



Part of the CAS A-Team all ready to start off on this January's BBC Stargazing Live extravaganza.
Photo: Roger Butler

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Editorial

Ian Davies

I write this after a busy few days, it all started on a Thursday evening with the first Dave's Star Party that has not had to be cancelled due to the weather. The Party proved highly successful for the two dozen or so people that turned up to hear Dave talk in his usual inimitable way. All went home entertained and with more knowledge than they came with.

This was followed the following night with the hunt for 2012-DA14 the small (45m) asteroid that came close (About 3.5 Earth radii of the Earth's surface) to Earth on the 15th February. The skies weren't particularly favourable , nor the circumstances of the encounter from the UK with 2012-DA14 being very low down in east when it was at its brightest. So unfortunately we did not manage to identify it, but we tried!

And then the following night we were booked to do a public event for the National Museum at St. Fagans. This again was successful despite the weather nearly thwarting any actual observing. The skies did clear towards the end of the event and everyone had views of the Moon and Jupiter. Inside we had our stand, where we dished out various handouts and advice. Everyone went home happy.

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 163 is 16th May).

Visit CAS on the web @

<http://www.cardiff-astronomical-society.co.uk>

General enquiries email info@cardiff-astronomical-society.co.uk

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**



CAS on facebook at

<http://www.facebook.com/CardiffAS>

The Annual General Meeting is on Thursday April 18th.

The current committee are running flat out and we urgently need new blood. The key word is “**ENTHUSIASM**”. At the very least we need two ordinary members to help run your society.

So how can you apply?

Our rules say, “Any member wishing to apply for committee membership shall complete a nomination form, supported by not less than two ORDINARY members, which must be received by the secretary not less than **fourteen** days before the date of the AGM”.

I have the forms; you or I can sort out the support required. Completed forms needed by Thursday April 4th.

Please help us to run your society.

Dave Powell Secretary.

Space Flight Round-Up John Richards

In ORBIT.....

Lots of exciting news to report, including space launches by North Korea and Iran, and drilling on Mars.....

NASA wants to blow up the Space Station?

Bigelow aerospace has signed an \$18 million contract with NASA to add a new module to the International Space Station (ISS). What makes this development truly revolutionary is that the module will be an inflatable crew compartment.

The Bigelow Expandable Activity Module (BEAM) will be launched aboard a Space X Falcon 9 rocket as part of its Commercial Resupply contract SpaceX has with NASA. It will be the 8th resupply mission and will launch in late 2015. BEAM will weigh 3,000 lbs (1,360 Kgs), and once the Dragon capsule has docked with the ISS, the Canada arm will remove BEAM and attach it to the Tranquility node of the ISS. Once successfully docked, BEAM will



Artist's impression of BEAM after deployment

expand to its full length of 13 feet (diameter is 10.5 feet or 3 metres). Once BEAM is inflated, the crew of the ISS will enter the new habitat. The BEAM 'skin' is made of Kevlar and has been in development since Bigelow bought the technology from NASA in the late 1990's. BEAM will be docked to the ISS for up to 2 years, to

examine the feasibility of inflatable modules in space.

Mini Space Shuttle launch

The X-37B spaceplane, otherwise known as the "mini space shuttle" launched for its third test flight in early December 2012. It was launched atop an Atlas V rocket from Launch complex 41 at the Cape Canaveral Air Force Station.



During its 2 previous missions the X37-b has spent more than

693 days in orbit. The X-37b is $\frac{1}{4}$ the size of NASA's recently retired space shuttle, (29 feet long, wing span is 15 feet) and its missions are highly classified. After spending, an as yet unknown time in space, the X-37b will return to the Earth, autonomously landing on a conventional runway at the Vandenberg Air Force base in California.

NASA Memorial

On February 1st NASA paid tribute to the crew of Apollo 1 (killed by a fire during a live "plugs-out" test in 1967), as well as the astronauts



The Space Mirror memorial at the Kennedy Space Centre

of Space Shuttles Challenger and Columbia by holding its annual Day of Remembrance. This date also marked the 10th anniversary of the Columbia disaster. As well as fallen astronauts, NASA honours people who have lost their lives, while furthering the cause of exploration and discovery. The main ceremony was held at the Space Mirror

memorial located at the Kennedy Space Centre and was attended by NASA administrator Charlie Bolden, current astronauts as well as the families of fallen crew members.

Next Progress resupply mission to ISS

The next Progress mission to resupply the International Space Station (ISS) is scheduled to lift off from the Baikonur cosmodrome in Kazakhstan on February 11th. It is scheduled to be the 1st of 8th resupply missions to the ISS in 2013. Its cargo manifest consists of food, clothing, oxygen, water (different supplies for the Russian and other crew members), replacement parts and fuel. This cargo will be removed by the astronauts and replaced with rubbish accumulated aboard the ISS. The Progress craft will then undock from the ISS, and will burn up in the upper atmosphere in early April.

NASA joins ESA Euclid mission

NASA will contribute 16 infra-red detectors and 4 spare detectors for one of the 2 science instruments on board Euclid. The Euclid mission is due to launch in 2020, as part of the ESA cosmic vision 2020-2025 program. The probe is designed to study the mysterious dark matter and dark energy that pervades the Universe.

In Brief

The latest launch from the Odyssey Launch platform failed on 1st February. The Zenit-3SL rocket, carrying the Intelsat 27 communications satellite left the platform, but the flight only lasted

around 40 seconds, before a problem with the first stage caused the rocket and its payload to crash into the ocean.

Iran successfully launched a monkey into space on a sub-orbital flight on 28th January lasting about 20 minutes. Also, North Korea has launched its first satellite into orbit. There is some disquiet as to the real intentions of these launches. Iran and North Korea say they are to advance science in their countries, while other observers see these missions as just thinly veiled long range mission tests.

There were also successful launches by South Korea (its first) and Japan.

And finally, the Mars Curiosity rover has for the first time used its



drill to excavate a sample of rock from the Martian surface. NASA is hopeful that this mission will determine, once and for all whether Mars had (or has) the capability to sustain life.

For more information about rocket launches, and space science in general, visit <http://www.stff.co.uk>

SGL (and all that jazz !)

**Roger Butler
Chairman**

SGL – Star Gazing Live (not to be confused with Star Gazers' Lounge) - seems to have been in our vocabulary and on our annual cycle of events for a long time. In fact, SGL 2013 was only the third year that the Beeb had encouraged the viewing masses to get out there in the dark and look upwards. As usual they put Brian Cox on the box, accompanied by his jovial sidekick Dara O'Briain. The one, a professional astrophysicist from Manchester University to provide authority with a smile, and the other, a graduate in maths and physics, better known to the audience for his larger than life comedy, to give a helping hand to the awestruck viewer. The 'Cheshire cat ' and the 'Moon' format works well and remains unchanged.

The ultimate and laudable objective of SGL is to urge the people to forsake their couches, warm lounges and bright interiors for a couple of hours and make the effort to go outside, in the dark and the cold, to see for the heavenly wonders for themselves. And so, following on from the programmes, a large number of stargazing events are staged throughout the country to introduce the people to the sky at first hand. And this crucial aspect has proved hugely successful. The 2011 and 2012 events that CAS held at Dyffryn Gardens completely exceeded all expectations as 500 car loads arrived each time to see what was on offer. And they were not disappointed. In 2010, the skies were near perfect, the CAS volunteers coped very well with the numbers and all went away satisfied that stars have been seen, telescopes had been employed, questions asked and resolutions made to go out and look upwards more often. In 2011, the skies were less clear but breaks in the patchy clouds still allowed the hoards to gaze at the stars, which duly worked their magic, prompted questions and captured imaginations. So what of SGL at Dyffryn in 2013 ? – well, we need to consider two other events earlier that week first.

BBC Wales had decided to promote a huge SGL event in South Wales. There was talk of 3000 attendees and various locations were considered. These ranged from the National Botanical Gardens, near Carmarthen, to Swansea Bay, and Newport. We had hoped that our base at Dyffryn might have been selected, building on our previous experience and successes. But in the event, it was decided to locate at the Riverfront Centre in Newport. Not really any astronomer's first choice for star gazing due to the immense levels of lighting in that area. However we agreed to take part and SGL was scheduled for Wednesday January 9th. There were to be two sessions, 4.30pm and 7pm with 700 free tickets for each. And very quickly all the tickets had gone !

The usual CAS suspects pitched our stall in the foyer and we set up an extended display to attract the public as they made their way into the theatre for a series of short talks. Pride of place went to the magnificent model of a Saturn V rocket, which Ian Davies painstakingly created a while ago. It is good to include this on our

stand as it always creates a huge impact with the public. However, it is very fragile and so, to avoid a huge impact of a different sort, the model was well protected behind a rope barrier. Our Vice President, Professor Mike Edmunds, was there to present one of the talks as was our longstanding friend, Martin Griffiths, from University of Glamorgan. A large contingent of enthusiastic students from UniGlam were also there to promote the Faulkes



Rage against the Light

Telescope facility with Paul Roche and to set up telescopes outside, at the back of the Riverfront on the banks of the Usk.

CAS also set up their telescopes outside, ready to show the public the splendor of the heavens as soon as it

got dark. Claude Vallée mounted the large binoculars on their tripod, Rob Love had his telescope ready and waiting, Mark Major had his Meade reflector pointing east to catch the first stars as they emerged above the horizon and I was in charge of the society's Dobsonian. Unfortunately Bob Biss, our director of observations could not be with us and so this was my first chance to get to grips with this telescope which I found very rewarding.

It was past 4.30pm when the doors were flung open and the queuing masses began flooding into the foyer. There were lots of attendants in BBC high visibility vests to show them where to go and what was on offer and suddenly we became very busy.

Outside, it was only just beginning to go dark and so we waited. We watched as several large tree trunks floated by on the river, only to see them all again shortly afterwards floating passed the other way as the tide turned. First up in the sky was Jupiter and soon all scopes were locked onto it. The equatorial belts were clearly visible and there were three of the Galilean moons – the other one would eventually emerge shyly from behind the disc of the planet. As Jupiter rose majestically, it became apparent that there was considerable light pollution over the opposite bank and a bank of cloud that seemed to be following the planet. And so the stars of Orion's belt were snuffed out as soon as they appeared and we

were left with just Jupiter. Nothing else became visible all evening. The rear of the Riverfront is far from ideal for observing since it faces ENE which means that there is only a short time to observe any object before it disappears behind the roofline of the centre itself. Also the rear terrace is a public walkway with overhead lighting which could not be switched off and so, as the Earth turned, Jupiter became occulted with a large bright light, forcing us to move our scopes, more than once !

Would we have anything to show the 1400 people, eager to witness the sights as described by Brian Cox ? Well yes ! It was Jupiter or nothing, but this was so spectacular that the hundreds that queued up to look through the eyepieces were not disappointed. I soon learned that when an 8 year old replies “ Yes” when asked if they can see the dark bands and the moons, you know he has not seen them. When an 8 year old shouts “Wow !” and nearly falls of the stepladder, you know they have definitely seen them. And there were so many “Wows”, from children and adults alike, that we knew we had succeeded in what we had set out to do. But half way through the second session, and just before it was about to disappear behind the roof, Jupiter gave up the struggle and was snuffed out by total cloud cover. CAS members and the UniGLam students had put on a great show – so rather a pity then that our efforts were billed in the programme as being by the Open University.

Nothing else to do but pack up and head off inside (into the warm !) and see how other colleagues were doing. Our stand had attracted a lot of interest, many questions and quite a few new members. A lady from Pontypool said she already had an observatory in her garden, complete with 12 inch Meade LX200 – and could we help her to learn how to use it ? I am sure we will oblige.

It had been a worthwhile but tiring venture and we were glad to take our displays apart, pack away the Saturn V for another day, and depart by 10pm. We reassembled the following night for the next lecture in our current series given by Martin Griffiths (It’s That Man Again !), talking about star clusters, jewels of the night.

On the Saturday we were double booked: not only were we due to

host our own SGL night at Dyffryn but we had agreed to be present at the daytime SGL event at the National Museum of Wales. Twice previously, we had declined an invitation by the museum, feeling that we were already fully committed to our own SGL on the same



St Joan, Maid of Heaven

day. But this year, Joan Thomas, our librarian, volunteered to man / woman our stand from 10.30am until 4pm. I arrived just after 10am and Joan was already in residence, and I soon had our display boards erected and ready for the day's visitors to the museum.

The foyer was a hive of activity with representatives from the Faulkes Telescope, Cardiff University, University of Glamorgan, the Museum Geology Department, Swansea Astronomical Society and others all in attendance. When I returned at 4pm to pick up the displays to take them to Dyffryn, Joan was still behind her stall, chatting to interested visitors. She looked elated but very tired, having soldiered on, on her own, all day. The table was now bare as all the literature had been taken. Being a wet Saturday, so many had headed to the Museum – where else can you go in Cardiff that is free, dry, warm and always has lots of interesting things to see ? – and over 3000 people had come through the doors that day. The scene must have been like Horatius at the Bridge with Joan, single-handed, dealing with masses of enquiries. We are immensely grateful to Joan for this magnificent effort and we have vowed that, should the National Museum hold another SGL day, we will make sure there are sufficient resources and volunteers to cope. I look forward to CAS taking over the whole of the foyer of the museum on Saturday May 11th, when we hold our biennial Astrofest.

So onwards to Dyffryn and our very own big SGL night. Would the public turn out in their droves as previously ? Would there be anything for them to gaze at as the clouds had covered the skies all day long ? And the forecast for the evening was 'continuous rain'. Whatever – the show must go on !

Sadly, it was third time unlucky ! The rain won, nothing in the sky could be seen, and it was too wet to mount any telescopes outside or even to open the roof of the observatory. As seasoned campaigners, we were ready for this contingency and had the Cory Educational Centre all prepared for a series of short talks, equipment demonstrations and opportunities for questions and discussions. Theresa took charge of a full complement of volunteers, who were briefed and ready to greet whoever ventured along the drive at Dyffryn Gardens. In the event, around 50 brave souls emerged, in dribs and drabs, out of the darkness and swirling rain. Perhaps drips and drabs would be more accurate.



Dyffryn talks

Nevertheless, we gave them a show, with short introductory talks by Mark Major, Dave Powell and myself, and everyone seemed resigned to not being able to observe anything and quite happy to chat informally with members of the volunteer team. Over in the observatory, Ian Davies did a great job

in demonstrating the telescope and computer systems to small groups, as best he could without being able to open the roof. Eventually the trickle of visitors dried up – in contrast to the weather outside that continued to pour down with rain. I was pleased to recall that we do our bit for the environment by harvesting the rain that falls on the observatory roof, for future use in dry spells at the gardens.

So time to pack away again. Under Theresa's direction, soon everything was being dispatched through the doors, loaded into waiting cars, and whisked away into the night. We had done our best and those that had come had been most appreciative. They understood the frustrations we frequently endure in order to observe in the British climate. But SGL was over for another year.

Will there be an SGL in 2014 ? Who can tell ? These initiatives have a limited shelf life and the fickle public will soon look for something new. The IYA – International Year of Astronomy was the exciting new venture of 2009 to celebrate 400 years since the invention of the telescope. It was extended to the following year and then extended

again, only to fizzle out as the world moved on. Professor Brian Cox has moved on already to present programmes on other science topics, even encroaching on sacred Attenborough territory. Dara O'Briain is in great demand in a wide variety of TV contexts and could well be unavailable in January 2014. But if the BBC does revive SGL again next year, we will be there and hopefully we can persuade the BBC Wales to hold their next event at Dyffryn.

Of course, before the possible reappearance of SGL in 2014, the BBC has to decide the long term future of the Sky at Night, now it's doyen, Sir Patrick Moore is no longer with us. Will his anointed successor Chris Lintoff become the anchor for the programme? Or will it be Brian May or even Mylene Kass? Or perhaps the ubiquitous Dara O'Briain? Watch this space.....

As always, a huge vote of thanks is due to all our volunteers who made SGL happen. The number of volunteers is the only limitation on the amount of outreach events we can manage. It is a most worthwhile and important aspect of the activities of CAS – and hugely enjoyable too; so do come and join us.

Astrocamp Ashdown Forest

Astrocamp is an astronomy camp that has been held for many years in Ashdown Forest, East Sussex. A lot of the people who attend are from societies in the South East but any society is welcome to come along.

The camp itself is on a private campsite called Hindleap Warren. There are two camping areas between them is what is known as the Telescope field. The site is surrounded by trees and there is a lot of wildlife in the area. Deer are often seen, various birds including Tawny Owls which are often heard at night and basking Adders.

The skies are dark and the Milky Way can be seen from the campsite.

Ashdown Forest is where A.A.Milne based his Winnie the Pooh stories. There is a Pooh walk and you can play Pooh sticks at Pooh Bridge. The Forest was once a Royal hunting forest and there are many walks of varying lengths across the area.

The nearest village to the campsite is Forest Row and nearest Town, East Grinstead.

This years camp takes place from Wednesday 31st July till Wednesday 7th August.

On the Saturday a star BQ will be held.

If any-one is interested in coming please Contact John Bush : john.bush2@ntlworld.com

Lets hope the weather is good.

Rary gets a new bathroom. David Powell

I knew straight away something was wrong. The moment I parked the car on the driveway, hairs stood up on the back of my head, a cold shiver went right up my spine. The giveaway was the builders van parked next to me.

I rushed in hoping against hope I may be able to stop Mrs Powell from doing something rash. Fat chance, I have spent 36 years practicing, so far without success.

"So that's a new floor, heated towel rail, complete new bathroom suite, wall tiles, new ceiling, lighting, window, and power shower."

"Don't sign anything." I say.

"Oh hello love, don't worry, I will sort everything out." she says.

"At least think about it. What about the wall and floor tiles, don't I get a say."

"Of course you do."

"Well, what about this style?" I say.

"To dark."

"Ok this lot?"

"To light."

"This colour?"

"To cold."

"This type?"

"Makes the room look small."

With that, the builder comes back in the room and says. "So Mrs Powell, having chosen everything I reckon we could start in three weeks."

That evening over dinner things are quiet. "Come on Dave, you said yourself it needs doing."

"When? I don't remember saying that, I mean it doesn't seem that long ago since it was done."

"It was 20 years ago." she said.

"Well it doesn't look in bad nick."

"Oh do stop sulking, and finish your pudding." she says.

"Well at least we won't need a new door stop." I mutter.

"What was that? what did you say?"

"Nothing, I think I will get some observing in tonight, might even see Rary."

Now anyone who has a cat will know, they don't like change; I don't like change, but Rary!!

The day dawns, in come three guys, and start tearing the bathroom to bits. I offer Mrs Powell some advice. "Whatever you do, don't keep offering them cups of tea and biscuits, it just slows them up."

"Ah there you are, make yourself useful, and call the men down for a tea break."

Down came three huge guys in overalls that must have seen 100 jobs or more. They put dust sheets down over the stair carpet and still manage to coat the carpet in Polyfilla. Half an hour later, they decide to get back on the job. Two minutes later, one guy comes down. "Have you got a cat?" he asks.

"Yes, why?"

"He's in the bath, my mate just woke him up and he won't budge."

Rary always has 40 winks about this time of the morning, and quite often it's in the bath.

"Well we have to take the old bath out."

"Could you come back in about an hour?" I ask.

"Dave just go up and move the cat." Mrs Powell hisses though clenched teeth.

"OK OK, give me your marigold gloves."

"What?"

"Look you can't move him unless all bits of naked flesh are covered." I say.

The guy, smirks. "look mate as long as you say it's alright, we will shift him, a quick bang on the bath side with this lump hammer will do the trick."

"Now hold on, you cant do that sort of thing, and anyway, now the



job is started I cant afford anyone of you taking time out to visit A&E at the local hospital."

Before I could say another word, BANG, one second later Rary comes down the stairs hell for leather.

"See" says Mrs Powell, "It doesn't do any good treating that cat gently."

Before I can reply Rary is followed down the stairs by one of the gang holding the back of his head, screaming. "He got me, he got me."

Mrs Powell is embarrassed and horrified, the last time she was in this state, was after seeing our wedding photos, well the one of me kneeling at the altar, the soles of my brand new shoes showing up well. The left sole had the letters HE, the right sole LP. I myself was just horrified, after all this would delay the job.

We patch the guy up, gave him a cup of sweet tea and asked "What happened?"

"How does he do that?"

"Do what?" I ask.

"I hit the side of the bath and he just sat there, so we pick the bath up to tip him out and he jumps on my head holding on with his claws. My mate told me to stand still, but he was so heavy, so I hit him with a wall tile, it breaks and the sharp bit cuts my head open."

"I hope you have spare tiles?" I say. "He likes sleeping on the toilet as well."

A couple of days later the job going well, they put up the new bathroom cabinet. They made so much noise; I thought they had used the lump hammer again. They down tools, for the day and when they have left we inspect the work done so far. Mrs Powell is pleased, so that's ok then, we go to bed leaving the cabinet doors

open. I get up and shut them. Next morning back come the boys. We sit downstairs quietly having breakfast.

AAAAAAHHHHHHHH, thud, down the stairs comes Apache (my name for the guy we patched up) he is wearing (he calls it a bandanna) I call it a blood soaked bandage, closely followed by a second guy. "What are we going to do about the toilet?" he asks.

Mrs Powell and I look at each other, the first guy is now in the van, the second guy is pleading with him to come out, and we find the third guy mopping the bathroom floor. "What happened?" I ask.

"The boss opened the bathroom cabinet, and that cat was sat inside, the boss drops the lump hammer in fright, which in turn cracked the new toilet bowl."

Tomorrow they will bring another toilet bowl. That night Mrs Powell and I had a little chat about things.

"You know love, I must admit, it did need doing, and will look really nice when finished." I say.

"By the way, where is Rary?"

"Asleep in the new bath." I say.

"Well promise me you will get up early and move him out of the men's way or we will never get to see it finished....."

Behind the Scenes

Rosa Adams

The last couple of months have not seen any lessening of CAS' busy outreach schedule, with requests to attend events received frequently and from diverse sources such as schools, guide groups and organisations like St Fagans and Dyffryn gardens.

Thanks to good planning and a stalwart band of volunteers CAS is able to oblige many of these requests. If you would like to volunteer to help at an event then you can do so online on our website.

During January we held our annual stargazing live event in conjunction with the BBC at Riverfront theatre Newport. A clear and very cold night we were able to set up our telescopes on the terrace and observe Jupiter and its moons, a successful and enjoyable

night for everyone. A few days later we held our own SGL event at Dyffryn Gardens and our own observatory, Unfortunately the rain and snow lashed down, the wind blew and the public stayed home except for a hardy few, but that's astronomy UK style.

One event deserves a special mention. The National Museum of Wales invited CAS to take part in their SGL event but clashing with our own we had to refuse except for Joan that is, whom most of you know as our librarian and poser of pithy questions to our speakers. Joan set up a stall at the museum and used the opportunity to bring the question of light pollution before over 3000 visitors. Joan manned her post all day alone. Now that's dedication and it is to be hoped a goodly number will take her message to heart.

The end of 2012 saw us at The Deri, a pub where we held our Christmas meal. We had a full house and an excellent dinner. Any suggestions for alternative venues let me know and I will happily check them out.

Also towards the end of 2012 we were invited to hold an event at Cwmcarn forest drive just outside Newport. It is an excellent site and is becoming a regular venue. We have been very lucky as each time we visit the skies are dark and clear. It certainly adds to the atmosphere when after the talks, a long line of cars snake up the mountain to the observing site where we are treated to hot food, starry skies and an appreciative audience.

Back in Dyffryn gardens we now have our storage shed up and running, a replacement for the old Castle Heights container it means we can store our equipment safely and close to the observatory.



Inside the new storage unit, before our equipment took up residence.

Lastly don't forget our website where you can find information on all things CAS. For anyone who has forgotten it, your password is surname followed by membership number.

Up-coming CAS Public Events

Date	Time	Event	Venue
16 th Mar	11:00am to 4:00pm	Discovering the Universe with a Telescope	Dyffryn Gardens (Cory Education Centre and CAS Observatory)
23 rd Mar.	7:00pm to 9:00pm	Stargazing from a Dark Site	Brecon Beacons National Park Visitor Centre
11 th May	10:00am to 4:30pm	Cardiff Astronomy Festival	National Museum Cardiff
27 th July.	10:00am to 4:00pm	SAFE solar viewing	Brecon Beacons National Park Visitor Centre
5 th Oct.	7:00pm to 9:00pm	Stargazing from a Dark Site	Brecon Beacons National Park Visitor Centre

CAS Lectures March to July

Date	Title	Lecturer
7 th March	Alien Worlds.	Dr. Marek Kukula, Royal Greenwich Observatory. London
21 st March	The Science of Armageddon - An Update.	Jay Tate, Spaceguard, Knighton, Powys.
4 th April	The European Extremely Large Telescope.	Prof Mike Merrifield, Nottingham University.
18 th April	Annual General Meeting.	Cardiff Astronomical Society
2 nd May	Observing Black Holes - Photons from the Edge.	Dr Andy Young, Bristol University.
16 th May	John Goodricke, Deaf and Dumb Astronomer – My Hero.	Dave Powell MBE, Cardiff Astronomical Society.
30 th May	Images of the Universe, Volume 1.	Paul Money, Horncastle, Lincolnshire.
13 th June	Astro Imaging from your Garden, Evenings in the Company of Hedgehogs.	Grant Privett, Wiltshire.
27 th June	Massive Collisions in the Solar System	Dr Paul Roche, Glamorgan University
11 th July	Three Short Talks.	Members of Cardiff Astronomical Society.

Dave's Star Parties

Date	Day	Time	Venue
14 th March	Thursday	19:30 - 21:30 GMT	Dyffryn Gardens/Observatory
11 th April	Thursday	19:30 - 21:30 GMT	Dyffryn Gardens/Observatory
9 th May	Thursday	19:30 - 21:30 GMT	Dyffryn Gardens/Observatory

Almanac Compiled by Ian Davies

Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
01 st March	05:07	06:58	17:51	19:42
08 th March	04:51	06:42	18:04	19:55
15 th March	04:34	06:27	18:16	20:08
22 nd March	04:17	06:11	18:28	20:22
29 th March	03:58	05:55	18:39	20:36
01 st April	03:49	05:48	18:44	20:43
08 th April	03:29	05:32	18:56	20:59
15 th April	03:08	05:17	19:08	21:16
22 nd April	02:46	05:02	19:19	21:35
29 th April	02:23	04:48	19:31	21:57
01 st May	02:16	04:44	19:34	22:03
08 th May	01:49	04:32	19:46	22:28
15 th May	01:19	04:21	19:56	22:58
22 nd May	00:29	04:11	20:07	23:49
29 th May	--:--	04:03	20:16	--:--

Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
12 th April	Virginids	14h04m	-09°	5
22 nd April	Lyrids	18h08m	+32°	12
28 th April	alpha-Scorpiids	16h32m	-24°	5
06 th May	eta-Aquarids	22h20m	-01°	35
13 th May	alpha-Scorpiids	16h04m	-24°	5

Observers Club Meetings

Date	Day	Time	Venue
29 th March	Fri	20:00 - 22:00 GMT	Black Cock Inn
26 th April	Fri	20:00 - 22:00 GMT	Black Cock Inn
31 st May	Fri	20:00 - 22:00 GMT	Black Cock Inn

Observing Sessions

Date	Day	Time	Venue
8 th or 9 th March	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
15 th or 16 th March	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*
5 th or 6 th April	Fri or Sat	20:00 - 24:00 BST	Dyffryn Gardens
19 th or 20 th April	Fri or Sat	20:30 - 24:00 BST	Castle Heights Golf Course*
3 rd or 4 th May	Fri or Sat	20:30 - 24:00 BST	Dyffryn Gardens
17 th or 18 th May	Fri or Sat	21:00 - 24:00 BST	Castle Heights Golf Course*
7 th or 8 th June	Fri or Sat	21:30 - 24:00 BST	Dyffryn Gardens
21 st or 22 nd June	Fri or Sat	22:00 - 24:00 BST	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.

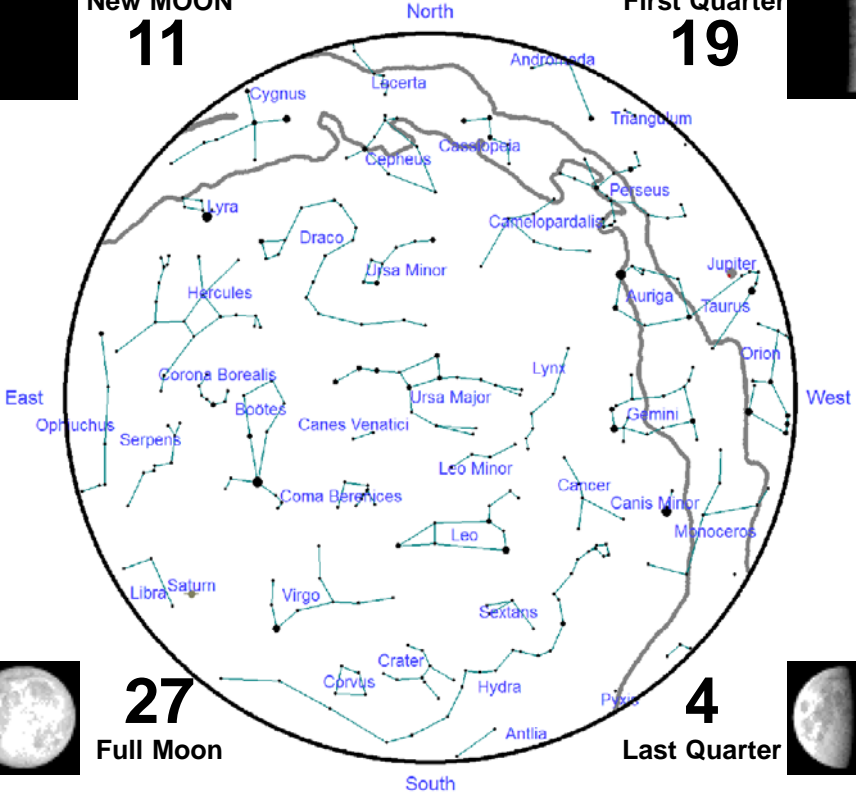
* Due to the current situation at Castle Height Golf Club the venue for the observing Sessions at Castle Height Golf Club are provisional and may be changed if circumstances require.

Almanac March



New MOON
11

First Quarter
19

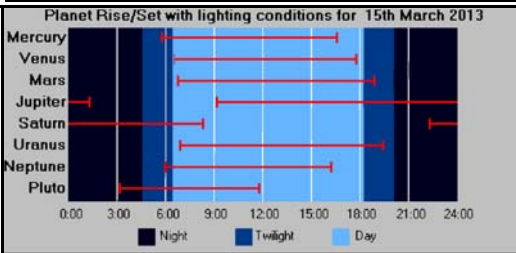


27
Full Moon

4
Last Quarter



	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Aquarius	22h28m36s	-07°35'46"	05:43	16:31	+1.6
Venus	Aquarius	23h29m37s	-04°50'39"	06:30	17:46	-3.9
Mars	Pisces	00h08m57s	+00°10'25"	06:44	18:51	+1.2
Jupiter	Taurus	04h30m53s	+21°24'46"	09:07	01:14	-2.2
Saturn	Libra	14h37m40s	-12°38'41"	22:16	08:15	+0.2
Uranus	Cetus	00h29m19s	+02°26'04"	06:53	19:23	+5.9
Neptune	Aquarius	22h29m52s	-10°09'22"	05:58	16:19	+8.0
Pluto (Dwarf)	Sagittarius	18h47m29s	-19°41'46"	03:11	11:46	+15.1



Planet Events

- 4th Mercury at Inferior Conjunction.
- 28th Venus at Superior Conjunction.
- 28th Uranus at Conjunction.

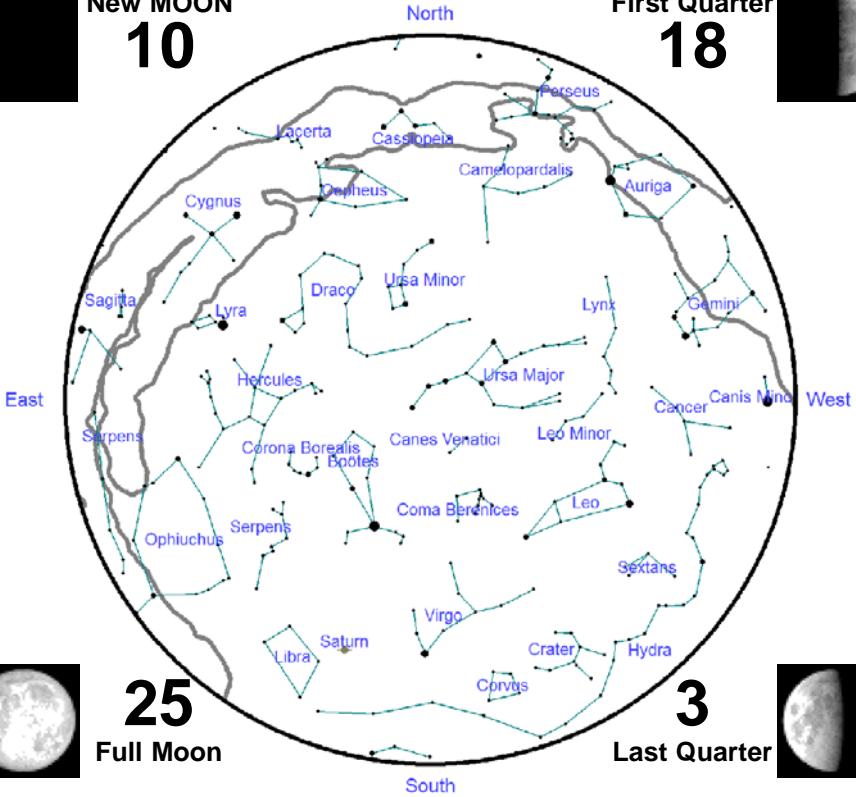
The data presented here is for the 15th March, positional data is at 00:00 GMT/UT

Almanac April



New MOON
10

First Quarter
18

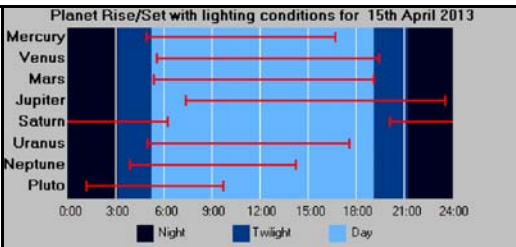


25
Full Moon

3
Last Quarter



	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Pisces	00h08m57s	-01°51'40"	04:52	16:39	-0.1
Venus	Pisces	01h51m32s	+10°27'26"	05:31	19:24	-3.9
Mars	Pisces	01h36m34s	+09°35'34"	05:21	19:05	+1.2
Jupiter	Taurus	04h52m10s	+22°09'49"	07:22	23:34	-2.0
Saturn	Libra	14h30m41s	-12°00'55"	20:04	06:10	+0.1
Uranus	Pisces	00h35m47s	+03°07'39"	04:54	17:31	+5.9
Neptune	Aquarius	22h30m01s	-10°08'33"	03:56	14:18	+8.0
Pluto (Dwarf)	Sagittarius	18h48m21s	-19°40'38"	01:10	09:45	+15.0



Planet Events

17th Mars at Conjunction

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

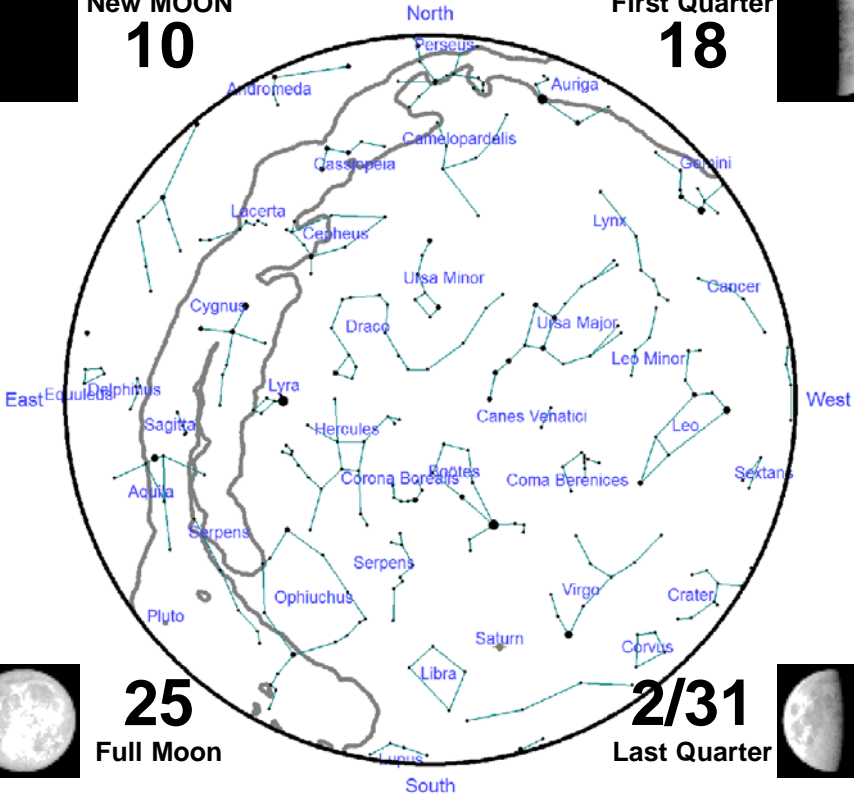
Almanac May

New MOON

10

First Quarter

18



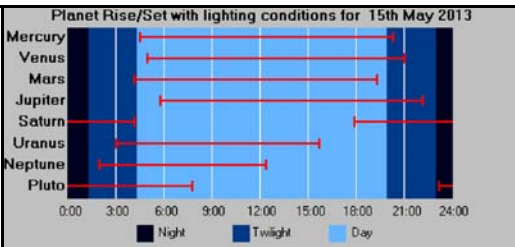
25

Full Moon

2/31

Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Taurus	03h42m54s	+20°20'54"	04:27	20:15	-2.0
Venus	Taurus	04h18m53s	+21°35'19"	04:54	20:59	-3.9
Mars	Aries	03h02m49s	+17°07'16"	04:07	19:15	+1.3
Jupiter	Taurus	05h18m38s	+22°48'18"	05:45	22:07	-1.9
Saturn	Virgo	14h22m02s	-11°18'53"	17:54	04:07	+0.1
Uranus	Pisces	00h41m26s	+03°43'20"	02:59	15:41	+5.9
Neptune	Aquarius	22h30m09s	-10°07'44"	01:58	12:20	+8.0
Pluto (Dwarf)	Sagittarius	18h47m16s	-19°42'11"	23:11	07:45	+15.0



Planet Events

11th Mercury at Superior Conjunction.
16th Mercury at Perihelion (0.31 A.U.).

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



To Infinity and Beyond!

by : David Hitt , NASA Educational Technology Services.

(May contain traces of Rocket Fuel)

"When once you have tasted flight, you will forever walk the earth with your Eyes Turned Skyward, for there you have been, and there you will always long to return."

When people think about jobs at NASA, certain careers come to mind first. Astronaut is almost always near the top of the list, often followed by the fabled "rocket scientist." The job title is almost mythical -- the gold standard for a challenging occupation. To put a task in perspective, a common expression is "Well, it's not rocket science." But, at NASA, it is.

The word "rocket" can mean different things. Most people think of a tall, thin, round vehicle. They think of a rocket that launches into space. "Rocket" can mean a type of engine. The word also can mean a vehicle that uses that engine. Like most engines, rockets burn fuel. Most rocket engines turn the fuel into hot gas. The engine pushes the gas out its back. The gas makes the rocket move forward.

A rocket is different from a jet engine. A jet engine needs air to work. A rocket engine doesn't need air. It carries with it everything it needs. A rocket engine works in space, where there is no air.

There are two main types of rocket engines. Some rockets use liquid fuel. The main engines on the space shuttle orbiter use liquid fuel. The Russian Soyuz uses liquid fuels. Other rockets use solid fuels. On the side of the space shuttle are two white solid rocket boosters. They use solid fuels. Fireworks and model rockets also fly using solid fuels.

In space, an engine has nothing to push against. So how do rockets move there? Rockets work by a scientific rule called Newton's third law of motion. English scientist Sir Isaac Newton listed three Laws of Motion. He did this more than 300 years ago. His third law says that for every action, there is an equal and opposite reaction. The rocket pushes on its exhaust. The exhaust pushes the rocket, too. The rocket pushes the exhaust backward. The exhaust makes the rocket move forward.

This rule can be seen on Earth. Imagine a person standing on a skateboard. Imagine that person throwing a bowling ball. The ball will go forward. The person on the skateboard will move, too. The person will move backward. Because the person is heavier, the bowling ball will move farther.

The first rockets we know about were used in China in the 1200s. These

solid rockets were used for fireworks. Armies also used them in wars. In the next 700 years, people made bigger and better solid rockets. Many of these were used for wars too. In 1969, the United States launched the first men to land on the moon using a Saturn V rocket.

Early NASA missions used rockets built by the military. Alan Shepard was the first American in space. He flew on the U.S. Army's Redstone rocket. John Glenn was the first American in orbit. He flew on an Atlas rocket. NASA's Gemini missions used the Titan II rocket. The first rockets NASA built to launch astronauts were the Saturn I, the Saturn IB and the Saturn V. These rockets were used for the Apollo missions. The Apollo missions sent men to the moon. A Saturn V also launched the Skylab space station. The space shuttle uses rocket engines.

NASA uses rockets to launch satellites. It also uses rockets to send probes to other worlds. These rockets include the Atlas V, the Delta II, the Pegasus and Taurus. NASA uses smaller "sounding rockets" for scientific research. These rockets go up and come back down. They do not fly into orbit.

New rockets are being developed today. They will launch astronauts on future missions. The new rockets will not look like the space shuttle. These rockets will look more like earlier ones. They will be tall and round and thin. These rockets will take astronauts into space. They will take supplies to the International Space Station. NASA also is working on a powerful new rocket called a heavy lift vehicle. This rocket will be able to take big loads into space.

Together, these new rockets will make it possible to explore other worlds. Someday they will send humans to Mars.

Rockets have always been a big part of what NASA does, and someone has to make them fly. But what is a rocket scientist? The truth is, a lot of them are actually engineers -- men and women who take the raw science of Newtonian physics and apply it to design vehicles to launch things into space. As NASA research engineer Tom Benson put it, "Call them what you want, scientist or engineer. People who work on rockets have to eventually build an efficiently working piece of machinery that has many complex physical and chemical phenomena present that must be fully understood. The success of the rocket depends on the knowledge and experience of the builder." Do you have what it takes to earn the title of rocket scientist?

**To find out more, visit the NASA Kennedy Space Center website:
<http://www.nasa.gov/centers/kennedy/launchingrockets/>**