NEWSLETTER

September - October 2013 Issue 164

A busy public safe solar viewing event at the Brecon Beacons National Park Visitor Centre, the telescope in the front is our latest acquisition a Coronado SolarMax II 60 partly funded by the Institute of Physics.

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Editorial — Ian Davies

Well here we are again, as I write this CAS' 39th season is rapidly approaching and as usual Dave has put together another fantastic programme of talks, you can enjoy 21 of these between now and July 2014. Most astronomical and space subjects are covered in one or more of the talks, all the speakers are asked to talk at beginner level, so there should not be anything too taxing. If you want to know about something in a bit more depth there is usually a question and answer session following the speaker's formal presentation. Most speakers are also available for a short time at the end of the meeting for a one to one chat.

We of course are continuing our extensive outreach programme of events, we currently have another 6 events planned before 2013 is out, and 2014's events list is already starting to be filled. You can see a full list of upcoming events on our web site (in the Members' area->Future CAS Outreach Events), you can also help out at any of the outreach events by volunteering for an event on this web page. If you are worried about you level of astronomical knowledge, don't be, there will be more experienced members there as well. The main quality we are looking for in a volunteer is enthusiasm for astronomy.

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 165 is 14th November).

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

Secretarial bits and bobs David Powell

Subscriptions

By now you will have received, if you have not renewed already, a reminder that subscriptions become due on Sept 1st. Please can I ask you all to pay your subscriptions ASAP. Thanks to all those who renewed already we look forward to having you with us throughout the coming season.

Faulkes Telescope.

Do you know that the society has its own Faulkes Telescope account. This means that any member of CAS can get access to this site. Interested? Come and talk to us.

Recording of meetings.

We have taken advice from someone with knowledge on this subject. We have been informed we would need to inform and gain individual permission from every speaker. We are aware already some are not comfortable being videoed. Speakers would need to confirm their talks are cleared for copyright. Add to this some speakers will not wear a microphone, and turn towards the screen, your committee feel it is not possible to proceed with this idea.

Programme.

I am sometimes asked can speakers provide a synopsis of their talk. Most titles I feel are self explanatory, and on occasions when even I myself am not sure, I do ask. Most however are reluctant to provide a synopsis. Partly I think because they wish to retain some air of mystery.

Three Peeps at My Diary
Roger Butler, Chairman

Wednesday March 6th 2013 - AuroraFlight: from Bristol Airport to……..er……Bristol Airport.

A select few of us had booked onto the Aurora Flight from Cardiff Airport. It came highly recommended by none other than our Outreach Coordinator, Theresa Cooper, who had thoroughly enjoyed the experience last year. But a few weeks before takeoff, we were contacted by the company to say that only 30 people had booked to fly from Cardiff and so would we transfer to

the flight from Bristol or cancel ? Surprisingly we found only out about these flights indirectly and I would have thought that an email to each of the amateur astronomical societies listed by the FAS would have reached a bigger target audience. Nevertheless, there were five, fully-booked flights from Bournemouth this year. I am not sure what to conclude by the lack of response from amateur astronomers in South Wales.

So Bristol it was and our happy band of pilgrims arrived safely at the terminal eager to see the Northern Lights for ourselves.

First there was an excellent introduction to the current night sky, given by Paul Money and then another talk on the aurora themselves by Pete Lawrence, both well known to viewers and readers of Sky at Night. Even the pilot explained what was going on with his rather unusual flight plan – though he didn't actually fly the plane !

We all filed out, ready to embark and follow the signs to the gate listing a flight to……..Bristol Airport. Then it was all aboard our Airbus A320 where a tasty snack awaited us. After an unremarkable takeoff our bizarre adventure began.

You may have been on some weird budget airlines before. Or some obsolete planes in exotic locations. But you have never been on a flight as peculiar as this one !

The basic idea was to fly due North, over Scotland, passing over the Shetlands, until we entered Icelandic airspace. There, we would fly alternately due East and then due West, affording passengers on each side of the plane a view towards the North. All CAS members will know that viewing conditions are paramount when it comes to observing and dark-adaption is essential. So, on reaching Scotland, the toilets became out of bounds as the light inside would immediately destroy everyone's adaptation to the dark when the door opened.

A mass photography shoot was organised to ensure that no one had inadvertently left their camera in flash mode – and yes, there is always one. Since they could not be switched off manually, all the seatbelt, no smoking, toilets and exit signs were then covered up with gaffer tape. It was pretty dark inside now, with only the faint green aisle lights still glowing. The final coup de grace, with the permission of Icelandic Air Traffic Control, was the switching off of all the external navigation lights. Obviously no other planes were flying around that area at that time of night.

The Airbus A320 is not designed as an ideal observational platform. It has the usual porthole-type windows that only those right next to them can see

out of and even then with a limited angle. So to make sure that everyone on the flight had an equal opportunity to view the sky, we had to exchange seats at regular intervals with the other two passengers on our side of the aisle. In total darkness, this proved to be quite a fun party game – rather like a combination of 'postman's knock' and 'twister'. Certainly a novel way of making friends !

Once we had reached our northernmost point, the plane began cruising, repeatedly eastward and then westward. At 35,000 feet we could see a pitch black sky, unhindered by cloud, and the stars shone with a brilliance not seen from the ground. Throughout a commentary was given, alternately by Paul and Pete so that we all knew what they were looking at. And other members of the team patrolled the aisle to make sure everyone was having a good time and to answer any questions.

Of course the aurora themselves are a natural phenomenon which can flare up spectacularly instantly and disappear again just as abruptly. We had high hopes that they would put on a really good display for us as there had been a significant solar mass ejection just a few days before. But, although they were definitely there as a vague green cloud, they refused to put on the sort of show, with multi-coloured dancing curtains of light, that we have all seen in photographs.

So were we all disappointed ? Not a bit of it ! Everyone was absolutely delighted with the trip. The organization could not have been better and the 'team', who have now completed over 200 of these flights, had an infectious enthusiasm that captured everyone's imagination.

And we are all going to book up to fly and try again next year, so why not come with us - hopefully from Cardiff Wales Airport?

Incidentally, earlier this year, Theresa spent two weeks on a ferry, sailing in and out of fjords, up and down the Norwegian coast, on another guided aurora tour. She thoroughly enjoyed that adventure too: up every night and then exhausted during the following day – just like being a teenager again! And she has also already booked up to go again next year. I am sure she will tell you all about it if you ask her.

Saturday May 11th 2013 - Astrofest: at the National Museum of Wales, Cardiff

Time marches on and suddenly the date for the CAS Astronomical Festival at the National Museum of Wales has arrived. Our Astrofest occurs in May every two years. There is a lot to organise and Dave, our Secretary, and Theresa, our Outreach Organizer begin work many months in advance. Of

course, with several previous such events behind us, we are seasoned campaigners by now. Nevertheless there is a great deal that could easily go wrong, which must be avoided at all costs. First is the line up of guest speakers. Dave never fails to convince eminent scientists that giving up a Saturday would be worthwhile thing to do and this year's offerings proved that the formula still works. But we need more than exciting talks and CAS blowing its own trumpet to make a real festival. In the current economic climate it can be difficult to persuade traders in astronomical wares to shut up shop for a day, drive all the way to Cardiff and back, packing and unpacking lots of delicate equipment (twice!) in the hope that many enthusiasts will turn up on the day and make purchases. But again Dave's magic still works well and we had a great variety of traders on show on the day.

Theresa's main responsibility is liaising with NMW staff on the organization of the day. This is also by no means easy: changes in staffing and structures and key staff away on courses or on leave result in starting from scratch every time.

Nevertheless, come the day, everything was ready and everyone knew their roles. The museum foyer was filled with traders, offering some very tempting items. There were books and telescopes galore, binoculars and all manner of accessories. Chris Williams' display of exquisite astro-sculptures attracted considerable interest. As usual, Bob Mizon was there to promote the Dark Skies Campaign. And the guys from Techniquest were kept extremely busy with a stream of youngsters eager to experience the planetarium. Outside Mark Major did his utmost to maximize those moments when the sun did manage to penetrate the clouds by offering solar viewing courtesy of our Coronado scope.

The theme for this year's Astrofest was 'The Sun', since maximum solar activity in the current cycle should occur around this time (allegedly) ! The first talk in the Reardon Smith Lecture Theatre was given by Paul Roche (recently appointed as Professor at the recently rebranded University of South Wales). His talk: "Star birth: how to make a Sun" was specially created for the festival and was both entertaining and informative. Lee MacDonald had come all the way from Yorkshire to present his talk on "Observing the Sun". His book, with the same title was also on hand, filled with practical techniques and expertise. Solar observing has proved very popular in recent times. There is usually something of interest on the surface of the sun and if you can see it through a specially adapted telescope, you know that it is nice sunny day. For many observing in the

daytime and the warm air is more attractive than clear dark skies at night time which are inevitably perishingly cold !

Rhys Morris is part of the astrophysics group at Bristol University but, since he lives in Canton, he merely strode through Bute Park to join us at the Museum. Chatting beforehand, he remarked that many important scientific lectures have been delivered from the Reardon Smith Lecture Theatre. It has also been the venue of many musical performances that I have taken part in and where Rhys fell off the stage in spectacular fashion, whilst playing in the second fiddles of the schools' orchestra. This time there was no such embarrassment as he gave an account of the ultimate fate of our Sun, and everything else in the solar system, in a few billion years time.

Overall the Astrofest was another success story: 3000 people came through the doors and the traders were well pleased with the day's business and they made a great number of friends as well.

The next Astrofest, in May 2015, will mark the 40th anniversary of the society and needs to be very special indeed. If you have any ideas on how we can mark this auspicious occasion, please contact Dave or Theresa as soon as possible as the planning has already begun.

Saturday May 18th 2013 - International Astronomy Show: at Warwickshire Exhibition Centre

There are a number of astronomical shows each year in the UK and CAS members have been attending them over the decades. It is a great opportunity to see new equipment in the flesh and discuss the finer details with retailers as well as meet up with old friends with similar interests and make new ones. However the shows in London are rather awkward to get to and some find the Winchester convention is getting rather expensive. So, this year, a number of CAS members decided to give the IAS at the Warwickshire Exhibition Centre near Leamington a try. Located pretty much in the middle of the England, it is not very far from a motorway in any direction. On offer were the usual main and specialist retailers of astronomical equipment and a programme of talks, many given by presenters on the CAS calendar.

Several groups of CAS members attended the show and all seemed to think it was worthwhile, interesting, a great venue and a good day's outing.

Certainly the splendid range of new telescopes and mounts on display has since given rise to lively debate concerning the future replacement of the aging Meade LX200 in the observatory.

Why not join us at next year's show?

Spacefest V: - To infinity (of fun) and beyond!!! John Richards

John?

What?

*You've gotta go. You'll **LOVE** it!! How many more opportunities will you get, in your lifetime, to talk to the people who've walked on the **MOON** and to shuttle astronauts? To talk to people involved in Apollo 13, Cassini, Mars Explorer and who are, as we speak, attempting to find life on other planets, or searching for objects that could obliterate life on Earth in an instant?*

Yeah Nick, but it's not cheap.

*Just, **TRUST ME!!!***

And that was the start my wonderful, magical journey to some of the best experiences of my life, including, as well as Spacefest, a visit to the Kitt Peak observatories, standing within 4 feet of a space shuttle, meeting MANY wonderful people who've I've admired for years, and turning the ignition key on a nuclear weapon!!

What's Spacefest?

Spacefest is THE astronomical event for anyone with an interest in ANY aspect of astronomy from stellar astronomy, planetary and space exploration, rockets, space history, space art, comets, meteorites; it's **ALL** here. Oh, and astronauts. LOTS of astronauts! Attended by some of the biggest names in the astronomical community, this is the one of the premier astronomical festivals in the WORLD. You'll be BLOWN away by the breadth of material and people that are available to talk to in the stunning Arizona wilderness. You can have lunch with Fred Haise (yes Apollo 13 still hurts), discuss recent discoveries about Enceladus with Caroline Porco while buying coffee at Costa, or just listen to Andrew Chaiken and Geoff Notkin (TV's meteorite man) play in an impromptu astronomical rock band, for one night only.....

Spacefest V (and the previous 2 Spacefests) was held at the, appropriately named, Starr Pass resort; a stunning hotel on the

outskirts of Tucson, Arizona, nestling in the foothills of the Cat and Tucson Mountains.

Figure 1 The view outside my window

It was held from 24th - 27th May and the weather (from a Brits perspective) was amazing, though from what I gather the locals thought it was cold!! Spacefests I-III were bi-annual events held in Arizona in 2007 and 2009, and California in 2011. Since 2011 though, Spacefest has become an annual event.

Even though spacefest starts officially on Friday, many people start arriving a few days before. Tickets for Spacefest V were released on Boxing Day 2012 and MANY of the British contingent (type 'Brit Army at Spacefest V' in facebook), of which there was a considerable number, decided to make an extended holiday of it. Some drove cross-country to visit the Arizona impact crater and the Grand Canyon, while others, like myself, decided to visit the Space Shuttle Atlantis in California.

A huge series of talks are lined up on a variety of astronomical subjects. Some talks are free, while others cost $10. Each talk lasts around an hour. This year's excellent speakers included Sy Liebergot (giving an insight to the events leading up to Apollo 13) Andrew Chaikin, Phil Plait (Bad Astronomer), Robert Brand (involved in Apollo 11 from the Australian tracking station, and also the Google Lunar X prize), Nick Howes, Emily Lackdawalla (Planetary Society), Geoff Notkin (TV's meteorite man) as well as loads of others. As an alternative to pay-per-lecture, EVENT TICKETS can be purchased. Buying these tickets provides **MUCH** greater access to the participants. Lunches, Sunday breakfast and banquets are laid on where you can submit a list of people (authors, astronauts, astronomers, mission specialists) you would like to sit next to. These event tickets also allow an opportunity to take personal group photos of the Apollo astronauts.

There is normally a “headliner act” that takes pride of place at the festival. This year, the headline act was Brian Cox and Carolyn Porco. Caroline presented some fascinating insights into her work on the Cassini project, and some up to the minute research on Enceladus. In fact it was SO up to the minute she asked us NOT to tweet about it, as what she was presenting hadn’t even been published yet! Brian Cox, really needs no introduction. He is the current doyen of science broadcasting in the UK, having presented shows such as “Wonders of the solar system” and “Astronomy Live” on the BBC. He presented insights into the work he has been conducting at the large Hadron collider in CERN and mused with Caroline about the majesty of the universe.

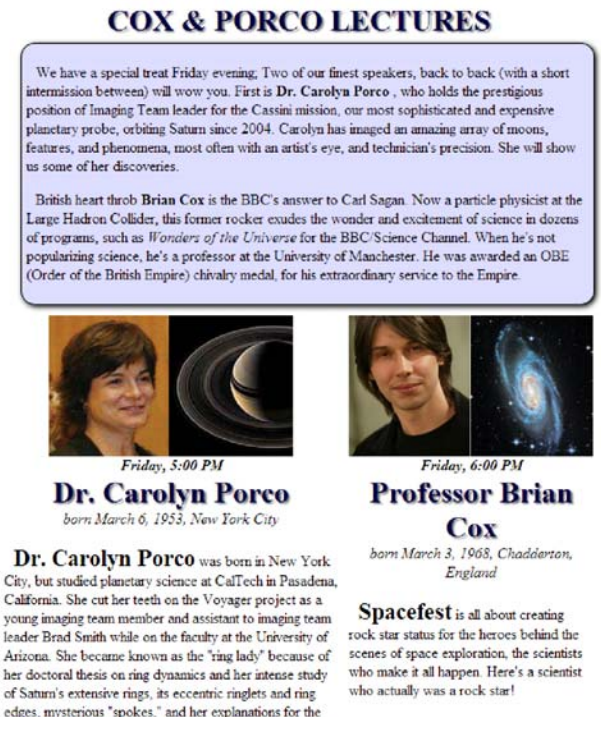


Figure 2 Star turns @ Spacefest V

If you’re done with the talks, and need a rest, perhaps you could meander to a book signing or visit the main hall. As you walk in, you are transported to stunning vistas of space imagery. Featuring images by Kim Poor, Michael Collins and Alan Bean, as well as many others this area is truly spectacular. From factual images of Apollo or shuttle launches to magnificent space vista of far-away planets; these images take your breath away, and is THE place to re-charge your batteries. The main hall also has stalls offering many space memorabilia. From signed books, DVD, space flown items (I now own a piece of the space shuttle Atlantis !!), posters, meteorites, the hall has it ALL.

On the left of the hall, are the heroes. 16 astronauts covering NASA's manned spaceflight from Gemini through Apollo,Skylab & Shuttle, including Gene Cernan, Alan Shepard, Walt Cunningham, Charles Walker, Jerry Ross and Bruce McCandless who are prepared to record special messages, sign autographs and just "shoot the breeze" with anyone interested in hearing their stories (and here at spacefest, that was everyone).

For those people not attending the banquet, a star party was organised. I had my first real view of Saturn, with its majestic rings in a 14 inch telescope… The Moon looked almost close enough to touch, and the viewing conditions, were stunning.

Figure 3 Photograph taken by putting mobile phone against telescope eyepiece

Sundays were set aside mainly for panels. These are slightly less formal gatherings where luminaries in the chosen fields sit and discuss burning issues and new developments. It has the feel of a town meeting, with friends and colleagues discussing new research or just riffing stories with each other. Each normally last around an hour.

There were panels on spacecraft modelling, comets, Mars, asteroids, and the outer limits (of our solar system) The highlight though, for me, HAS to be the Apollo panel. Sunday morning was set aside for 6 Apollo astronauts to reminisce about their astronaut training, their missions, legacy and just general comical stories. The panel consisted of Jim McDivitt, Fred Haise, Richard Gordon, Walt Cunningham, Ed Mitchell and Bruce McCandless.

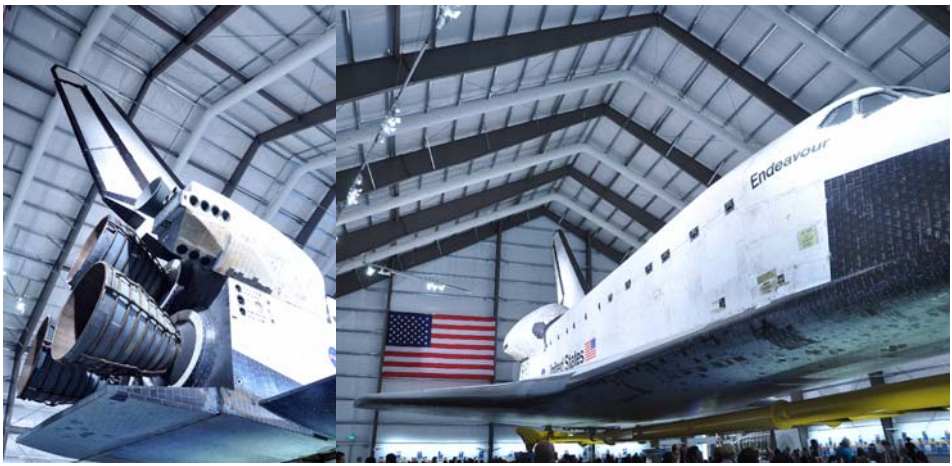
Figure 4 The Apollo Panel

As expected, the room (the largest venue available at the hotel) was packed; standing room only. The panel, (moderated by Brian Cox) was AMAZING, and though the astronauts may be getting on in years, age certainly hasn't diminished their faculties. Old friendships between colleagues blossomed before our very eyes, and the ribbing between the group of veteran astronauts was intense. The Air Force/Navy rivalry still lives in these guys let me tell you!! It was fascinating to hear what these men thought of Apollo, the Shuttle and the direction in which they feel NASA is headed. Any NASA manager present would have been in no doubt where the astronauts feel they have failed. Brian Cox asked questions of each astronaut, and then they took questions from the audience. An UTTER joy....

The social aspect of Spacefest cannot be underestimated. To sit around a fire, discussing subjects of mutual interest is amazing. At one point, we realised it was the birthday one of the BritArmy, so we arranged an impromptu birthday party. How many times can you say you've drunk champagne and inhaled helium with Geoff Notkin (massive Sci-fi fan btw) at a birthday party? You will forge friendships that last a lifetime.

Figure 5 Some of the Brits who attended

Arizona, sometimes called the "Space State" has so much to offer the astronomy/spaceflight enthusiast. Not one, but two, world class observatories (I visited Kitt Peak, but there's Mount Lemmon as well), Pima air and space Museum (including the amazing Boneyard), the Titan II missile range, and don't get me started on my trip to stand within 4 feet of the Space Shuttle at the California Science Centre.



Tucson even has its own astronomy pub, fuelled by solar power!!

Figure 6 A Titan 2 missile

Figure 7 The 4 metre Mayall Telescope

I WHOLE HEARTERLY recommend a visit to Spacefest. For me it was a wonderful, truly remarkable, life affirming event. It's not cheap, but the warmth of the people you meet, and the friendships I made will energise me during the cold winter months to come. It **TRULY** is a once in a lifetime experience. How many days is it to Spacefest VI again....?

Perseid Meteors. David Powell

We arranged a "Dave's star party" for the night of August 12th, a Monday night.

I must say in spite of what the weather forecasters were saying as we set off for Dyffryn Gardens at 10pm the clouds looked ominous.

On arrival there must have been about 50 people, mostly non-members, already settled into deckchairs or just lying on blankets. It reminded me of the "flower-power" scene way back in the 1960s in a California park.

I explained to the assembled masses (fingers firmly crossed), that

as soon as the clouds cleared I would do a sky talk and we would all be enthralled with the meteor shower. Overhead a small hole appeared, and I could see the bright star Vega, the constellation Hercules, the tail of the Great Bear, and the bright star Arcturus.

They all seemed happy and there were lots of giggles and laughter. Then we saw the space station rise and even though it was still very cloudy it shone through, and I invited everyone to wave. They did, and I told them I could see the astronauts waving back.

Slowly the clouds melted away and by midnight the sky was quite good.

We saw plenty of meteors (even Theresa saw some), several fireballs, one of which was at least magnitude – 6! Most of the fainter ones left dusty trains.

The Observatory was open and the guys worked overtime showing what the night sky has to offer. By now the Milky Way was clearly seen above our heads, in Cygnus down to Perseus.

Besides the shooting stars I list the deep sky objects I saw through the telescope and when I left for home they were still open for business!

Planetary nebulas

M27 and M57.

Galaxies

M31, M51, M81 and M82.

Globular clusters,

M13, M15, M71 and M92.

The highlight for me was M92, because I am always banging on about this Globular looks better in a telescope than its nearby and illustrious neighbour M13, and last night our own CAS telescope proved me right.

If you have not been to one of the regular observing sessions, make a date to do so soon, you will not be disappointed.

Behind the Scenes

Rosa Adams

May 11th saw CAS at the National Museum of Wales at what has become something of a fixture in our calendar, the bi-ennial astronomical festival.

As in previous years the NMW saw a large numbers of visitors on the day, our invited traders did brisk business and everyone enjoyed themselves.

The CAS summer meal was held at the popular Deri Inn in Rhiwibina and marked the end of the 2012 /2013 season for CAS . September sees Catrin Griffiths tackling her first start of year session as Membership secretary. Catrin took over from Vannita Popli earlier this year.

We were invited back yet again to the Brecon Beacons National Park Visitor Centre, this time for some solar viewing, this took place in July and proved very popular especially as we were able to field 2 solar telescopes including our latest acquisition a Coronado SolarMax II 60 Telescope that was partly funded by an £850 grant from the Institute of Physics. It really is a first class instrument and provides some stunning views of the sun.

The Society is forging ahead with its application for charitable status, this is progressing well –we will keep you posted on any new developments as they occur.

Observers Club held at the Black Cock, last Friday of the month is still going strong some several years after its inception, and we have seen new visitors at every meeting this year. Observers club is a—whatever the weather social and/or observing night and is in addition to our regular observing nights at Dyffryn Gardens. Current CAS membership stands at a very healthy 484.

Our little band of volunteers have been carrying out some routine maintenance on our observatory, tasks such as painting the exterior and refinishing the deck have all recently been completed so we are well protected for whatever the British weather has in store for us.

CAS is in process of joining UKMON an expanding network of pc /camera linked meteor watching, follow this link for more information. http://ukmeteornetwork.co.uk/ . We should soon have our own camera in place at the observatory and be able to contribute to the meteor mapping of the UK.

Brightest recorded Perseid meteor from UKMON's Clanfield North camera

Still on the subject of meteors—this years Perseid meteor shower watch was held at our Dyffryn Gardens Observatory site and saw about fifty people turn up to enjoy the show. Although there were fewer meteors than hoped for, there was much merriment and lots of ooh aahs as a couple of passing fireballs livened things up. The ISS passed over, always a nice sight and received the usual salute from us down here on the ground. Altogether a very pleasant evening

Quick reminder about the trip to NOC Southampton to visit Discovery on Oct 12th There is now just 1 place left –if you are interested then contact me—details in the handbook.

For Sale

A complete set of Build a Model Solar System magazines and all orrery pieces plus Earth Moon and Sun Orrery complete with magazines. Not put together. All solid brass pieces. £200 the lot.

Also have a 900 mm telescope with 10 accesssories for £70

Contact: Amanda Peters, email: newmoonvirgin@yahoo.co.uk

Up-coming CAS Public Events

Date	Time	Event	Venue
14th Sept.	10:00am to 4:00pm	SAFE solar viewing at Open Doors Wales	CAS Observatory, Dyffryn Gardens
21st Sept.	11:00am to 4:00pm	Telescope Workshop	National Museum Cardiff
5th Oct.	7:00pm to 9:00pm	Stargazing from a Dark Site	Brecon Beacons National Park Visitor Centre
9th Nov.	7:00pm to 9:00pm	Stargazers Evening	Dyffryn Gardens
30th Nov.	7:00pm to 9:00pm	Stargazing from a Dark Site	Cwmcarn Forest Drive and Visitor Centre
7th Dec.	9:30am to 5:00PM	SPA Jubilee Year: Welsh Meeting	Cardiff University - Trevithick Building

CAS Lectures September to December

Date	Title	Lecturer
5th Sept.	Galaxies Common Sense, and Cosmology.	Prof Mike Disney, Cardiff University.
19th Sept.	Johannes Kepler 1571-1630	Dr. Allan Chapman, Oxford University
3rd Oct.	The Sun, a Biography.	Dr David Whitehouse, Farnborough.
17th Oct.	Observing the Moon.	Dr Tony Cook, Aberystwyth University.
31st Oct.	The Herschel Space Observatory-the greatest Hits.	Prof Steve Eales, Cardiff University.
14th Nov.	Observing the Aurora.	David Phillips, Hampshire.
28th Nov.	Choosing and using your Astronomical Telescope.	Adele Horton, Astronomia, Surrey.
12th Dec.	Constructing the Mechanical Universe.	Prof Mike Edmunds, Cardiff University.

Dave's Star Parties

Date	Day	Time	Venue
11th September	Wednesday	19:30 to 21:30	Dyffryn Gardens/Observatory
9th October	Wednesday	19:30 to 21:30	Dyffryn Gardens/Observatory
13th November	Wednesday	19:30 to 21:30	Dyffryn Gardens/Observatory
4th December	Wednesday	19:30 to 21:30	Dyffryn Gardens/Observatory

Almanac Compiled by Ian Davies

Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
01st September	03:19	05:25	19:00	21:05
08th September	03:35	05:36	18:44	20:45
15th September	03:50	05:47	18:28	20:25
22nd September	04:04	05:58	18:12	20:06
29th September	04:17	06:09	17:56	19:48
01st October	04:21	06:12	17:51	19:43
08th October	04:33	06:24	17:36	19:27
15th October	04:45	06:36	17:20	19:11
22nd October	04:56	06:48	17:06	18:57
29th October	05:07	07:00	16:52	18:44
01st November	05:12	07:05	16:46	18:39
08th November	05:23	07:18	16:34	18:29
15th November	05:33	07:30	16:24	18:20
22nd November	05:43	07:41	16:15	18:14
29th November	05:51	07:52	16:08	18:09

Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
9th September	Piscids	00h36m	+7°	10
21st September	Piscids	00h24m	+0°	5
13th October	Piscids	01h44m	+14°	?
22nd October	Orionids	06h24m	+15°	25
3rd November	Taurids	03h44m	+14°	8
18th November	Leonids	10h08m	+22°	10

Observers Club Meetings

Date	Day	Time	Venue
27th September	Fri	20:00 - 22:00 GMT	Black Cock Inn
25th October	Fri	20:00 - 22:00 GMT	Black Cock Inn
29th November	Fri	20:00 - 22:00 GMT	Black Cock Inn

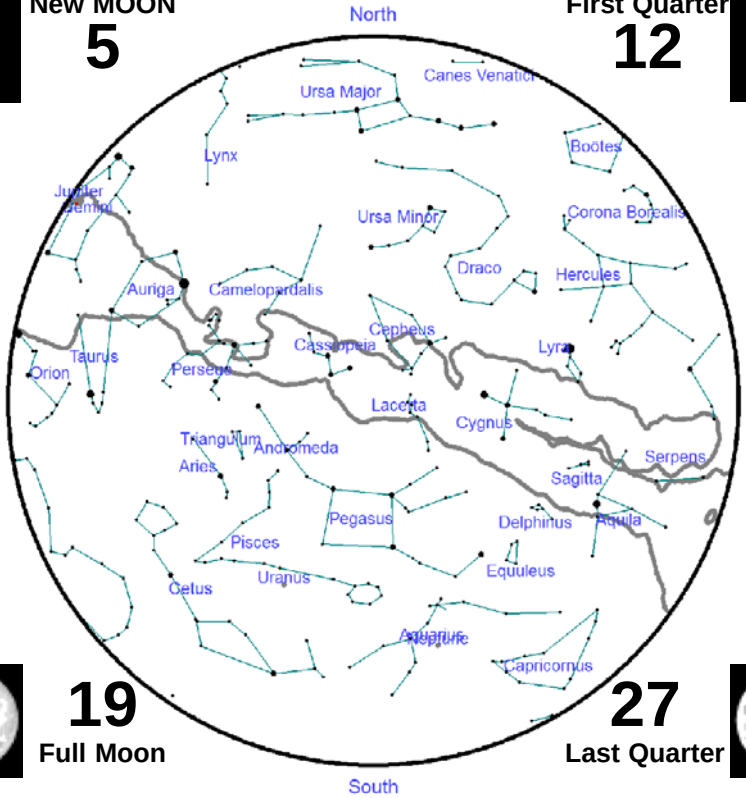
Observing Sessions

Date	Day	Time	Venue
6th or 7th September	Fri or Sat	20:30 - 24:00 BST	Dyffryn Gardens
20th September	Fri or Sat	20:00 - 24:00 BST	Dyffryn Gardens
11th or 12th October	Fri or Sat	20:00 - 24:00 BST	Dyffryn Gardens
18th or 19th October	Fri or Sat	20:00 - 24:00 BST	Dyffryn Gardens
1st or 2nd November	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
15th or 16th November	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens

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.

Almanac September

New MOON
5

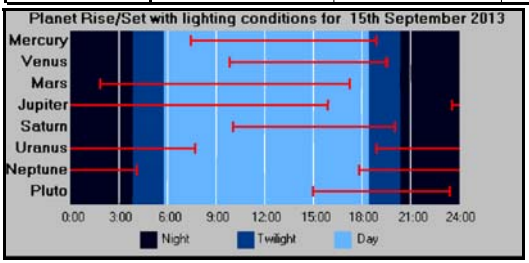


First Quarter
12

19
Full Moon

27
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Virgo	12h33m51s	-03°41'40"	07:23	18:51	-0.3
Venus	Virgo	14h06m48s	-13°55'21"	09:49	19:30	-4.1
Mars	Cancer	08h56m32s	+18°27'18"	01:48	17:12	+1.6
Jupiter	Gemini	07h10m28s	+22°20'55"	23:33	15:52	-2.1
Saturn	Libra	14h26m51s	-12°12'09"	10:00	19:59	+0.5
Uranus	Pisces	00h42m34s	+03°47'10"	18:52	07:39	+5.7
Neptune	Aquarius	22h30m43s	-10°06'30"	17:51	04:17	+8.0
Pluto (Dwarf)	Sagittarius	18h37m27s	-20°07'08"	14:58	23:28	+15.0



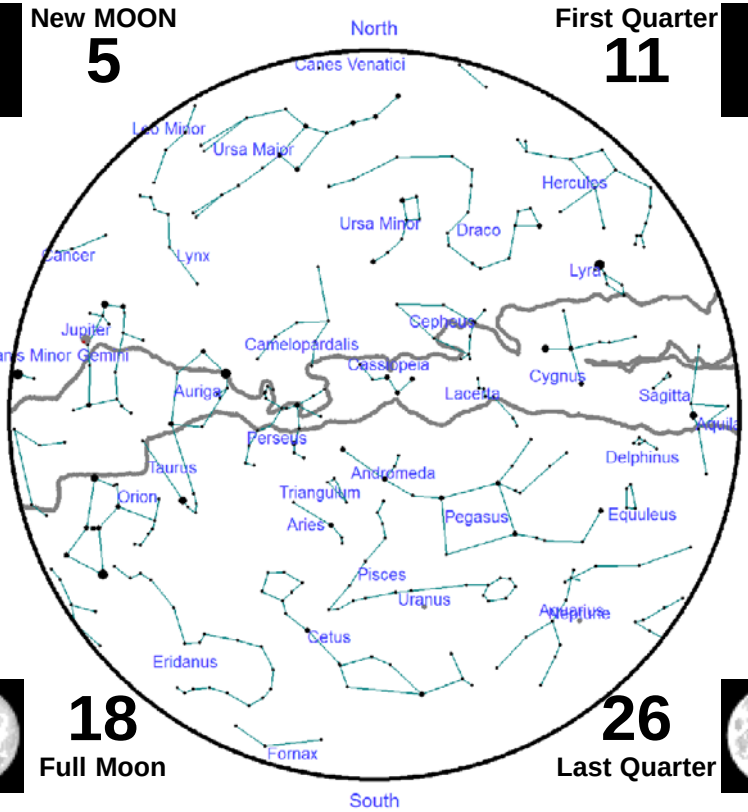
Planet Events

25th Mercury at Aphelion (0.47 A.U.)

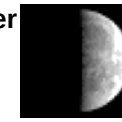
The data presented here is for the 15th September, positional data is at 00:00 GMT/UT

Almanac October

New MOON
5



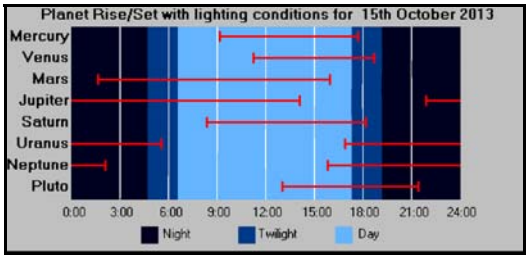
First Quarter
11



18
Full Moon

26
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Libra	14h50m37s	-19°43'29"	09:09	17:42	+0.1
Venus	Scorpius	16h22m34s	-24°32'19"	11:13	18:41	-4.3
Mars	Leo	10h09m19s	+12°52'40"	01:35	15:54	+1.6
Jupiter	Gemini	07h24m59s	+21°57'01"	21:52	14:06	-2.3
Saturn	Libra	14h39m12s	-13°15'43"	08:20	18:08	+0.5
Uranus	Pisces	00h38m10s	+03°19'17"	16:52	05:34	+5.7
Neptune	Aquarius	23h30m52s	-10°03'42"	15:53	02:19	+8.0
Pluto (Dwarf)	Sagittarius	18h38m06s	-20°12'18"	13:01	21:30	+15.1



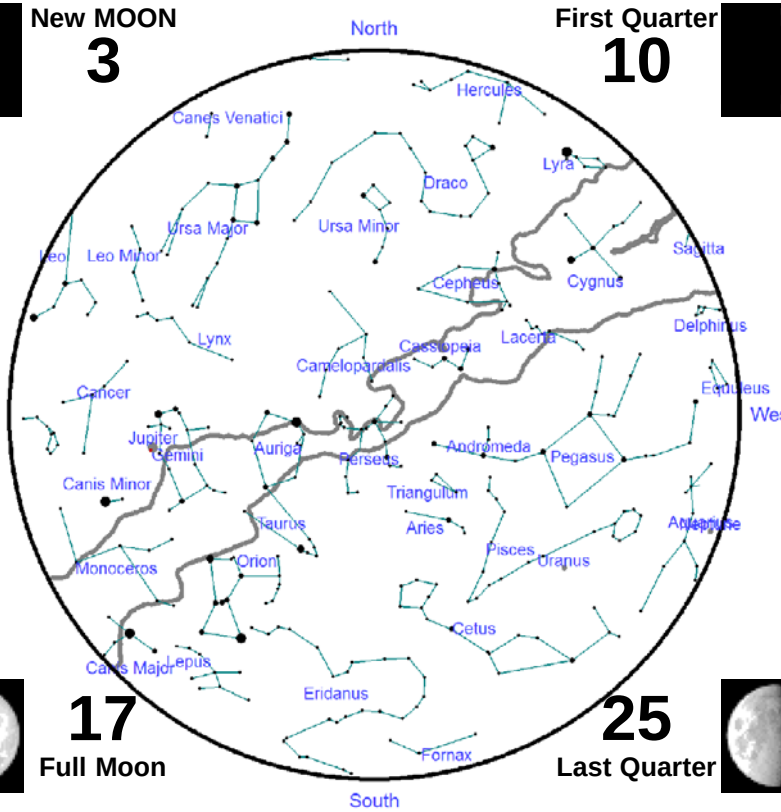
Planet Events

15th Uranus at Opposition

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

Almanac November

New MOON
3

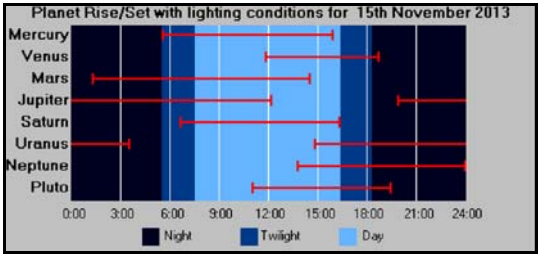


First Quarter
10

17
Full Moon

25
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Virgo	14h10m00s	-10°37'53"	05:34	15:51	-0.3
Venus	Sagittarius	18h40m14s	-26°50'00"	11:46	18:39	-4.5
Mars	Leo	11h17m22s	+06°25'00"	01:16	14:26	+1.4
Jupiter	Gemini	07h28m19s	+21°53'53"	19:54	12:07	-2.5
Saturn	Libra	14h53m39s	-14°22'42"	06:38	16:14	+0.5
Uranus	Pisces	00h34m18s	+02°55'19"	14:48	03:27	+5.8
Neptune	Aquarius	22h31m00s	-10°02'54"	13:51	00:18	+8.0
Pluto (Dwarf)	Sagittarius	18h40m44s	-20°15'14"	11:02	19:30	+15.1



Planet Events

1st Mercury at Inferior Conjunction.
6th Saturn at Conjunction.
8th Mercury at Perihelion (0.31 A.U.).

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

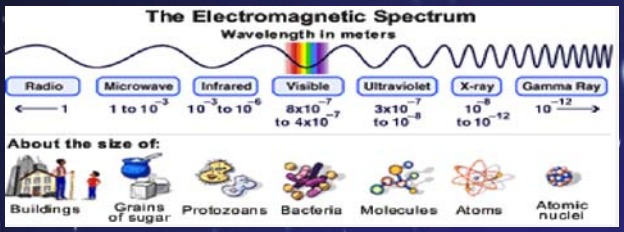
Radio Ga Ga!

What is Radio Astronomy?

All we hear is!..... Wait a minute, what is that faint noise in the background?

Radio waves occur naturally all over the universe. In fact, they are a special type of light that humans can't see. Radio waves can be found coming from clouds of gas where stars are born, as well as the centres of galaxies. But what is the difference between light and radio waves?

Let there be light! You can read this page because your eyes can detect light, which is made up of electromagnetic waves. Visible light covers only a small part of the electromagnetic spectrum, but radio waves are electromagnetic waves of much greater wavelength.



In the 1930's Karl Jansky, who was working for Bell Telephone Laboratories at the time, was asked to investigate the use of "short waves" (wavelengths of about 10-20 meters) for transatlantic radio telephone service. What has this story got to do with radio astronomy?

Well, Karl built an antenna specifically designed to receive radio waves at a frequency of 20.5 MHz (wavelength about 14.5 meters).

It was mounted on a turntable that allowed it to rotate in any direction. By rotating the antenna, it could find the direction of any radio signal. After recording signals from all directions for several months, Karl identified three types of static 1.nearby thunderstorms, 2. distant thunderstorms, and 3. a faint steady hiss of unknown origin.

Karl eventually figured out that the faint steady hiss, was in fact radiation coming from the Milky Way and was strongest in the direction of the centre of our Milky Way galaxy, in the constellation of Sagittarius. This was the beginning of Radio Astronomy.

Radio Astronomy is defined as “The branch of astronomy that deals with the origin and nature of emissions from extra-terrestrial sources in the radio wave range of electromagnetic radiation” but in order to detect radio waves from extra-terrestrial sources, you need a special kind of telescope, like the one Karl used in the 1930s.

The most familiar type of radio telescope is the radio reflector, like the one opposite. The Radio telescope pictured is known as the Lovell telescope, and is based at Jodrell Bank Observatory.

Radio telescopes vary widely, but they all have two basic components, a large radio antenna and a sensitive radiometer or radio receiver. Because cosmic radio waves are extremely weak, radio telescopes are usually very large and only the most sensitive radio receivers are used. But there could be a problem, as cosmic radio waves are weak they can be easily masked by terrestrial radio interference, so great effort is taken to protect radio telescopes from man-made interference.

To find out more about Radio Astronomy check out the NASA website
http://spaceplace.nasa.gov/cosmic-colors/