



*The SOFIA (Stratospheric Observatory for Infrared Astronomy) aircraft both inside and out. SOFIA carries a 2.5m IR Telescope. Photo: John Richards*

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As you are probably aware CAS has an extensive public out reach programme, indeed many of you have joined us, as the result of such an event. We are increasingly being asked, by outside bodies, to host events at their premises for them. We would like to put on as many of these events as possible. However it is increasingly difficult to do this with our small band of volunteers and an already extensive programme of events. What we need to do is increase our volunteer base of members willing to come along and help out. Most tasks at our events are straight forward and can be done by any one with common sense, tasks such as talking to the public individually about astronomy and CAS, manning a telescope (this might sound daunting, but it really isn't. At such events we tend to show big bright objects e.g. the Moon and Planets, that are easy to find and keep a telescope pointing at.), you could give a short 20 minute talk at beginners level (90% of your audience at these events have no astronomical experience at all, you don't have to go into any great depth with a talk.). So you don't need a degree in astrophysics to help out, or indeed any astronomical qualifications at all, what you need most is enthusiasm for astronomy.

So why not give it a try? You can volunteer for any CAS event by entering your details on the Volunteering page in the members' area of the website or by contacting Theresa Cooper CAS's Public Events Organizer, by email, phone or in person at a meeting.

Wishing you dark skies - Ian.

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## Subscriptions

For those of you who haven't renewed your subscriptions yet they are now well overdue so this will be the last newsletter you receive unless you take a couple of minutes to renew your subscription. You can use the form inside this copy, or why not go on line and use PayPal.

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## 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 157 is 10<sup>th</sup> November).

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# The Greatest Heritage in the World?

## Roger Butler

More and more tourist venues are realising that they are blessed with dark skies and little light pollution. They could extend their remit to include astronomical observation and they have locals who would dearly love to see the stars at first hand through a telescope. So they continue to approach CAS to ask if we can organise something for them and we do our best to accommodate if we possibly can.

So it was that we received an invitation to host an evening of talks and observing at the Industrial Museum inside the World Heritage Centre. Blaenavon is designated a 'World Heritage Site' so what better place to introduce the public to the sights of the greatest heritage in the world – the sky at night?

As our various cars set off at various times and following instructions from various satnavs with consequently various routes, the weather heading to Blaenavon was not promising. A cloudy sky with drizzle became complete cloud cover with moderate rain as we reached our destination. The 'seeing' was not looking good.

Undaunted we disgorged our cargos and set up in the main hall of the museum – a superbly refurbished school. As seasoned troubadours, this did not take long and we have plenty of time to wander around the museum before curtain up. The museum brings the harsh reality of what it was like to be working and living in Blaenavon, dragging the black gold to the surface for the rest of the world to fuel their industries, vividly to life. And many of the images were taken in living memory. So the museum plays a vital role in recording and remembering our debt to previous generations.

But what of our vital role? It is nearly time to begin but not many people seem to have ventured out in the rain to see our show. They probably realise that the stars in the sky will be a 'no show' as well. 60 people have booked but, being a free show, they have little personal commitment.

But wait, here they come: living quite locally, they have left it until the last moment to make an appearance. Thankfully the hall is full and we can begin.

Events such as this always require considerable flexibility as conditions can change quickly. Plan A tonight is for Dave Powell to give the first talk, then a break to examine the many telescopes that are on display. This is followed by refreshments before I give the second and final talk, and lastly an opportunity for questions.

However this can all change and as it gets dark, we post sentries to check for any breaks in the cloud. We are determined to get some observing done if at all possible.

Dave gets into his stride, explaining the techniques and procedures for observing – naked eye, binoculars or telescope. Finding your way around the sky is the first stage so that our audience can make out some features when they next look up on a clear night. The talk goes very well and is peppered as usual with Dave's unique brand of humour. It helps the medicine go down !

Then we break to talk individually about scopes and things. The CAS team to go into action engaging the public in chatting about all sorts of astronomical topics.

At the end of the refreshment break, I receive an encouraging message from the sentries: the clouds have parted slightly and two stars can clearly be seen. Not really cause for a stampede outside just yet but it is decided to get all the telescopes down in the lift and out onto the terrace and ready, just in case conditions improve even further.

I have decided to give a talk on the moon. No, sorry! I mean about the moon. Everyone knows the moon, it regularly crops up in all our lives and it is completely embedded into our folklore. So I begin to consider what is fact and what is fiction. As expected, a show of hands from the audience reveals most are still convinced that the moon is made of green cheese. And of course, much as the moon has been studied over the centuries, there are so many unexplained aspects and unanswered questions. Which is why the Grail moon project was launched by NASA just a few days prior.

Getting towards the end of my talk – 'does the full moon make people go crazy?' (the facts show 'no, it doesn't !') and thankfully nobody shouts out 'speak for yourself !' – I am aware of an excitement in the wings, heralding news that the clouds have indeed rolled away and the sky is now laid out for all to see.

So outside we all pile to where the scopes are already set up, waiting to take maximum advantage of the splendours above.

Thanks to Dave's talk, all the people can now find Polaris and have soon moved on to identify The Plough and Cassiopeia. Although there are street lamps on the road outside, the terrace is shielded by the museum building itself. The sky is very dark and many are amazed at their first sight of the Milky Way. Our galaxy is stretched out across the sky with so many stars that, yes, it does actually appear 'milky'. Blaenavon is the first field trip for our new Dobsonian scope, bought with funds from the Kickstart 3 Initiative specifically for this kind of event. Bob Biss is at the helm and a queue of eager stargazers waits patiently for their turn at the eyepiece. I begin to wonder if we could make a modest charge to look at the Andromeda Galaxy. Only 5p – 'bob-a-dob' – but one look from Dave signals "leave it!"

All in all, we are out there until way beyond the supposed finish time. No one shows any desire to head home and in the end it is the cloud which rolls in from the west which decides that we have seen enough and there will nothing more to see tonight.

Nothing left to do but pack up the circus and head off down the valleys towards Cardiff. We will all take different routes again and none of us will be navigating by the stars. But not before we have taken leave of the Blaenavon staff who have been tremendously helpful and supportive and didn't seem to mind some unplanned overtime.

Blaenavon was a success: despite unpromising weather conditions, the skies cleared just at the right moment. We had so many appreciative comments from the public that attended and we have been invited back next year.

So, if you haven't visited the Blaenavon World Heritage Centre as yet, do so as soon as you can – you will find it very rewarding. And why not join us on the next outreach event? You would be most welcome and they are so worthwhile. They are all listed on the website. CAS has put on 15 outreach events in 2011 and the diary for 2012 is showing 17 events already, with more to be added. These events cannot happen without members helping out, chatting to the public, helping set up our stand, giving talks, 'manning /womanning' scopes. Let us know if you can join in.

Fortunately we had a great team at Blaenavon: Theresa, Rosa, Chris, Ian, Bob, Mark, Dave, Edward, Hugh, and I apologise to any I have forgotten. Many thanks one and all – you are what makes CAS flourish.

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## A review of a set of Plossl 1.25 inch eyepieces by Nippon Optics. £44.99

**Dave Powell**



Having enjoyed reviewing this company's Binoculars; I was delighted to do the same for the eyepiece set.

I must confess, I have always thought the cost of eyepieces as being far too high but I did wonder what you get for £15 per eyepiece.

The package arrived safe and well, each eyepiece had its own plastic storage barrel to keep optics dust free and safe from minor knocks.

They did look the business, and boasted fully multibroadband lens

coatings for excellent image and light transmission. They also have foldable rubber eyecups.

The Telescope I chose to carry out this review was my Skywatcher, ED 100 F-900mm, Refractor on a solid EQ mount.

The set of three were 32mm, 26mm, and 16mm. They give an apparent field of view of 52 degrees, and have comfortable eye relief. On my scope this gave me powers of X28 X34 and X56, so nothing too taxing. Some people may be surprised at how low the powers are, but many objects look much better at low powers, and anyway unless your Telescope is driven, high powers can be a nightmare.

First I checked if the fields of view were flat to the edge of each lens. Yes they were. Then I tried some double stars that I could split and see not only complete separation but also contrasting colours. All three eyepieces performed well. The Galaxy M31 was next and then M57, M52 and M103, all showed up as expected. The Moon was stunning, more detail than you could shake a stick at. Next I used each lens with an X2 Barlow and at a stroke doubled the power of each eyepiece. All three worked very well, so then the big challenge, Planet Jupiter was high enough for a look. Yes at low powers I could see what I expected, two belts, some shading and the Galilean Moons. Using the 16mm and a Barlow I could make out much more detail, and this individual eyepiece performed just as good as a similar one purchased for £42!

So far so good, I wanted to say yes go out and buy them, however, they have one major drawback, If your viewing site requires the use of light pollution filters, or coloured filters in my view, essential for planetary observations they just do not work. I tried to thread a variety of filters, but the 32mm and 16mm eyepieces have threads but don't fit, they are slightly too proud, and the 26mm eyepiece does not have any thread what so ever. I did speak to the supplier, who is aware of the issue of fitting these filters. They have had coloured filters and compact Barlow Lens available with M30x1mm outer threads to fit these Plossl 1.25 inch eyepieces. The new Plossl 26mm eyepiece will also have M30x1mm threads made. All in all right at the end they failed. I wanted so much to pass them, but if the manufacturer can sort the problem without adding to the cost they could still end up being a winner.

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## **Communicating Astronomy Conference October 22<sup>nd</sup> 2011**

**Roger Butler**

In August, the Newbury Astronomical Society announced it would be holding a conference on 'Communicating Astronomy' at the Rutherford Appleton Laboratories in Didcot, headquarters of the Science and Technology Facilities Council. Even though there was as yet no programme, Theresa, Ian and I realised that this could be a useful event to interface with other societies and learn about initiatives elsewhere. So we signed up immediately.

Came the day, we headed off very early in the morning along the M4 and were soon at the Harwell Campus. The buildings looked very much like an 1950's artist's impression of a future moon base. Minimal, curved shapes, sleek lines. The view through some lab windows was less futuristic – dexion frames, trailing wires, gaffer tape and winking monitoring equipment – Heath Robinson would have felt right at home !



*Hi Tech. Campus at RAL*

We set up a stall and our display stands with the theme of outreach, showing images from our events this year. There were about a dozen stands in the exhibition area. It was good to see many familiar faces, who have presented CAS lectures, also setting out their wares: Bob Mizon and the Campaign for Dark Skies and stands from Newbury, Mexborough and Reading Societies.

Time to head off to the lecture theatre for the day's main events: a series of short lectures.

But first the health and safety announcements. In the case of a fire: the siren will sound, evacuate the building immediately. In the case of the siren and a klaxon (remember those ?): stay where you are. Presumably they will tell us when the mushroom cloud has dispersed and it's safe to come out again (?)

After a brief introduction given by Chris Hooker, Chairman of Newbury AS and Jo Lewis from the RAL, we began with Dr Robert Simpson and 'From Galaxy Zoo to Zooniverse'. He gave a similar talk to CAS members on October 29<sup>th</sup> 2009. In case you don't know, Galaxy Zoo is similar to the SETI scheme and was an idea from Chris Lintott to get amateur astronomers working at home over the internet, to categorize the overwhelming number of galaxies being discovered by Hubble and other telescopes, which the professional astronomers had no chance of being able to process. It has been a runaway success and more than 65,000 galaxies are now being sorted in *one hour*. The scheme has recently expanded to feature 12 specific projects, all similarly weighed down by masses of data. These include the moon, planet hunters, solar storms, weather and whales. It seems amateurs – and there are now 480,000 signed up worldwide - just love getting involved and helping professional scientists do real science. Take a look at the Zooniverse site and see if you would like to get involved.

Next Dr Sarah Roberts from the University of Glamorgan in Treforest gave an exposition of the Faulkes Telescope Project which she directs along with colleague Paul Roche. Again for those who are unaware, the Faulkes Project was set up by philanthropist Dill Faulkes to provide free professional telescope access for school children, right in their classrooms over the internet. So the



schools, say in daytime UK, can direct the telescope in Hawaii or the telescope in Australia (where it will be dark) to image objects in space and have the data downloaded straight to their school computers for processing. This is an amazing concept and takes full advantage of the technological opportunities available today. The project is being extended to form Las Cumbres Observatory Global Telescope Network (LCOGT) with 5 more, large telescopes across the globe. Surely this will inspire the next generation of astronomers?

Dr Chris Davis from the RAL gave a detailed description of his latest work with Solar Stormwatch – part of Zooniverse. This takes data from Soho and Stereo which are focussed on the Sun, trying to detect and measure the solar mass ejections when they hurtle out in all directions of the solar system. They are potentially lethal to our life on Earth and certainly life in space. They could so very easily have killed the Apollo astronauts if they got their timing wrong. A massive storm occurred between Apollos 16 and 17 - it was a very close thing.

Of course the main problem is to determine in which direction and how fast the storms are headed and, as with asteroids, it is always the one that is coming straight at you that is the most difficult to detect. Speed of processing is of the essence and, once again, 'citizen science' allows data to be processed into useful information far faster than the small team of researchers.



*Theresa and The CAS Display*

That was enough food for thought for one morning and food was next on the agenda. Lunch was followed by time back in the exhibition centre, chatting to some of the 111 delegates who had attended. Our display gained lots of attention and we were asked about our activities by many interested attendees. Particular reference was repeatedly made to the CAS membership (now standing at over 400 – “you must be rolling in money!”) and the 15 outreach events listed for 2011.

The afternoon session was started by Jo Lewis (RAL) who introduced us to the DarkSkyDiscovery Project . The official launch and press release followed a couple of days later. This is an extension of the excellent work of DarkSkyScotland who have succeeded in focussing much public attention on astronomy and in gaining Dark Sky Park status for Galloway Forest – the first such park in the UK. This has made many elsewhere wonder if their area could be designated an officially dark sky area which would provide a boost to tourism. So the DarkSkyDiscovery Project has divided up England into 9 areas, each with it's own coordinator who will act as an amateur for astronomy projects and encourage surveys of light pollution and locate areas of dark skies. DarkSkyWales is currently run by the University of Glamorgan



Any initiative which seeks to advance the cause of public astronomy is to be welcomed. But delegates were quick to point out that the burden of delivering outreach projects lies with the amateur societies, DSD has no funds with which to assist them to do this or encourage them to do even more of this. In fact most societies are flat out already, coping with the demand to the limit of their resources. And all projects come at a cost.

The DSD coordinators will each have a massive area to cover so they are encouraging communities to help determine the best places in their location for astronomical viewing. This would then be conveyed to local councils in the hope that they will be willing / able to prevent further intrusion of lighting. Unfortunately the legislature to effect this is not in place and DSD has no powers of enforcement whatsoever.

So I wait to see if the scheme will have any lasting benefit and to hear what proposals Dark Sky Wales have for amateur astronomical societies in our neck of the cosmos.

We were next reminded of the important part that magazines and journals have in amateur astronomy by Dr Emily Baldwin of Astronomy Now magazine. There are many such magazines available and they are gaining in popularity despite the impression that all the latest information is found on the web. We were informed about how the magazine is put together, articles commissioned, how to write a magazine article and, most importantly, deadlines !

Dr Jenny Shipway is director of the planetarium at INTECH, near Winchester. She is also pretty much the only staff ! She operates the planetarium singlehanded and has to cater for a wide variety of ages, interests and tastes with a turnover of 90,000 visitors per year. An enormous responsibility but one that she simply relishes. Her enthusiasm is highly infectious and her basic message clear. When trying to communicate astronomy, just be yourself and let your commitment and passion do the work. Streams of facts and figures just confuse and will not be remembered.

The final talk was given by Professor Mike Edmunds, our Vice President. He succeeded in intriguing all with the title: 'Middlemarch, Einstein and the Barmaid.' Having seen his vivid portrayal of 'Mr Newton' in costume, I felt sure he would turn up dressed as George Eliot, Albert E or even a barmaid ! He did not. And though his new lecture was excellent, overall it was his commitment and passion for his subject – just as Dr Shipway had advocated - which captured his audience. He took us through public literature all the way from the Arosatus in 276BC to the present day, showing how science, and in particular astronomy, was discussed in every age. Middlemarch – a book not for the faint hearted – contains very many references to the science of the day and the reader was expected to be acquainted with this already. Through anecdotes and science fiction Professor Edmunds showed our preoccupations remain the same – what is it all about ? / who are we ? - and the unquenchable thirst to know more.

And the barmaid ? Well she turned up in a quotation of Ernest Rutherford himself: "If you can't explain your physics to a barmaid it is probably not very good physics". And as our speaker quipped, the situation for employment of science graduates is now so grim that it is quite conceivable that the barmaid has a PhD and would fully understand 'your physics'.

However it was good to note that of the 8 speakers on the day, four were confident young ladies with PhDs, forging ahead with their science careers, and who had not been called to the bar.

I know that Chris Hooker and his colleagues at Newbury Astronomical Society worked very hard to put this event together. I thought it was very useful and I do hope that they can be persuaded to put on another similar day in the future so that amateur astronomical societies can meet again to discuss common issues, learn from each other and expand our horizons.

***"I would not creep along the coast but steer out in mid-sea, by guidance of the stars."*** - George Eliot, *Middlemarch*

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## My Day in Tweetup Heaven

John Richards

I, along with 59 other lucky space enthusiasts, attended the 1ST ESA spacetweetup in Cologne, Germany on the 18<sup>th</sup> September as part of the German Aerospace day. Here is a record of the AWESOME day. Before I start though, I should probably explain:

### What is a tweetup?

A tweetup is an informal gathering (in person) of people who use the social media site twitter. At a tweetup you meet the people you might only otherwise know in an online sense ; It is an opportunity,if you will, "to put a face to the name". NASA has been running tweetups for the later stages of the Space Shuttle programs and has also arranged other tweetups for other,more recent missions they have flown. There are usually rules governing who can apply to attend a tweetup. You have to:

- Use twitter
- Follow the organisation(s) arranging the event
- Be prepared to pay all your own fees
- BE SELECTED!!

In a spacetweetup, the organisation arranging the tweetup (in this case ESA/DLR) normally arrange exclusive access to scientists, equipment, astronauts and information the public would not have access to. It's an amazing opportunity to ask questions and really get under the skin of a subject.

For the 1ST ESA/DLR tweetup, 60 people were selected. Of those 60, only 5 were from the United Kingdom. I was one of those 5. For more, information on the selection criteria for this tweetup, goto <http://www.stff.co.uk/blogs> and click on spacetweetup on the right hand 'categories' column.

## Spacetweetup

My journey to space heaven started early on Saturday morning; the day before the event. When I say early, I mean 'criminally' early. 04:30am to be precise. Only burglars and milkmen are up that early in the morning. I met neither though, as I jumped on the 05:24 train from Pontypridd to Cardiff. The 06:45 Inter-City train from Swansea to Paddington dutifully arrived on time, and I found my reserved seat. It was a fairly uneventful journey during which time I tweeted about my impending excitement, and charged the battery on my phone. I disembarked at Reading, crossed the platform to catch the train to Gatwick Airport. I arrived at the airport with plenty of time to spare, so wandered around 'smiths' to find something appropriate to read. I found 'Packing for Mars', a fantastic book by Mary Roach. In it, she asks lots of the space related questions you'd "like" to ask, but don't. Such as: "Can you drink beer in space?", "What happens when you vomit in your space helmet?", and "Has a fight ever broken out in space?" It certainly was a suitable book for the journey. The plane took off and landed at Cologne/Bonn airport about 2 ½ hours later (taken the extra hour into account) After being selected for the trip, I had informally agreed to meet up with @Nickastronomer. He's a fascinating guy, having 'rodied' with Ultravox in the 1980's and is now equipment consultant for Astronomy Now magazine, Pro-Am Programme Manager at the Faulkes telescope, as well as holding down a full time job.

Part of the joy of attending an event like this, is the associated events you can attend; "to make a weekend of it" as it were. One such event arranged for this spacetweetup was a visit to the Bonn Observatory. This was a meeting of tweetup attendees and local amateur astronomers. Situated in what is now a Bonn suburb, in its heyday, the Bonn Observatory, was an astronomical Mecca. It is where Friedrich Wilhelm August Argelander, a German astronomer, published his catalogue of the fixed stars visible by the naked eye, and where he also created a method for estimating the brightness of the stars in relation to one another.

It is customary at a spacetweetup to have what is called the #endlessBBQ. This was our opportunity. Interspersed between the eating, drinking and generally having a convivial time were presentations on STS-135, extreme Lunar photography, a tour of the former observatory (which is now a performing arts studio) and a talk about the HyperX add-on for Celestron Cassegrain telescopes. ALL very interesting stuff.

For ME, a large part of the spacetweetup was actually meeting people who you may have 'spoken' to on twitter for months. After the BBQ, we met up in a local

bar. I suspect the locals wondered whether aliens had in fact landed. A very pleasant evening was had by all and new friendships forged. By the time my head hit the pillow it was 01:30 on Sunday morning. A long, but enjoyable day.

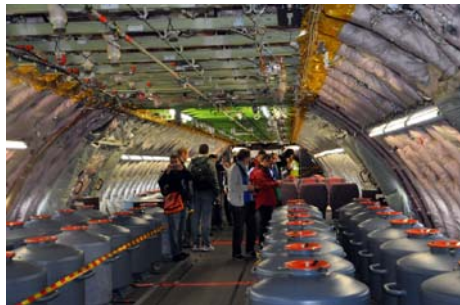
## **Spacetweetup Day**

The battery on my phone had died the previous evening. I had no other clock, and the hotel room didn't have anything as enlightened as an alarm, or even a wake-up call!! This meant I had a fitful nights sleep. My ultimate nightmare, was of course, missing the bus, and hence the spacetweetup. I had of COURSE, brought a converter plug with me; but it was one for the United States (for my trip to watch the launch of STS-133), and wasn't really much use in mainland Europe!! The pick-up point was around ½ mile from the hotel (quickly renamed ISS House, as so many of the spacetweetup attendees stayed there.) At 07:30 we all the made the bleary eyed trek from the hotel to the coach. We were met by Erica, our ESA/DLR contact, ticked off a list, handed a blank name badge and within 10 minutes were off. It wasn't a long journey before we arrived at the ESA astronaut centre, but the buzz of excitement could be sensed by everyone on the coach. WE WERE ATTENDING THE SPACETWEETUP!!

After disembarking from the bus, the first order of business was to set-up. Oddly all 'The Brits' sat together. From my point of view, it was because I needed a UK/Euro power connector. A plethora of tablets, laptops, camera (still and video), phones were extracted from people's bags. We were ALL journalists for the day.

On our table were myself, @nickastronomer, @drlucyrogers and @spacekate. A good knowledgeable group to be around. After setting up our equipment, it was back on the bus to visit the 'Zulu Platform'. This is where the 'kit' was.

The first thing we saw was the Airbus A380 Zero G plane. This is the plane on which a lot of the electronic equipment destined for space is tested. It is a MASSIVE plane, and is very sparse. Gone, are nearly all the protective plastic we are used to seeing on aeroplanes.



Instead, lots of wires and equipment to measure performance are visible. Also, there are hardly any seats. Instead, lots of grey canisters filled with water serve as ballast. This helps the scientists exactly position the centre of gravity on the plane. On the lower deck of the plane are the electronics that control this massive beast.

A short walk away was SOFIA (Stratospheric Observatory for Infrared Astronomy). For those who don't know SOFIA is a large (2.5 metre) infrared telescope mounted in the back of a former commercial 747 jumbo jet. Of the 75,000 visitors to the German Aerospace day, only 5,000 actually got to go



INSIDE the plane. It is TRULY a sight.

The telescope is mounted at the end of the Jet, and sits within a massive gyroscope.

Then it was back to the tent for the main event! After getting slightly lost, along with a number of other attendees, we arrived for a talk about the SOFIA space telescope by Bob Meyer from NASA and Alois Himmes from DLR (the German National space agency)

The SOFIA telescope is housed in an old commercial 747 jet, formerly owned by PAN-AM and originally manufactured in 1973. It was purchased by NASA in 1997, and work started modifying the jet in 1998. It is 80% funded by NASA and the remaining funding comes from the DLR.



Currently, the flight schedule for SOFIA is worked out for the next 12 months, though it was stated 'some' flexibility was possible if a major astronomical event occurred. SOFIA is based in the US at present. All flights are done in the US because the flight plan is never straight and in land masses where lots of borders exist (i.e. Europe) constant contact with air traffic controls would make these flight plans impossible.

Based on the amount of maintenance the plane and equipment requires, the SOFIA telescope normally manages 7 flights in a 2 week period. Each flight lasts around 10 hours, with about 8 hours actual 'observing time'. This allows for around 1,000 science observation hours per year.

A number of questions were asked about turbulence and 'seeing'. It was pointed out that atmospheric 'seeing' is better flying at 800km an hour, and the long infra red wavelengths captured by the telescope are less susceptible to movement than visual wavelengths. Also where SOFIA flies, there is less air, and hence less turbulence. In videos showing SOFIA it 'appears' when turbulence occurs the telescope is seen to move. In actual fact it is the plane moving around the telescope. The gyroscope within the telescope mount keeps it fixed on its target.

SOFIA is able to see new stars being formed, interstellar clouds, spot stellar evolution and perhaps even planetary formation. Germany has so far spent around €95 million on the project, and the US has spent around \$1 billion. It is hoped that as the project files more often outreach will be possible; with teachers flying on board. It is also hoped that New Zealand can be used as a possible based for Southern sky observation.

Next, we were introduced to astronauts Paolo Despoliation and Cary Coleman. Paolo and Cady were, of course, part of the ISS expedition 26/27 crew and they introduced us to the MagIStra experiments. These were conducted on the ISS and consists of an intensive programme of experiments, ranging from radiation monitoring to measurements that could improve oil recovery in petroleum reservoirs. The missions 30 experiments also cover human research, fluid physics, biology and technology demonstrations. Paolo, as an accomplished photographer, also used ESA's novel 3D camera to show unprecedented images of the ISS.



During this time, and for most of the day, astronauts were dropping by to say "hello"?. The DLR site is the home of ESA astronauts, where some of their training takes place. I think we saw around 12 astronauts in all. What I was struck by, was how seemingly 'ordinary' they appear. No massive ego's, no gung-ho attitudes, just people doing an amazing job, with lots of backup, which they seem to TRULY appreciate.

Lunch followed, which gave us an opportunity to stretch our legs, grab some food (kindly provided by ESA/DLR) and soak in the atmosphere of the day. This is the 2nd German Aerospace day. The 1st was held in 2009, at the same venue, and was attended by over 100,000 people. Figures for this year's event suggested around 85,000 attended. This was probably due to the weather which was appalling in parts. As well as SOFIA and the Zero-G plane, there were military aircraft, helicopters and various ESA facilities were open to the public. It was very much a party atmosphere. Tents selling beer and food, alongside tents exhibiting telescopes very much in evidence. A central stage also held interviews with astronauts and during lunch a Star Wars show was held. By this time the weather had improved greatly and the sun was shining.



After lunch more astronauts including the crew of STS-134 visited us. This was the crew that installed the AMS (Alpha Magnetic Spectrometer) on the ISS (International Space Station) Then it was time for the group photo to be taken.

After the photo, an astronaut was assigned to each table. Each astronaut was supposed to spend around 5 minutes answering questions at a table and then move to the next table. As it turned out, each table 'kept' their astronaut occupied for 30 minutes. Paolo

Nespoli was assigned to our table. He was the astronaut that took those amazing ISS/shuttle photos. He seems a genuinely nice guy, very open with his answers and aware of the wonderful opportunity he has been given.

Thomas Reiter, the Director of ESA's Directorate of Human Spaceflight and Operations was introduced next. A veteran of more than 350 days in space, he has flown on the Space shuttle (twice), and also spent extended times aboard both the Mir and International Space stations.



STS-134 Crew



Thomas Reiter



Samantha Cristoforet

More Fascinating talks followed. Paolo Ferri and Ed Trollope gave a talk on the Rosetta cometary mission. It is a probe, launched in 2004, that with four gravity assist manoeuvres, will land a probe on comet 67P/Churyumov-Gerasimenko in 2014. No-one is 100% certain what the exact make-up of the comet is, and therefore ESA scientists have had to cater for a number of landing scenarios. One includes a harpoon!!

Alexander Soucek gave a presentation on earth observations and how space probes are helping to conserve the planets resources. He was brilliant, and knew how to keep the crowd focused during his talk (which was NOT easy with interruptions from astronauts 'popping' in). These guys just have an amazing passion for their work and it shines through when they speak.

Other astronauts we saw included Luca Parmitano (@astro\_luca), Samantha Cristoforet (@astrosamantha) and Alexander Gerst. He informed us he had only been assigned to a crew very recently. While details of his mission are hazy at the moment, he hopes to be aboard the ISS aboard Expedition 36/37 in around 18 months.

Tweetups are the brainchild of NASA and the chief architects of this movement; namely Beth Beck and Stephanie Schierholz were next onto the podium. They explained in turn, how it started, what NASA allow and doesn't allow and how NASA and ESA tweetups vary. At one point while Stephanie was talking, Beth suddenly started tweeting and taking pictures. They are both wildly enthusiastic about the tweetup concept and are hugely likeable people.







weather at the Black Cock Inn 50 yards from Castle Heights golf course.

Sadly this month saw the death of Don Stenhouse, a member and benefactor of the society for many years. Don never lost his sense of humour despite his illness. He will be much missed.

September's event at Dyffryn gardens went well as did the stand we had at the Usk show both attracting new members. A major success was the stargazing evening we staged at Blaenavon Heritage centre. The organisers said it was the most popular of all the events they had held there. We must be doing something right.

Naturally the success of all our events depend upon volunteers but with the number of events we are being asked to attend we need more, so if you can help out even for a few hours it will be a welcome contribution.

**There are a number of new features on our website –firstly there is now a form on the website that you can fill in if you would like to volunteer for a specific event.**

**It is now possible to renew your CAS membership via Paypal.**

**With Xmas approaching don't forget that we have an Amazon link on our website, if you log in from this link Amazon will make a small payment to the society. It will not cost you any extra.**

You may have seen at meetings some of the merchandise we have for sale. To add to the fleeces we now have packs of cards/envelopes featuring our members images, blank inside for your own message they would make great xmas cards etc.

I will be looking for new contributions next year so sharpen up those imaging skills and don't forget that the observatory can be used for imaging as well as observing, you will need to be trained in observatory use and anyone interested in training should see Roger Butler our current observatory manager. Send any images you would like considered to me. Any pictures must have an astronomical content. Roger has taken over from Grahame Carter who is taking a well deserved break, but to whom thanks are due for his hard work to date.

Remember that we also have our own Facebook page so hope to see many of you posting there.

Finally the xmas meal is being renamed the winter meal-- for no other reason than that during the period just before xmas ,there is often a clash with office/works parties when the 3rd turkey dinner is beginning to lose its appeal. It is to be moved to January where it is hoped it will brighten up the post xmas dull days and giving us a greater choice of venue and menu so we hope many of you will join us then.

# Up-coming CAS Public Events

Date	Time	Event	Venue
21 <sup>st</sup> January	7:00pm to 9:00pm	BBC Stargazing Live	CAS Observatory, Dyffryn Gardens
25 <sup>th</sup> February	7:00pm to 9:00pm	Stargazing from a Dark Site	Cwmcarn Forest Drive and Visitor Centre
3 <sup>rd</sup> March	7:00pm to 9:00pm	Stargazing from a Dark Site	Brecon Beacons National Park Visitor Centre

# CAS Lectures December to April

Date	Title	Lecturer
8 <sup>th</sup> December	Mission to Mars.	Gemma Lavendar, Cardiff University.
5 <sup>th</sup> January	A Planetary Nebula Observing Marathon.	Martin Griffiths, Glamorgan University.
19 <sup>th</sup> January	Aliens.	Marc Delaney, Cardiff Astronomical Society.
2 <sup>nd</sup> February	Studying the Dark Universe with X-Ray vision.	Dr Ben Maughan, Bristol University.
16 <sup>th</sup> February	Astronomy without a Telescope or Binoculars may surprise you.	Martin Chick, Cardiff Astronomical Society.
1 <sup>st</sup> March	Quasars and Active Galaxies	Dr. Marek Kukula, Royal Greenwich Observatory. London
15 <sup>th</sup> March	A brief history of the telescope from the bronze age to the space age.	Peter Wise, Abergele.
29 <sup>th</sup> March	Time and the Stars.	Bob Mizon, Dorset.
12 <sup>th</sup> April	Annual General Meeting.	Cardiff Astronomical Society
26 <sup>th</sup> April	Binoculars and Telescopes for Observing the Heavens.	Prof. Ian Morison, University of Manchester.

# Almanac Compiled by Ian Davies

## Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
01 <sup>st</sup> December	05:53	07:54	16:07	18:09
08 <sup>th</sup> December	06:01	08:03	16:04	18:07
15 <sup>th</sup> December	06:07	08:11	16:03	18:27
22 <sup>nd</sup> December	06:11	08:15	16:05	18:09
29 <sup>th</sup> December	06:14	08:18	16:10	18:14
01 <sup>st</sup> January	06:14	08:18	16:13	18:16
08 <sup>th</sup> January	06:14	08:16	16:21	18:23
15 <sup>th</sup> January	06:11	08:12	16:31	18:31
22 <sup>nd</sup> January	06:07	08:05	14:42	18:40
29 <sup>th</sup> January	06:00	07:56	16:54	18:50
01 <sup>st</sup> February	05:56	07:52	16:59	18:55
08 <sup>th</sup> February	05:47	07:41	17:12	19:06
15 <sup>th</sup> February	05:35	07:28	17:25	19:17
22 <sup>nd</sup> February	05:23	07:14	17:38	19:29
29 <sup>th</sup> February	05:08	06:59	17:50	19:41

## Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
10 <sup>th</sup> December	Puppids-Velids	09h00m	-48°	15
15 <sup>th</sup> December	Geminids	07h28m	+32°	75
23 <sup>rd</sup> December	Ursids	14h28m	+78°	5
26 <sup>th</sup> December	Puppids-Velids	09h20m	-65°	15
5 <sup>th</sup> January	Quadrantids	15h28m	+50°	80

## Observers Club Meetings

Date	Day	Time	Venue
27 <sup>th</sup> January	Fri	20:00 - 22:00 GMT	Black Cock Inn
24 <sup>th</sup> February	Fri	20:00 - 22:00 GMT	Black Cock Inn

## Observing Sessions

Date	Day	Time	Venue
16 <sup>th</sup> or 17 <sup>th</sup> December	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*
6 <sup>rd</sup> or 7 <sup>th</sup> January	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*
13 <sup>th</sup> or 14 <sup>th</sup> January	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
3 <sup>rd</sup> or 4 <sup>th</sup> February	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
17 <sup>th</sup> or 18 <sup>th</sup> February	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*
9 <sup>th</sup> or 10 <sup>th</sup> March	Fri or Sat	20:00 - 24:00 GMT	Dyffryn Gardens
23 <sup>rd</sup> or 24 <sup>th</sup> March	Fri or Sat	20:00 - 24:00 GMT	Castle Heights Golf Course*

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

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

# Almanac December

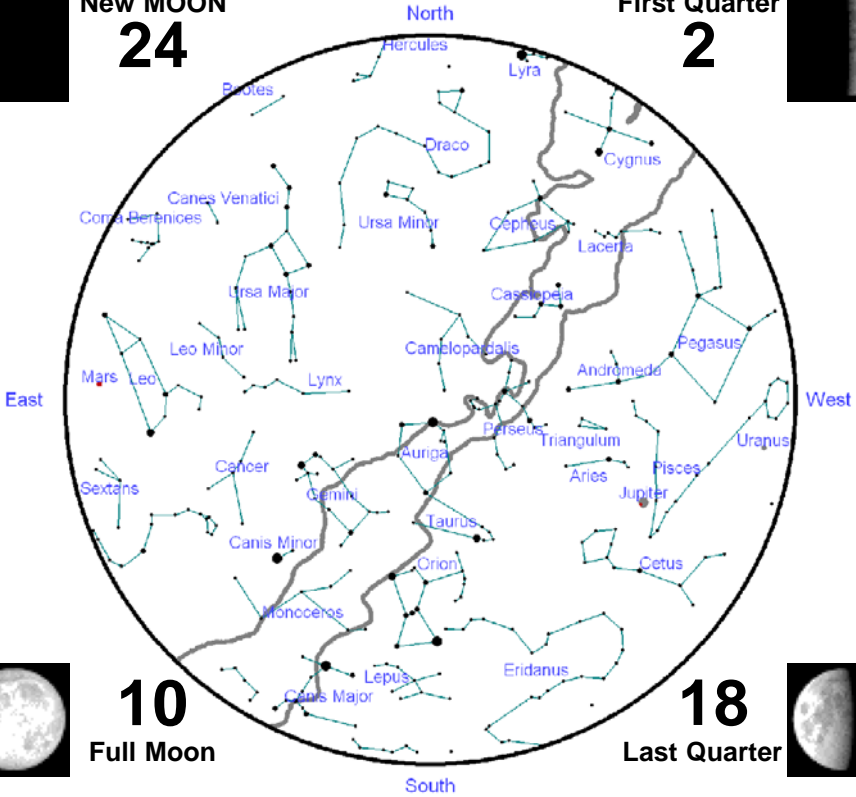


New MOON

24

First Quarter

2



10

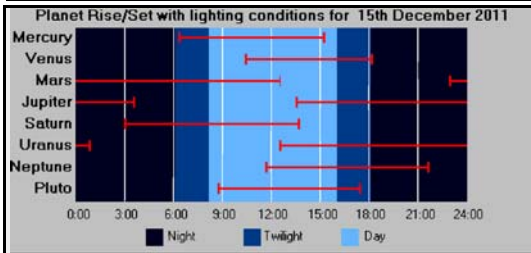
Full Moon

18

Last Quarter



	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Scorpius	16h09m55s	-18°10'03"	06:20	15:12	+0.2
Venus	Sagittarius	19h40m04s	-23°13'37"	10:23	18:09	-4.0
Mars	Leo	11h08m21s	+08°14'52"	22:57	12:30	+0.5
Jupiter	Pisces	01h55m43s	+10°26'25"	13:34	03:31	-2.7
Saturn	Virgo	13h43m42s	-08°12'22"	03:00	13:42	+0.4
Uranus	Pisces	00h03m33s	+00°24'30"	12:34	00:47	+5.8
Neptune	Aquarius	22h14m39s	-11°28'49"	11:46	21:54	+8.0
Pluto (Dwarf)	Sagittarius	18h27m44s	-19°19'52"	08:47	17:26	+15.1



## Planet Events

4<sup>th</sup> Mercury at Inferior Conjunction.  
5<sup>th</sup> Mercury at Perihelion (0.31 A.U.).

The data presented here is for the 15<sup>th</sup> December, positional data is at 00:00 GMT/UT

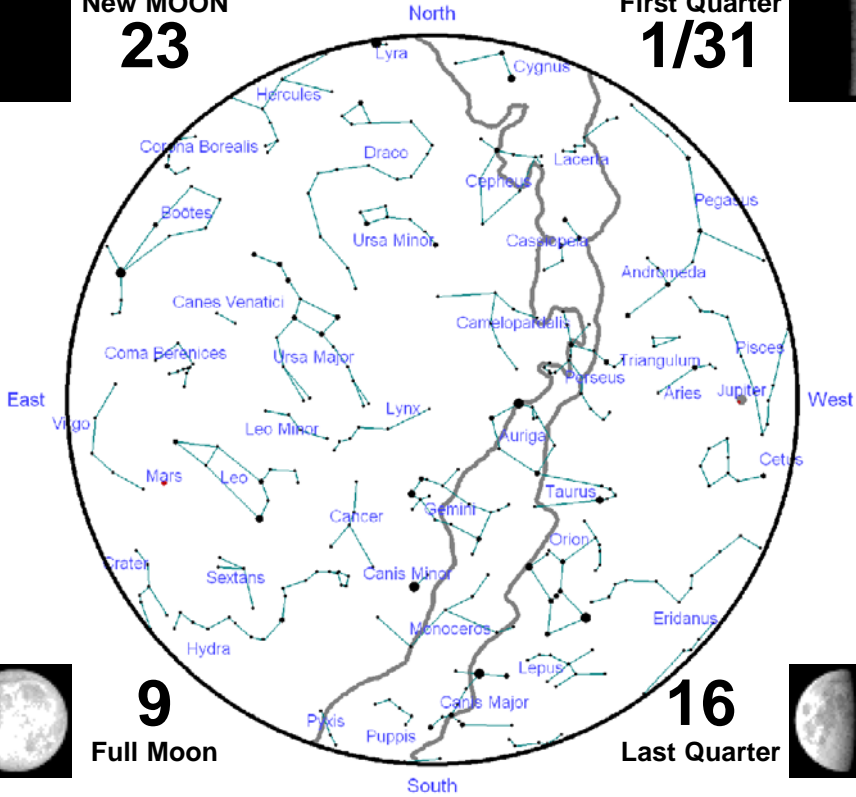
# Almanac January

New MOON

23

First Quarter

1/31



9

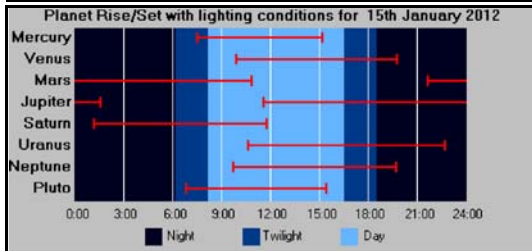
Full Moon

16

Last Quarter



	Constellation	R.A	Dec	Rises	Sets	Mag.
<b>Mercury</b>	Sagittarius	18h43m36s	-23°53'33"	07:29	15:07	-0.4
<b>Venus</b>	Aquarius	22h14m11s	-12°38'00"	09:50	19:45	-4.0
<b>Mars</b>	Virgo	11h38m06s	+06°00'19"	21:37	10:47	-0.1
<b>Jupiter</b>	Aries	01h57m20s	+10°45'42"	11:32	01:32	-2.5
<b>Saturn</b>	Virgo	13h51m26s	-08°48'12"	01:09	11:44	+0.3
<b>Uranus</b>	Pisces	00h05m28s	+00°11'09"	10:35	22:42	+5.9
<b>Neptune</b>	Aquarius	22h21m26s	-10°54'09"	09:48	20:02	+8.0
<b>Pluto (Dwarf)</b>	Sagittarius	18h32m23s	-19°19'21"	06:49	15:29	+15.1



## Planet Events

3<sup>rd</sup> Earth at Perihelion  
 18<sup>th</sup> Mercury at Aphelion (0.47 A.U.).

The data presented here is for the 15<sup>th</sup> January, positional data is at 00:00 GMT/UT

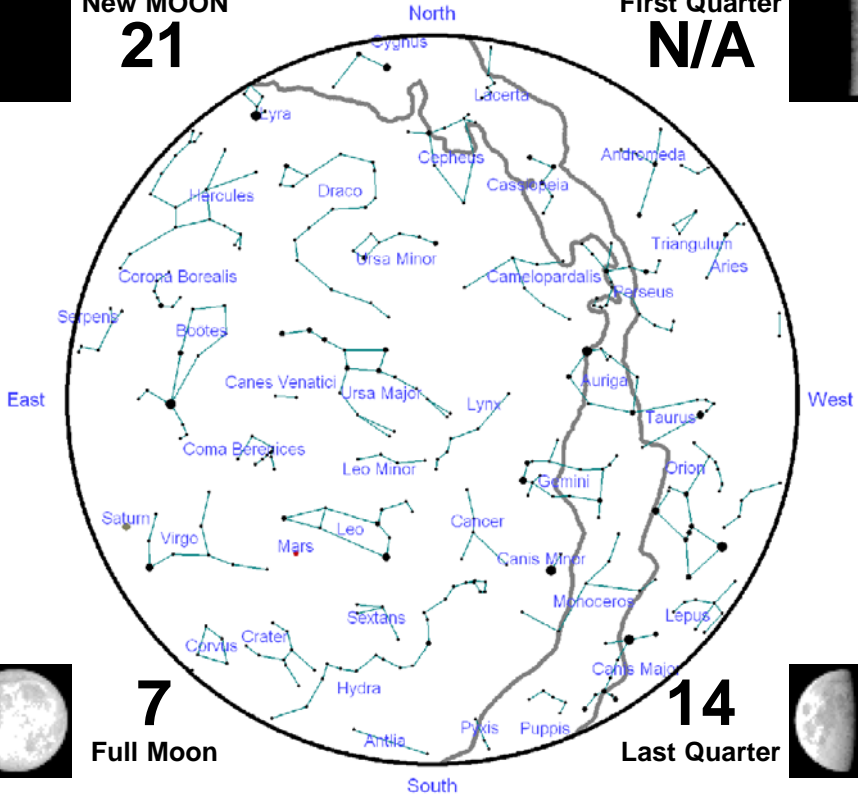
# Almanac February

New MOON

21

First Quarter

N/A



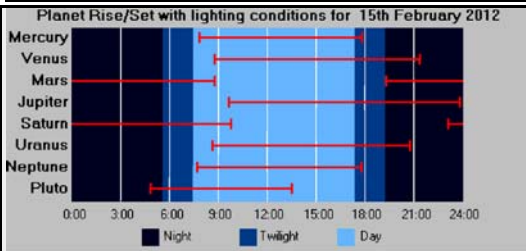
7

Full Moon

14

Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Aquarius	22h17m20s	-12°26'36"	07:50	17:48	-1.4
Venus	Pisces	00h29m10s	+03°03'51"	08:43	21:19	-4.1
Mars	Leo	11h29m42s	+07°46'03"	19:17	08:42	-0.9
Jupiter	Aries	02h10m28s	+12°04'22"	09:37	23:47	-2.3
Saturn	Virgo	13h53m17s	-08°49'46"	23:05	09:44	+0.2
Uranus	Pisces	00h09m57s	+00°19'03"	08:37	20:46	+5.9
Neptune	Aquarius	22h21m35s	-10°53'20"	07:46	18:00	+8.0
Pluto (Dwarf)	Sagittarius	18h36m27s	-19°16'58"	04:51	13:31	+15.1



## Planet Events

7<sup>th</sup> Mercury at Superior Conjunction.

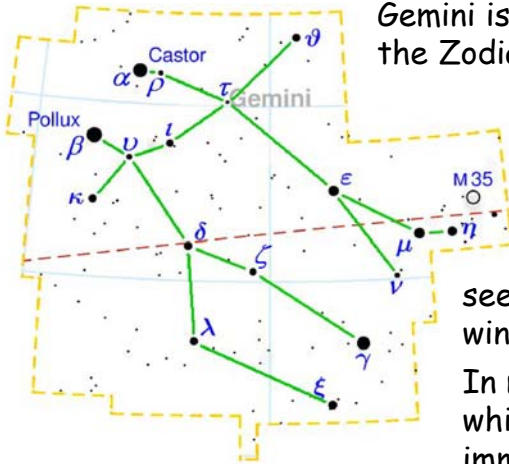
19<sup>th</sup> Neptune at Conjunction.

The data presented here is for the 15<sup>th</sup> February, positional data is at 00:00 GMT/UT



# The Junior Page

## Gemini the Twins



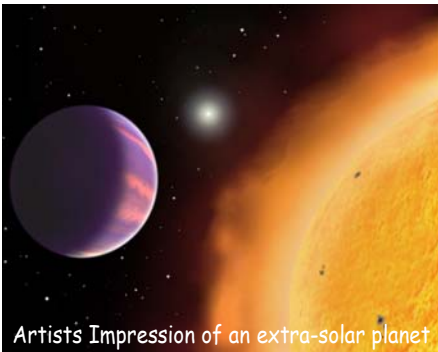
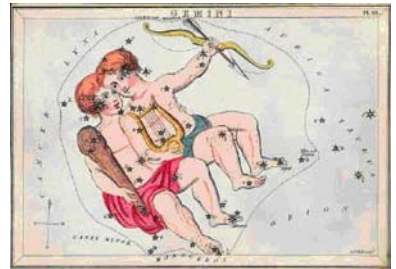
Gemini is one of the constellations of the Zodiac. Gemini is Latin for twins and the constellation is associated with Castor and Pollux in Greek mythology.

The constellation is well seen in the evening during the winter months.

In mythology Castor was mortal while his brother Pollux was immortal, his father was Zeus.

Castor unfortunately was killed so Pollux shared his immortality with him and they were both placed in the sky and became the constellation of Gemini.

The two brightest stars in Gemini are Castor and Pollux.



Artists Impression of an extra-solar planet

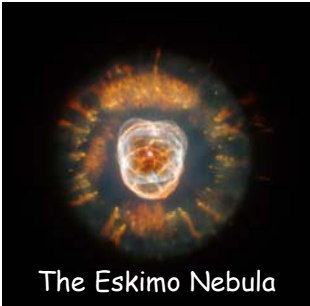
Pollux is the brightest at magnitude at 1.2 and is 34 light years from Earth. It is an orange giant star and an extra solar planet has been discovered orbiting it.

Castor is the second brightest and has a magnitude of 1.6 and is about 49 light years from Earth.

Although to the naked eye it looks like a single point of light

there are six stars orbiting around each other in the Castor system.

There are some deep sky objects in Gemini. The Eskimo and



The Eskimo Nebula

Medusa Nebula's are what are known as planetary nebula, a dying star puffing off its outer gas layers.



The Medusa Nebula

M35, NGC 2129, NGC 2158, NGC 2355, NGC 2266, NGC 2331, NGC 2395 are various open star clusters found in Gemini.

Geminga is a neutron star, the remains of a giant star that exploded about 300,000 years ago and is approximately 550 light years from Earth.



The Geminid meteor shower appears to radiate from Gemini around about 13<sup>th</sup>-14<sup>th</sup> December. Over 100 meteors an hour have been recorded for this shower under good conditions. The shower is associated with the asteroid 3200 Phaethon which some astronomers think is the inactive remains of a comet.