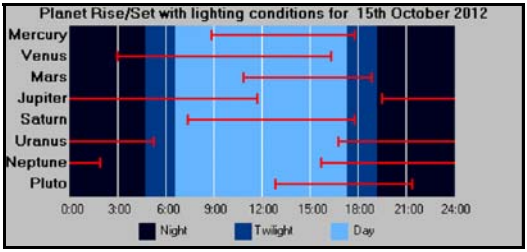


First Quarter
22

29
Full Moon

8
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Libra	14h41m53s	-17°48'12"	08:47	17:44	-0.2
Venus	Leo	11h01m42s	+07°17'45"	02:56	16:16	-4.1
Mars	Scorpius	16h14m03s	-22°09'24"	10:47	18:48	+1.2
Jupiter	Taurus	05h00m25s	+21°53'53"	19:27	11:40	-2.6
Saturn	Virgo	13h58m55s	-09°44'58"	07:20	17:46	+0.5
Uranus	Pisces	00h22m58s	+01°40'04"	16:44	05:10	+5.7
Neptune	Aquarius	22h22m42s	-10°47'00"	15:48	02:07	+8.0
Pluto (Dwarf)	Sagittarius	18h29m31s	-19°43'37"	12:49	21:23	+15.1



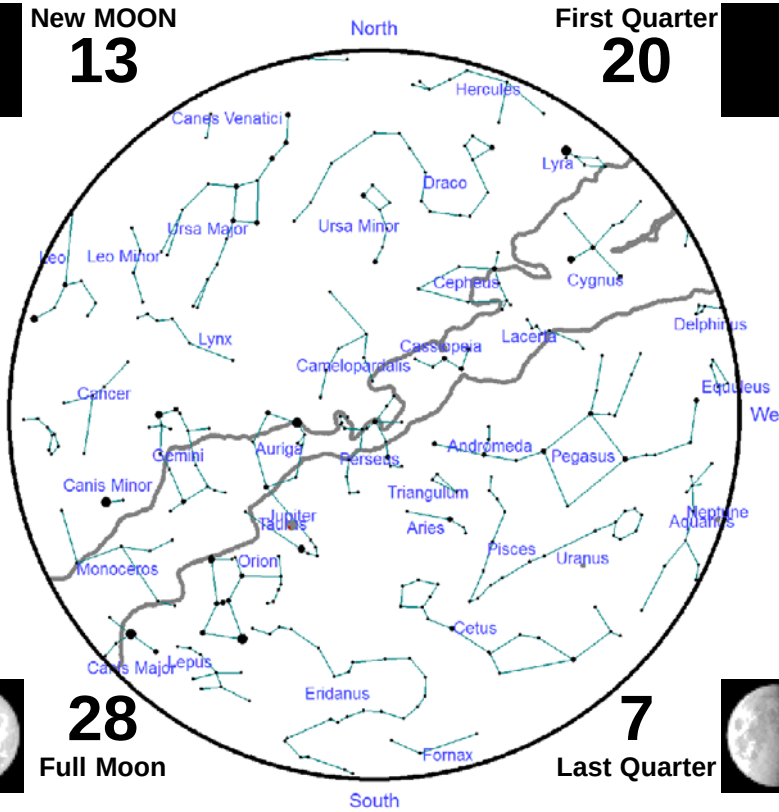
Planet Events

25th Saturn at Conjunction
31st Venus at Perihelion (0.72 A.U.)

The data presented here is for the 15th October, positional data is at 00:00 GMT/UT

Almanac November

New MOON
13

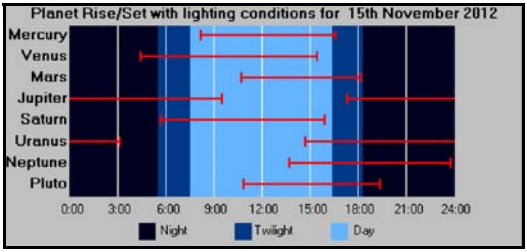


First Quarter
20

28
Full Moon

7
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Libra	15h47m29s	-20°27'50"	08:07	16:31	+3.6
Venus	Virgo	13h21m26s	-06°39'05"	04:24	15:22	-4.0
Mars	Sagittarius	17h53m00s	-24°31'59"	10:40	18:08	+1.2
Jupiter	Taurus	04h49m35s	+21°37'22"	17:16	09:26	-2.8
Saturn	Virgo	14h13m09s	-11°00'24"	05:39	15:51	+0.5
Uranus	Pisces	00h19m20s	+01°17'29"	14:40	03:03	+5.8
Neptune	Aquarius	22h22m51s	-10°46'14"	13:46	00:01	+8.0
Pluto (Dwarf)	Sagittarius	18h32m17s	-19°47'27"	10:50	19:23	+15.1



Planet Events

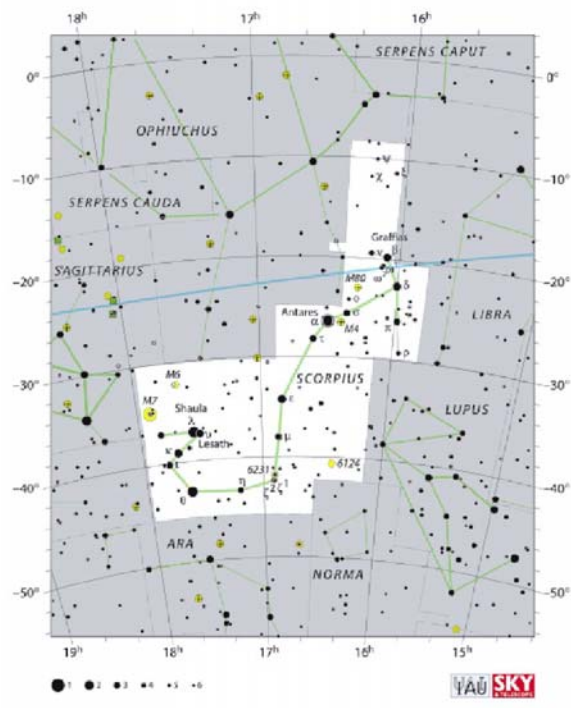
17th Mercury at Inferior Conjunction.
21st Mercury at Perihelion(0.31 A.U.).

The data presented here is for the 15th November, positional data is at 00:00 GMT/UT

The Junior Page

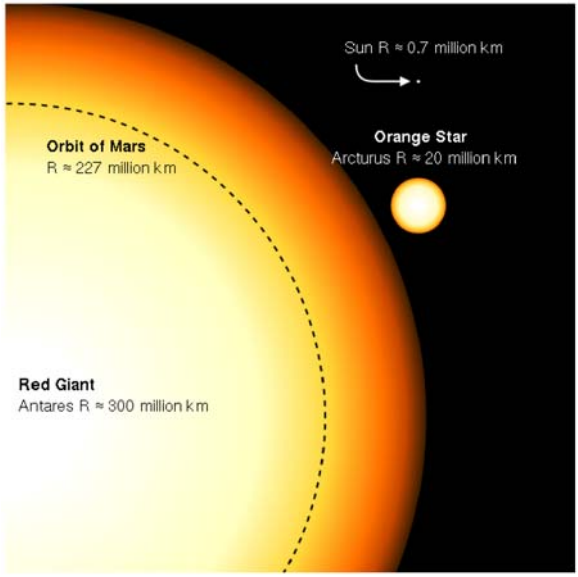
Scorpius

Amanda Peters



The constellation of Scorpius the Scorpion is low down in the Summer skies from the UK. However its brightest star Antares is easily seen in the night skies as it has an obvious deep orange colour. The Babylonians knew the constellation as a Scorpion before the Greeks and called it MUL.GIR.TAB

In mythology Scopius killed Orion the hunter. Orion had boasted that he could kill any creature in the world so to punish his boastfulness the Goddess Artemis sent a giant Scorpion to put his boast to the test. Orion battled the Scorpion for many hours but just as he stabbed the Scorpion in the heart the Scorpion stung Orion on the shoulder and they both died together. Artemis placed them both in the sky but on opposite sides so they could never fight again. Orion is therefore seen in the Winter and Scorpius in the Summer. Betelgeuse in Orion is said to be where the Scorpion stung him and Antares in Scorpius is where Orion stabbed the Scorpion.



Both Betelgeuse and Antares are red supergiant stars and will at some time in the future, explode as supernova. Antares means rival of Mars as its colour has a similar deep orange to the planet Mars. The ancient Egyptians associated it with the Scorpion Goddess, Serket. To the ancient Mesopotamians it was GABA GIR.TAB, the Breast of the Scorpion. Antares has a companion star that observers have described as being green. It is about 550 light years from Earth and is a variable star just as Betelgeuse is and would extend to between the orbits of Mars and Jupiter if placed in our solar system.

The two stars on either side of Antares are known as the out works of the heart as Antares was considered to be the heart of the Scorpion. Not far from Antares is a Globular cluster,M4,which is about 7,200 light years away. It can be seen as a fuzzy ball of light in small telescopes. Other deep sky objects are the open clusters M6 (Butterfly cluster),M7 (Ptolemy cluster) and NGC 6231. Another globular cluster is M80. The star clouds of the Milky Way are very bright here and the centre of our Galaxy is not far from the constellation.

M6 (Butterfly cluster), M7