NEWSLETTER

June - August 2013 Issue 163

A selection of Dr Edward Cloutman's work, this year's Bill Sutherland Award recipient. Clockwise from top left, Rosette Nebula (Caldwell 49), Needle Galaxy (NGC4565), Horsehead Nebula (IC434) and Whirlpool Galaxy (M51)

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Editorial — Ian Davies

As I write this, a week or so after the Cardiff Astronomy Festival, I can report that we held another successful event with around 2000 people through the door on the day. All the exhibitors and traders put on excellent displays and all reported that they had a good day, both in trade and meeting the public. I spoke to the people on the Astronomia stand, our prime trader, at the IAS (see below) the following weekend, they said they also had loads of follow up orders as a result of coming to Cardiff and would definitely come again.

The following weekend I and several other CAS members visited the International Astronomy Show that took place at the Warwickshire Exhibition Centre a few miles south east of Leamington Spa. The show was of a similar format to Astrofest that takes place in Kensington Town Hall, central London. This show, organised by UK Astronomers Ltd in association with Sky at Night magazine, was much easier to get to and has plenty of free parking spaces as well. Most of the top astronomy traders in the country were present and most doing brisk business.

It is a show that is well worth going to, if they hold another next year I intend to visit it again.

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 164 is 8th August).

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

Annual General Meeting – Chairman's Observations. Roger Butler

The AGM 2013 has already been and gone. It seems to come around more quickly these days. Is the earth orbiting faster?

Nevertheless, this event on the calendar is every bit as important as the rest of the programme, even though it is bereft of astronomy! And for this reason it is traditionally poorly attended. Happily, this year the attendance was up by 50%.

CAS is a large and very active society and it is essential that we have the opportunity to take stock of what we are doing, where we are going and how we might improve our performance. Crucially the AGM allows all members the opportunity to hear reports from individual committee members and to comment, participate in discussions and make suggestions. This year's meeting was livelier than most with lots of verbal exchanges, which was really good! You can find Dave's fully-detailed account of the proceedings on the CAS website, in the members' area, under 'minutes of meetings'.

A primary concern was our annual 'churn rate'. That is, the fact that each year around a third of the total membership of 420 plus, does not renew their memberships and we have to continue to work strenuously to recruit an equivalent number of new recruits to maintain overall membership. This is very common in many societies, particularly in a time of recession and economic rationalization. We need to ensure we are doing everything to retain our members and our viability.

We continue to receive tremendous support from the University of Cardiff Physics and Astronomy Department and a recent realignment of our President and Vice Presidents means we now have no less than four professors in these important roles. An observation was made that perhaps such an academic endorsement, plus meeting in the university itself, could appear rather intimidating to the beginner in astronomy. The meetings are not part of an academic course and we must ensure that we have talks and events suitable for members at all levels of expertise and

encourage and support them in their hobby. However the point was also made that anyone embarking on a new sphere of knowledge and activity would expect to have to put some effort in getting 'up to speed' with jargon and basic concepts. I recall that when I joined the society – many moons ago! – I did make notes of names, facts and terminology I was not familiar with and looked them up with a Google search when I got home. In those days, there seemed to be several technical talks about radio astronomy with quite a few mathematical equations. Recent talks have a much broader range and balance and seem more accessible to all interests. We are indebted to Dave Powell who devises the programme with great care and skill.

Our finances remain healthy despite some hefty expenditure of late. We have managed to absorb these costs, thanks to the vigilance of Christine Saunders, our Treasurer. In addition we have been successful in bids for external awards for special projects and continue to seek out extra funding streams.

A significant change in January was the official handing over of the management of Dyffryn Gardens to the National Trust from the Vale of Glamorgan Council. It is still early days but we are given to believe that this change will ultimately be to the good with regard to our presence at Dyffryn. We are regarded as an added attraction for visitors to the gardens and will continue to consolidate and develop our mutual relationship. Use of the Cory Education Centre and maintaining a secure storage unit in addition to the observatory offer many opportunities for the future. In the meantime we aim to offer solar viewing and tours of the observatory to the public each Saturday morning, whenever weather conditions allow. We also support special weekend events promoted by Dyffryn.

The storage unit at Dyffryn has meant that we now have a base for all our resources and this has allowed an inventory of our telescopes to be completed at last, by our Curator of Instruments, Chris Fluck. The AGM heard several opinions concerning the loan of instruments to beginners and this scheme will shortly be revised. The availability of the Cory Centre also means that plans for our long awaited Junior Section meetings can go ahead, Kayleigh

Churchill, our Junior Rep, has all kinds of ideas for junior activities which we hope to roll out in the autumn.

Outreach remains as hectic but worthwhile as ever. We are in constant demand for our stargazing / solar viewing activities and everywhere we go, we are implored to return if we can. Theresa Cooper manages the intricacies and logistics of the outreach programme with great skill – and tact ! It has been an outstanding success, ever since International Year of Astronomy, and, once again our efforts have been acknowledged by NASA with their Certificate of Appreciation.

My AGM report concluded with my thanks to all committee members for their unstinting efforts throughout the year. But in particular, I also singled out Dave Powell for recognition of his leadership, hard work, and his award of an MBE. He is retiring this summer and looking forward to spending even more time on society matters. His enthusiasm is undiminished – despite all but one of the scheduled 'Dave's Star Parties' being jinxed by the weather - and I would not be surprised if he were eventually to move into the observatory. Our Society Coordinator of Public Events (SCOPE), Theresa Cooper was also mentioned in dispatches for her hard work, tenacity and diplomacy on behalf of the society.

So that was the AGM 2013. Sorry if you missed it but there will be another one early next year. Do come along and be a part of the debate about *your* society. In the meantime, the suggestion box is available at every meeting so let us know of any ideas or comments you may have. They are all taken seriously and will be discussed at the very next committee meeting.

Telescope Donation.

We have received a very fine 8" Meade LX200 Telescope.

Donated by Denis O'Neill. The committee wish to record our thanks to Denis,for his generosity, his daughter Lucy, and brother Ken for making the gift possible.

Dave Powell Secretary.

Launch News John Richards

This has been a prominent few months in the development of commercial (non governmental) space activities.

On April 29th, the Virgin Galactic craft ‘Spaceship 2’ successfully conducted its first supersonic test of its engines. During the ten minute rocket powered flight, the craft, reached a maximum speed of Mach 1.2. After a successful test, it has been announced that Virgin Galactic hopes to fly its inaugural flight on Christmas Day this year. The price tag though, is still a little high. After the successful test, Virgin Galactic raised the price of sampling a few minutes of weightless in a sub-orbital flight by 30%, to around £130,000!!

Earlier in the month, on April 21st an Antares rocket, manufactured by Orbital Sciences made its inaugural test flight from the Mid Atlantic Regional Spaceport (MARS) at Wallops Air force base in Virginia. The rocket, carried the Cygnus mass simulator (simulates the weight of an actual payload) and a number of mobile phone based nano-satellites, called Alexander, Graham and Bell.

Orbital Sciences hope that after a number of successful test flights, they, along with Space X Corporation, will be used to provide US capability to resupply the International Space Station (ISS).

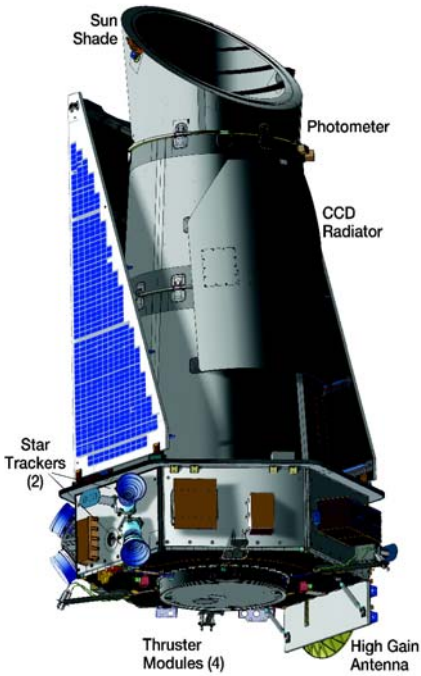
In May, the Dream Chaser Test vehicle was shipped to the Dryden Flight Research Center in California for a series of ground tests and aerodynamic flight tests. The craft, which looks like a smaller version of the space shuttle, will be launched atop an Atlas V rocket, hopefully within the next few years. It has the capacity to carry seven astronauts into low Earth orbit. Its primary mission will be as part of NASA's Commercial Crew Program to supply crew and cargo to the International Space Station.

On 24th April, a Progress M-19M from the Baikonur Cosmodrome in Kazakhstan, was launched on a standard 2-day rendezvous profile towards the ISS. The craft which carried about 365 kilograms of fuel, 50 kgs of oxygen, 410 kgs of water (separate supplies for Russians and Americans) & over 1,500 kgs of spare parts, scientific equipment and other supplies to the ISS. Once these supplies have been removed, the Progress craft will be filled with rubbish, undocked from the ISS and allowed to burn up in the Earth’s atmosphere.

On 14th May, Canadian astronaut and ISS Commander Chris Hadfield, Nasa's Tom Marshburn and Russian Roman Romanenko left the ISS aboard their Soyuz craft and landed safely in Kazakhstan. During his almost 6 months stay aboard the ISS, Commander Hadfield has transfixed his many twitter followers by regularly posting images of the planet Earth as well as creating the first pop video in space.

Prior to leaving the ISS, Mr Marshburn and fellow US astronaut Chris Cassidy had to perform an unscheduled spacewalk to replace a leaking ammonia tank. The ammonia was used to allow heat from the space station to dissipate into space. The successful repair will allow the station to operate normally before the next crew is launched from Russia at the end of May.

In NASA news, it appears the Kepler mission, to discover exoplanets, may be in its final phase. While it was reported that the cryogenic supply of liquid helium, used to keep the instruments at very low temperatures, was on the verge of running out, it is now reported that a reaction wheel aboard the craft has become faulty. If this turns out to be true, this will mean that two of four reaction wheels are now faulty. At least three are needed to orient the telescope correctly in space. It is still hoped that the telescope can continue to operate in some capacity, but the search for exoplanets may have to be handed to the next generation of spacecraft.



Per Ardua Ad Astra Roger Butler

It has always struck me that the RAF motto – 'through adversity to the stars' – is particularly appropriate for UK astronomers. Observing the stars with our climate is less to do with buying the right telescope and finding your way around the Milky Way than peering through the gaps in the clouds and making the most of those rare clear nights. And it was ever thus: our forebears like Herschel and Newton must often have been frustrated by fickle weather conditions

Some years ago, we had a very informative talk from a retired meteorologist who explained why the weather is so unstable and unpredictable in the British Isles. Standing as we do, with a huge ocean on one side and the whole landmass of Europe and Asia on the other, with the warmer climes of Africa to the South and freezing winds of the Artic Circle to the North, we lie exactly at the cross roads of four major weather systems, each vying for supremacy. And at any moment the balance can vary ever so slightly to change our weather dramatically. This explains a lot but is little consolation for countless cancelled observing sessions.

It seems that before we can study the stars we must study the clouds: know as much about meteorology as meteor showers.

Perhaps astronomers should just be called 'Skyentists'.

Knowing when to call off a scheduled observing session is an art in itself. It is not about the cloud cover and the wind now but how it will be in a couple of hours hence. These days you can look up 'weather forecasts for astronomers' on the web, which will give a predicted percentage cloud cover, hour by hour, at your location. This can be reasonably accurate but is by no means foolproof. Instinct can be just as reliable and we all know that a brilliant clear night can follow a wet afternoon where the rain has rinsed the dust out of the atmosphere.

There I am, loading the car with my observing gear, ready for when the downpour abates and clouds roll away, hopefully. Meanwhile a neighbour walks past, dragging his reluctant damp dog. His

greeting is accompanied by a wry smile and shake of the head, as if to say: “He must be star craving mad!”

My wife studiously ignores the practicalities of astronomy.

“I thought you were going out observing” she declares as I settle down to read the latest Sky at Night magazine.

“It’s chucking it down.”

“And you can’t observe in the rain?”

“Well you may have noticed that rain tends to fall out of clouds.” “And your fancy telescopes can’t see through clouds ?”

This catechism has been repeated so many times.

On more than one occasion I have neglected to check on the website to see whether the observing session has been called off. Castle Heights is less than a mile from my home and all appears clear. Consequently I have found myself all alone on Caerphilly Mountain, with a splendid display of the Milky Way, unaware the session had been cancelled earlier and wondering where everyone else has got to.

And we can all tell stories of the one that got away. The long journey to the ideal location to observe the eclipse which was shrouded in a cloud that arrived just at the wrong moment. The latest transit of Venus was accompanied by reports from all around the world that clouds had unexpectedly appeared to veil the modesty of Venus, exposed across the face of the Sun. All that remained was a strange affinity with all the countless people across the globe, engaged in the same bizarre pantomime. In contrast many could recall the magnificent transit of 2004. Ah well, 2012 was the last chance in our lifetime.

It would be easy to develop a sense of paranoia. One in three of our

scheduled observing sessions was called off last year. 'Dave's Star Party' has been arranged for numerous occasions but has actually only taken place once so far. But what a night it was: brilliant stars beaming down to a couple of dozen highly enthusiastic skywatchers. Of course our outreach events are equally affected and many visits to the Brecon Beacons Visitors' Centre have resulted in no possibility of observing. But our last visit there was amazing. The skies were so glorious that the 60 people booked in were totally mesmerized and did not want to go home.

There is now a way you can completely avoid all of these issues. If you use the internet to log on to a robotic telescope somewhere far away, where clouds are not really a hindrance. In Hawaii or Australia your instructions will be received to control the telescope and the images beamed back to your laptop in your cozy lounge. No need to go outside in the cold and the dark in the middle of the night. No worries about light pollution either. And of course, these locations on the other side of the globe will be dark when it is daytime in the UK. So students can be exploring the night skies during the school day via the Faulkes' telescope project. And there are many other robotic scopes available.

I can't help feeling this is not the same though. Just as a Kindle is not a book and a video game is not like driving a rally car or flying a plane, virtual images via the internet do not really connect me with the sky. On one of those rare clear nights, you can go outside, look up and, apart from the fragile but vital film of our Earth's atmosphere, there is nothing between your eye and the moon (240,000 miles away) and ginormous Betelgeuse (800 light years away) and that feint smudge which is the Andromeda Galaxy (a mere 2.5 million light years distant). That is a direct connection.

So the occasional rewards are well worth the frequent frustrations. In your quest to discover the universe and your place in it, astronomy will also teach you a great deal about the entirely human attributes of patience, forbearance, persistence, spontaneity, determination, resilience, resolve and fortitude; not forgetting, humility and humour.

Enjoy your astronomy and don't give up: nil desperandum.

Behind the Scenes

Rosa Adams

After a very busy start to the year with CAS hosting stargazing live for the BBC, the following few months were only slightly less so, and our astronomy shows at Brecon Beacons National Park Visitors Centre, Cwmcarn Forest Drive and St Fagans saw some of our members working just as hard as ever. The Brecon stargazing evening, cancelled due to snow but re-scheduled to take place a few weeks later was a tremendous success with the usual full house and on this occasion beautifully clear skies.

Invited for a second time to return to St Fagans to take part in their astronomy event this venue looks set to become part of the CAS annual calendar. A cloudy, wet and windy evening the skies eventually cleared enough for the public to look through the great variety of telescopes on display and to get some good views of amongst other things Jupiter, always impressive.

Dave's star parties have since their inception been unable to go ahead because of the weather, except that is for February's meeting which was well attended, with very clear skies and lots to see. Jupiter set, Saturn rose and a small, shivering band of hardy observers stayed until the small hours. Let's hope the weather is as kind for the next one.

The AGM took place on the 18th april and some new committee members were welcomed, they are Chris Hughes, James Hennessey and Catrin Griffiths. Catrin takes over the role of membership secretary from Vannita Popli. The Bill Sutherland plaque was awarded to Ed Cloutman for his contribution to the society over the past year and Ed's astro/photographic work can be seen along side Nick Harts on the packs of cards that we have for sale at meetings and events. If anyone has images of an astronomical nature they would like to be considered for inclusion in the next batch then let me know.

We rounded off April with 2 days of solar viewing at Dyffryn Gardens open weekend, again well attended with lots of interest in the solar scopes.

With May then almost upon us there is much going on behind the scenes with preparations for the “Cardiff Astronomy Festival” at the National Museum of Wales, Cardiff in full swing. These events entail a huge amount of work not only in signing up the exhibitors but in complying with all the necessary regulations and the ever increasing paperwork that comes with them. By the time you read this the Festival will have taken place, on Saturday 11th May, I hope that you made it there.

None of our outreach events, lectures, observing sessions, website etc. could take place without the great deal of planning and hard work of relatively few members so if you have any skills that would be useful or are just interested in helping out in any way then do have a chat with one of the committee.

RRS Dicovery leaving port for trials 7th February 2013

Our trip to see the new Royal Research Ship Discovery in October is almost full, just a couple of places have again become available. This ship is not open to the public and we are privileged to be able to visit it courtesy of CAS member Mr Edward Cooper, the Project Manager. The ship leaves for the Antarctic shortly after our visit. If you would like to join us then contact me for information. Seats will be sold on a first come first served basis.

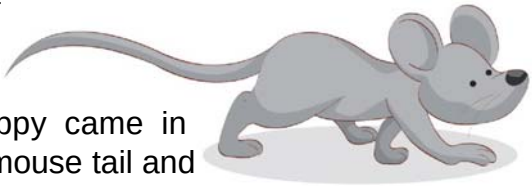
Finally Dave Powell is now out of hospital, pretty much mended, and in his rightful place at meetings although thanks must go to the members who did sterling job of standing in for him.

Junior Competition: Winner

The winner of the Junior Survey competition is Ethan Hughes, Ethan wins a Planisphere. Congratulations Ethan.

Has Rary met his match? A true story...

Amanda Townsend

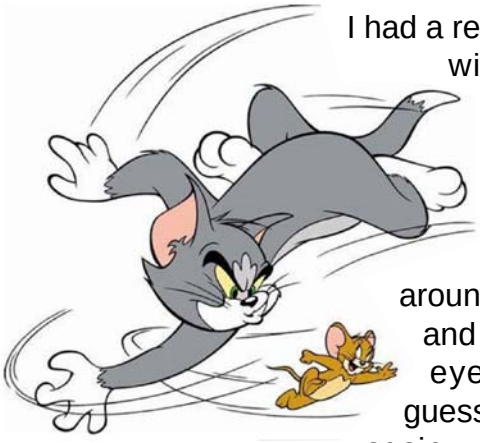


One evening a couple of weeks ago, I was sitting watching television at around 9.30 pm when my cat Poppy came in through her cat flap…..with mouse tail and legs dangling and wriggling from between her tightly-clenched jaws. In my pyjamas and dressing gown I jumped up and ran into the kitchen. The mouse was immediately dropped at my feet…..at which point it decided that the best exit strategy was to run up the front of my dressing gown.
I screamed like a raving banshee, the cat stared at me, and the mouse gently dropped off my dressing gown back on to the floor and started to scurry away.

I picked up the nearest plastic container and then the cat and I ran around the kitchen, arms and legs flailing, both chasing the mouse (who, of course, didn't know that one of us was going to kill and eat it and the other was going to gently pop it back into the garden…..)
I finally managed to get the pot over the mouse. I stood back to take a breath…….knocked over a sweeping brush which then fell over and, with a thundering BANG, landed on the pot and tipped it over, freeing the mouse again (which I suspect was also deaf at this point).

The chase started all over again, but I managed to beat Poppy to it and got the pot over the mouse. I put the lid on and then gently took it out of the front door and popped it around the side of the house in a 'safe' spot. The average temperature at this time was around -2^0 with winds of around 40 mph!

I decided not to shout at Poppy cos she's only doing what comes naturally – and she hadn't brought anything in since Christmas (as far as I'm aware……but what do I know…..), had a shot of Jack Daniels as my heart was racing and I felt a bit light-headed (well, that's my excuse anyway) and went up to bed.



I had a restless sleep, woke up at 2.00 am with my heart still racing so decided to have a relaxing read (well, maybe not THAT relaxing as I was reading a book about the serial killer John Cannan called 'Ladykiller'!). I read for around half an hour and decided to try and sleep again. Just as I closed my eyes I heard the cat flap and guessed that Poppy had just come in again – but she didn't come upstairs. I thought 'oh no' she's brought another bl**dy mouse in!
It was 2.30 am and I got out of bed, went downstairs into the kitchen and there she was, terrorising another mouse. This one was a bit more active so the chase was a little livelier than the earlier one. With my heart still racing I chased the mouse around the downstairs kitchen and lounge, eventually throwing the plastic pot over it just as it was escaping under the sofa. I went into the kitchen to get the lid. When I went back in the lounge I just managed to stop Poppy lifting the pot off the mouse – it was a close call.

Once again (I hope the neighbours weren't watching) I crept out of the front door into the arctic wind, this time just in my pyjamas, and popped the mouse in the 'safe place' again. (Current temperature around -4^0 this time with wind gusts of up to 60 mph)

My nerves were shattered. I couldn't have any more Jack Daniels so I did the sensible thing and had a small cup of hot milk with a little honey. I drank that in bed, switched off the light and popped my head back on the pillow.

After around half an hour's tossing and turning, I heard the cat flap go again…….. Poppy came straight upstairs and jumped up onto the end of the bed. Ah, I thought, she's come up to sleep as usual…..until the mouse which she'd just dropped onto the bed ran right up to me.

I flung the duvet into the air and screamed again. Poppy flew off the

bed, as did the mouse. Then I lost it. I thought it might have jumped into my handbag so I nervously rummaged in there – but no mouse. Poppy had disappeared. I have a double-bed with drawers in the bottom so it's not possible to see underneath it. So, I got my long feather-duster and shoved it frantically the whole length of the bed. No mouse. I moved the TV cabinet. No mouse. I pulled the bed right away from the wall. No Mouse.
At my wits end, I once again went down to the kitchen….and there was the mouse with Poppy.

It's now like 'groundhog day'. The pot, the lid, the pyjamas, the cat, the front door, the arctic wind and freezing temperature. This time I took the mouse into a neighbour's garden. (OMG I hope no-one was watching my house last night or I'll be sectioned). Walked back up the street (in my pyjamas) and went to bed.

After yet another blast of icy wind in the street, I knew at this point that I was never going to sleep and it was 4.30 am. I made a small cup of tea, took it back to bed and read a bit more of my non-relaxing book.

I heard the cat flap go…….. My heart raced and I went hot and cold….time stood still.....

Poppy came upstairs – nothing in her mouth. I couldn't settle. I'd assumed she'd dropped the mouse in the kitchen again. I searched the whole house. There was no mouse.

I really didn't know what to do to sort this out. The next night – the same thing happened – but this time only one mouse.

The next night I decided that, from now on, Poppy would have to stay out of the bedroom and I would shut my bedroom door so that she couldn't come in. I thought she might try and rip up the carpet trying to get the door open. I lay in bed feeling that dread of anticipation and I heard Poppy come up the stairs. As predicted, she started clawing at the carpet.

Through lack of sleep over the previous two nights, I thought 'bu**er the carpet', pulled the duvet over my head and tried to ignore it.

After a few minutes, the scratching stopped, and it all went quiet. Hoorah, I thought! I have it sussed!

Feeling very smug, I got up early the next morning to make myself a cup of tea. Went into the kitchen humming a happy song, only to be faced with what seemed to be a scene from the Texas Chainsaw Massacre. There was blood, guts and body-parts everywhere. Poppy must have caught a mouse/mice (or something similar), brought it in through the cat flap, played with it for a while and then ate it!! There were smudges of blood where she must have dragged half of the body around the kitchen floor. It was still only 5.30 am and there I was with a bowl of disinfectant scrubbing the kitchen floor.... in my pyjamas! For the next three days I was almost too scared to go downstairs in the mornings but, thankfully, no more pressies.

Now, I hear you all asking 'what's the astronomical connection with this story?' Well, for those of you wondering.....yes....this all happened on the night of a full Moon!

The Bill Sutherland Award 2012 -2013

Ed (right) receiving the Bill Sutherland Shield from CAS Vice Chairman Martin Chick.

This years award goes to Dr Edward Cloutman.

Ed has produce some excellent astronomical images this year, he also shares his work by submitting his images for display by CAS, this includes the web site's gallery page, society display boards etc.

Ed, in fact, is by far and away the most prolific contributor of images this year.

You can see Ed's work displayed, as mentioned above, on the Gallery pages of the CAS web site. There is also a small selection on the front cover of this newsletter.

Up-coming CAS Public Events

Date	Time	Event	Venue
27th July.	10:00am to 4:00pm	SAFE solar viewing	Brecon Beacons National Park Visitor Centre
August	10:00am to 4:00pm (Sat & Sun)	SAFE solar viewing at the Family Fun Weekend	CAS Observatory, Dyffryn Gardens. Provisional
Sept.	10:00am to 4:00pm (Sat & Sun)	SAFE solar viewing at the European Heritage Weekend	CAS Observatory, Dyffryn Gardens. Provisional
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
30th Nov.	7:00pm to 9:00pm	Stargazing from a Dark Site	Cwmcarn Forest Drive and Visitor Centre

CAS Lectures June to September

Date	Title	Lecturer
13th June	Astro Imaging from your Garden, Evenings in the Company of Hedgehogs.	Grant Privett, Wiltshire.
27th June	Massive Collisions in the Solar System	Dr Paul Roche, Glamorgan University
11th July	Three Short Talks.	Members of Cardiff Astronomical Society.
5th Sept.	Galaxies Common Sense, and Cosmology.	Prof Mike Disney
19th Sept.	Johannes Kepler 1571-1630	Dr. Allan Chapman

Dave's Star Parties

Date	Day	Time	Venue
11th, 12th or 13th August*	Sun, Mon or Tues*	Late	Dyffryn Gardens/Observatory

* *We are still checking out the final circumstances of the shower, see the web-site for final details of the Star Party.*

Almanac Compiled by Ian Davies

Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
01st June	--:--	04:01	20:19	--:--
08th June	--:--	03:56	20:26	--:--
15th June	--:--	03:54	20:31	--:--
22nd June	--:--	03:55	20:33	--:--
29th June	--:--	03:58	20:33	--:--
01st July	--:--	03:59	20:33	--:--
08th July	--:--	04:05	20:29	--:--
15th July	--:--	04:13	20:24	--:--
22nd July	00:45	04:21	20:16	23:53
29th July	01:31	04:31	20:06	23:07
01st August	01:44	04:36	20:01	22:53
08th August	02:11	04:46	19:49	22:25
15th August	02:34	04:57	19:36	22:00
22nd August	02:54	05:09	19:22	21:36
29th August	03:12	05:20	19:07	21:14

Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
10th June	Ophiuchids	17h56m	-23°	5
20th June	Ophiuchids	17h20m	-20°	5
8th July	Capricornids	??h??m	??°	5
16th July	Capricornids	20h44m	-15°	5
21st July	alpha-Cygnids	21h00m	+48°	5
26th July	Capricornids	21h00m	-15°	5
29th July	delta-Aquarids	22h36m	-17°	20
31st July	Piscis Australids	22h40m	-30°	5
2nd August	alpha-Capricornids	20h36m	-10°	5
6th August	iota-Aquarids	22h10m	-15°	8
13th August	Perseid	3h04m	+58°	75
21st August	alpha-Cygnids	21h00m	+48°	5

Observers Club Meetings

Date	Day	Time	Venue
28th June	Fri	20:00 - 22:00 GMT	Black Cock Inn
26th July	Fri	20:00 - 22:00 GMT	Black Cock Inn
30th August	Fri	20:00 - 22:00 GMT	Black Cock Inn

Observing Sessions

Date	Day	Time	Venue
21st or 22nd June	Fri or Sat	22:00 - 24:00 BST	Castle Heights Golf Course*

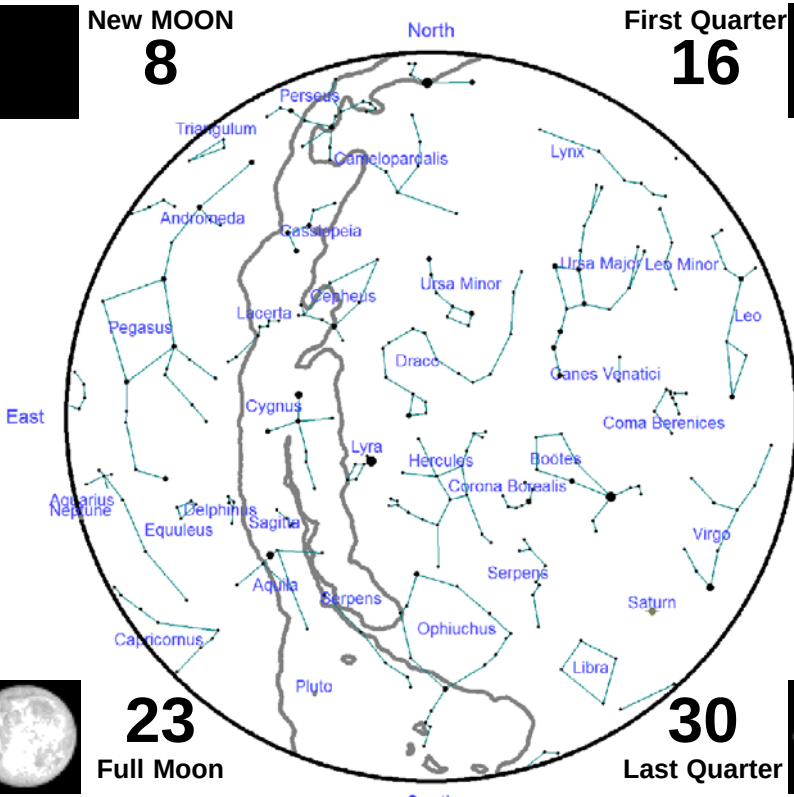
NOTE Where two dates are given we will attempt to hold the session on the first date, weather permitting, otherwise we will try again on the subsequent date. All dates are subject to weather conditions. For confirmation of any session please check on the CAS Web site or the CAS Observing line 07817 723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

New MOON
8

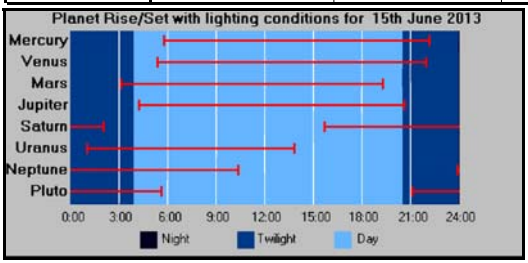
First Quarter
16



23
Full Moon

30
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Gemini	07h19m16s	+22°57'11"	05:43	22:07	+0.8
Venus	Gemini	07h03m45s	+23°56'21"	05:20	21:58	-3.9
Mars	Taurus	04h34m38s	+22°12'38"	03:04	19:17	+1.5
Jupiter	Taurus	05h48m58s	+23°10'37"	04:11	20:38	-1.9
Saturn	Virgo	14h15m16s	-10°50'10"	15:42	02:01	+0.2
Uranus	Pisces	00h45m34s	+04°08'46"	00:59	13:46	+5.9
Neptune	Aquarius	22h30m18s	-10°06'55"	23:52	10:18	+8.0
Pluto (Dwarf)	Sagittarius	18h44m37s	-19°46'36"	21:06	05:40	+15



Planet Events

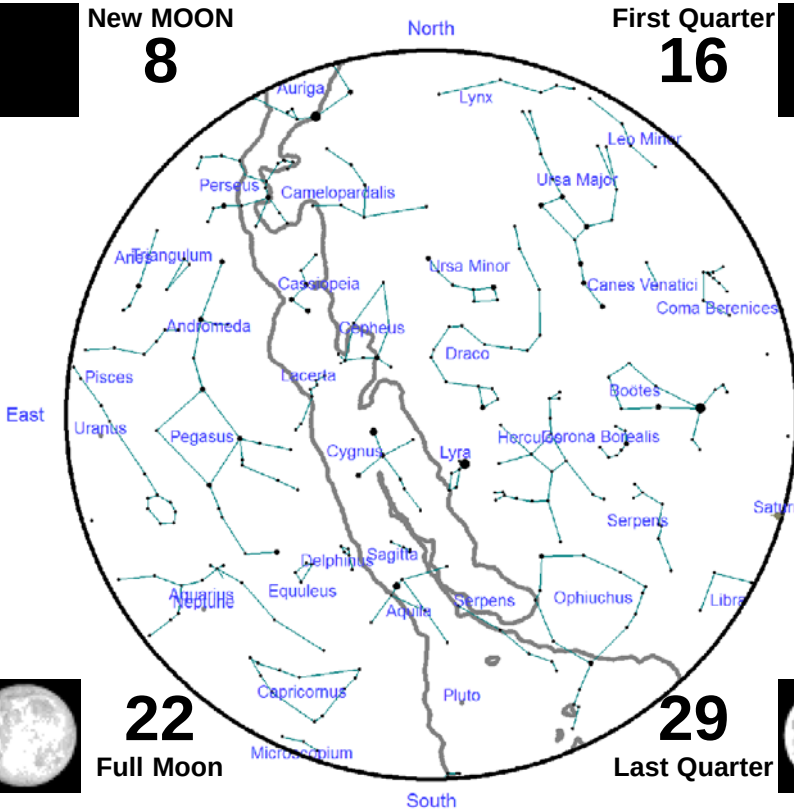
13th Venus at Periheloin (0.72 A.U.)
19th Jupiter at Conjunction.
29th Mercury at Aphelion (0.47 A.U.)

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

Almanac July

New MOON
8

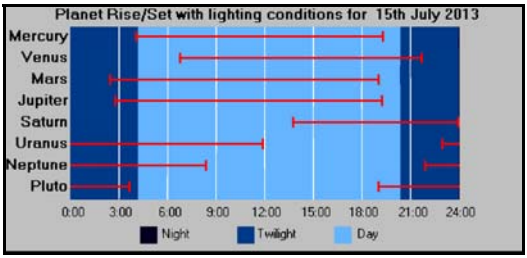
First Quarter
16



22
Full Moon

29
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Gemini	07h01m52s	+17°47'45"	04:01	19:17	+3.7
Venus	Leo	09h35m28s	+16°04'18"	06:45	21:40	-3.9
Mars	Gemini	06h04m17s	+23°57'54"	02:23	19:01	+1.6
Jupiter	Gemini	06h18m40s	+23°10'39"	02:43	19:10	-1.9
Saturn	Virgo	14h13m35s	-10°49'36"	13:43	23:57	+0.3
Uranus	Pisces	00h47m10s	+04°17'51"	22:58	11:50	+5.8
Neptune	Aquarius	23h30m26s	-10°06'07"	21:54	08:21	+8.0
Pluto (Dwarf)	Sagittarius	18h41m29s	-19°52'53"	19:05	03:38	+15.0



Planet Events

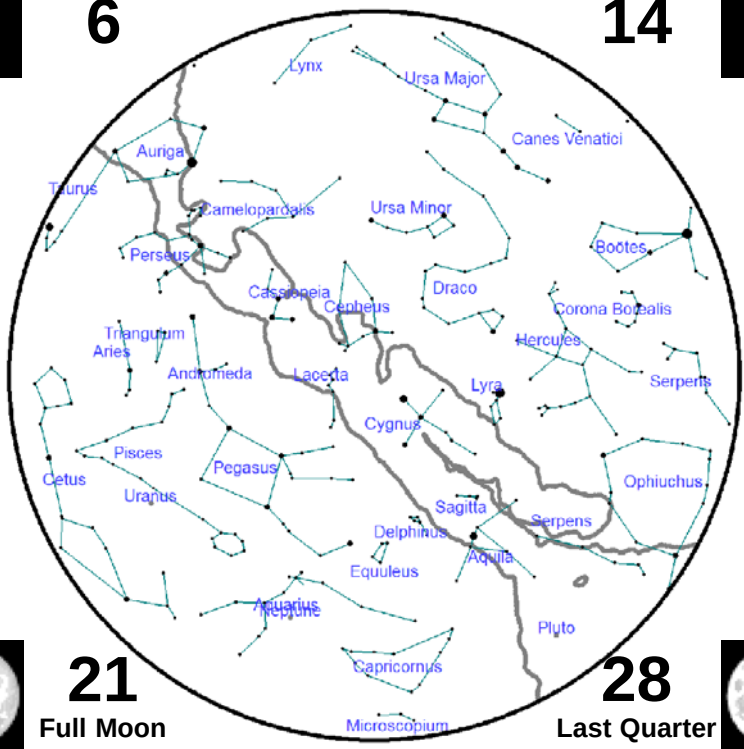
9th Mercury at Inferior Conjunction

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

Almanac August

New MOON
6

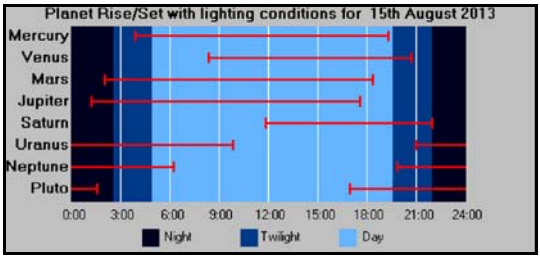
First Quarter
14



21
Full Moon

28
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Cancer	08h59m28s	+18°25'12"	03:53	19:17	-1.4
Venus	Virgo	11h54m06s	+01°31'09"	08:19	20:39	-4.0
Mars	Gemini	07h33m43s	+22°32'16"	02:00	18:18	+1.6
Jupiter	Gemini	06h47m08s	+22°50'56"	01:12	17:34	-2.0
Saturn	Virgo	14h17m39s	-11°19'04"	11:47	21:57	+0.4
Uranus	Pisces	00h46m02s	+04°09'47"	20:55	09:46	+5.8
Neptune	Aquarius	22h30m35s	-10°05'18"	19:53	06:19	+8.0
Pluto (Dwarf)	Sagittarius	18h38m44s	-20°00'14"	17:01	01:32	+15.0



Planet Events

12th Mercury at Perihelion (0.31 A.U.).
24th Mercury at Superior Conjunction.
27th Neptune at Opposition.

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

It’s Big. It’s Massive. It’s a BLACK HOLE!

Thanks to Owen Cornelius for providing the basis material for this edition of the Junior Page.

Today we will be talking about black holes. Now your understanding of black holes will probably be from some sort of science fiction film, well forget all of that.

Don't let the name fool you: a black hole is anything but empty space. Rather, it is a great amount of matter packed into a very small area.

Gravity is the force that keeps us on the planet, in other words, it is pulling us down and stopping us from floating around. Gravity in a black hole is thousands of times stronger than on earth. This is why not even light can escape them. Most black holes form from the remnants of a large star that dies in a supernova explosion. If the star is large enough (about three times the mass of the Sun), then there is no force that can keep the star from collapsing under the influence of gravity.

However, as the star collapses, a strange thing occurs. As the surface of the star nears an imaginary surface…

called the "event horizon," time on the star slows down. When the surface reaches the event horizon, time stands still, and the star can collapse no more - it is a frozen collapsing object. There are the countless black holes that are the remnants of massive stars peppered throughout the Universe. These "stellar mass" black holes are generally 10 to 24 times as massive