NEWSLETTER

March - May 2017 Issue 178

Full Moon - image taken by Alan Stephens

Contents

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Editorial John Richards

No successful Society runs itself, and CAS is no exception. Organising the varied lecture programme, opening the observatory, maintaining the library, writing the newsletter, organising the public events, and answering members queries, all takes time. The current members of the Committee and Trustees split out these responsibilities, but are always looking for members of the Society, new or established, to lend a hand when and where they can. Perhaps you could spend an hour on a Society stand at an outreach event, or write an article for the newsletter, or direct members to the observatory during a public event. All these tasks are vital to the running of the Society, so why not lend a hand? We currently have a number of vacancies on the Committee, or if you'd prefer a more informal arrangement, why not contact Theresa Cooper, our Public Events Coordinator. You don't need an in-depth knowledge of astronomy, just a willingness to help.

The Committee are currently organising the talks programme for the 2017-18 season. If there's a subject you'd like a talk on, or perhaps you have a burning desire to speak on an astronomical subject that inspires you, then why not put a suggestion in the box, at the front of the lecture room, or contact a member of the Committee via email. A happy membership is always the aim of a thriving Society, and anything you suggest is always discussed at our various Committee meetings. The phrase 'many hands make light work' is never truer than in a Society like ours, so why not make an effort to make the Society even better.

Contact Details

Have you changed your email address or other contact details recently? If so, you could be missing out on receiving important Society information. Please keep us up to date with any changes. Send your revised details to either our Membership Secretary (membership.secretary@cardiff-astronomical-society.co.uk) or Secretary (secretary@cardiff-astronomical-society.co.uk).

Visit CAS on the web at
http://www.cardiff-astronomical-society.co.uk
General enquiries can be sent to:
info@cardiff-astronomical-society.co.uk
As a CAS member you can use the Members Area of the web site to view Society handbooks, committee minutes,newsletters, CIO documents and other Society material of note.

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

CAS on facebook at
http://www.facebook.com/CardiffAS

BEHIND THE SCENES

Philip Wallace/Theresa Cooper

Astronomy Space Day - 28th January

Another wonderfully successful event was held when CAS attended the Astronomy Space Day on the 28th at the National Museum in Central Cardiff. Plenty of people swarming around our stand. Mike was there enrapturing (and possibly ambushing) people with his enthusiasm, and frankly amazing pictures, Our 'cardboard' Buzz proved popular as always, though Darth Vader may have caused a minor issue by threatening to decapitate a senior staff member! By the end of the day the museum counted over 3,000 people through the doors, which may be a record. It shows that science, and astronomy hold a place in people's hearts.

Astronomy Day at the Museum
Credit Katrin Raynor-Evans

In more CAS related matters, we managed to sell lots of merchandise, and the stuff for juniors worked particularly well. We had a good take-up of new members, and we also spoke to some exciting speakers for future events. All in all a very successful day. Thanks to Jim, Kayleigh and the other members of the Outreach Team who help make these events possible.

BBC Stargazing Live 2017 is to be broadcast on 28th/29th/30th March. Our registered tie-in event will be on Friday evening 31st March at Dyffryn Gardens. Exact timings to be agreed with The National Trust. It's a **FREE** PUBLIC event and will go ahead whatever the weather. The observatory will be open for everyone to have a look around at the equipment and the UK meteor monitoring system, manned telescopes outside for everyone to ask about and look through. Actual observing will of course be dependent on the weather! It will be a bookable event via Dyffryn Gardens, so if you're

interested in attending, then contact the Dyffryn Gardens as soon as the programme is announced on the BBC website.

Cardiff Astronomy Festival

This **FREE** biennial event celebrating all things astronomical and space returns on **May 6th 2017** from **10am - 4.30pm** at the **National Museum** in central **Cardiff**. CAS and the National Museum of Wales have arranged a full day of activities, exhibits, shows and help for everyone and all ages.

Techniquest will be there with their inflatable planetarium, lunar samples will be on display, **AstroCymru** are showing 3D films. Explore the Museum's meteorite collection, and use an impact simulator to discover the effects of a meteorite hitting your home town. Think you've found a meteorite? Bring it in and scientists will identify it for you. Want to own a meteorite? **Aerolite Meteorites** will bring a range of these cosmic delights for you to buy.

Experience stargazing through the ages – find out what it was like to look through Galileo and Newton's early telescopes, and how today's high-tech telescopes compare! Need help to get started in this fascinating subject with today's telescopes, then visit the Cardiff Astronomical Society stand. Follow a quiz trail into the '*Evolution of Wales*' gallery to discover a Moon rock collected by Apollo 12 astronauts and meteorites that have travelled millions of miles through space to Earth - enter your answers in a draw for the chance to win a prize. Have your picture taken as an astronaut!

There will also be a specialist stand (**Nippon Optics** of Bristol) with astronomical equipment set up and on offer, and to provide advice on what and what not to buy! **Chepstow Book Shop** will have a range of astronomy and space books, including some written and signed by the astronaut Chris Hadfield. **Dark Skies Wales** will be present. Their aim is to inspire young minds and advise on their workshops, they can supply to schools across the UK. The **Faulkes Telescope Project** is there to inform about their global network of robotic telescopes and the free resources they supply for science education.

So, if you're interested in astronomy and space, this is the place to be on May 6th!

The Night Sky March - May 2017

Hugh Lang

Part 1 The Planets

Due to its radial distance from the Sun, Mercury, the tiny metallic planet, takes approximately 88 days to make one complete orbit. This results in the planet normally making six separate appearances to Earth based observers each year. Due to the planet's proximity to the Sun, it can only be seen for around an hour or so after sunset, during its three evening apparitions, or an hour or so before sunrise, during its three annual morning apparitions. Additionally, and to make matters worse, due to Mercury's angle of the ecliptic (the angle the planets orbit makes to the horizon) the planet rarely climbs high enough into the sky to become obvious to the casual observer, as its normally subdued by the glare of the sunlight scattering in our planets atmosphere. I say rarely, because there are two yearly appearances of Mercury that are favourable to northern observers, these occur in late March and early September.

Mercury in the constellation of Aries passes through superior conjunction on March 7th and should become visible sometime around the middle of the month. The best time to look will be from the March 25th to April 8th, approximately an hour or so after sunset. Mercury, now resides in the constellation of Pisces, at visual magnitude -0.9 and angular size of 6 seconds of arc, and should be a fairly easy object to hunt down. Looking at the planet through a small telescope, around March 25th the observer should see an illuminated planetary phase of approximately 69%. Over the next few weeks the lit planetary phase, visual angular size (and hence it's magnitude) will decrease as the planet moves to conjunction with the Sun, on April 25th, to reappear in the morning sky in May, Unfortunately, as stated earlier, this apparition is not very favourable to observers in the northern hemisphere.

Venus has, during the past few months, been dazzling observers with its brightness, to the point of people asking what that white bright light in the evening sky actually is! Currently the planet is located in the constellation of Pisces. Its visual magnitude at the start of March is a blazing -4.6 with an apparent angular size of some 47 seconds of arc, but a lit phase as seen through a small telescope of only around 16%. By the end of this month the planet

will have departed from the evening sky, moving to inferior conjunction with the Sun on March 25th, to reappear as a morning object around April 5th at visual magnitude -4.3, angular size at 55 seconds of arc and 5% illuminated phase. Venus remains in the constellation of Pisces for the period covered by this article while ever distancing itself from the morning twilight glare. It remains brighter than visual magnitude of -4, though slightly reducing in apparent brightness with its lit phase slowly increasing to around 47% by the end of May.

Mars is still lingering low in the evening sky at visual magnitude 1.3 and angular diameter 5 seconds of arc, residing in the constellation of Pisces. By the middle of the month the planet will have crossed into the constellation of Aries and then into Taurus while growing slightly dimmer and smaller. In mid April the planet moves to place itself close to the Hyades and the Pleiades clusters. During May this planet's apparition draw's to a close, setting in an ever brightening sky some two hours after the Sun. Mars is still distancing itself from our planet Earth further and reduces its angular size to 4 seconds of arc, apparent visual magnitude of 1.7.

Jupiter is currently situated amongst the stars of Virgo, some 7 degrees from the bright star Spica. The planet is closing to opposition and is growing ever brighter and larger. At the start of March Jupiter blazes away at visual magnitude -2.3 and with an apparent angular size of 42 seconds of arc. At the start of March the planet will appear in the south eastern sky at 21:30, crossing the meridian at 03:00 with the planet brightening and growing in angular size. By the end of March Jupiter's visual magnitude will reach -2.5 and apparent angular diameter 44 seconds of arc, and reaches a peak visual magnitude at opposition on April 7th. Jupiter is closest to Earth at 21:27 UT the following day, when the planets angular size reaches 44.25 seconds of arc. Obviously Jupiter, now having regained the status of brightest object in the night sky will remain the 'premier' object for night sky observing for a few months to come! By the end of May Jupiter will still remain within Virgo's clutches, though slightly dimming to apparent visual magnitude -2.3 and visual angular size 41 seconds of arc.

Saturn is a morning object and can be located amongst the stars of Sagittarius, at apparent visual magnitude 0.5 Its declination of just -22 degrees means that it favours observers in the southern

hemisphere On the plus side the planets apparent distance between it and Earth is reducing so its apparent angular size and visual magnitude are increasing. By the end of March the planet's apparent visual magnitude is 0.5, while is equatorial apparent angular size will be 17 seconds of arc, with the rings spanning 39 seconds of arc. By the end of April Saturn will have brightened to apparent visual magnitude 0.3 with the ring diameter reaching 40 seconds of arc. Saturn reaches opposition in early June.

At the start of March the planet **Uranus** is found amongst the stars of Pisces with an apparent visual magnitude of 5.9 and angular size of 3.0 seconds of arc. By the end of March the planet will have sunk down into the brightening evening twilight sky. Uranus is in conjunction with the Sun on April the 14th and will re appear, though as a not a very well placed morning object, rising in a bright morning twilight sky throughout the month of May. The same goes for the planet **Neptune**. It starts March reaching conjunction with the Sun on the second of the month and remains hidden from sight till early June located low on the south east horizon.

Publication Dates

The CAS newsletter is published at the first Society meeting of September, December, March & June. The deadline for submissions is 4 weeks before the publication date, and is 8th June for issue 179. **Why not attach your article, to an email and send it to me, the Editor at *Publications.Officer@cardiff-astronomical-society.co.uk.***

Spaceflight Round-Up

On the day the capsule that carried Tim Peake safely back to Earth was unveiled as an exhibit at the London Science Museum, Tim revealed he is set for a second mission into space. While dates and schedules are sketchy at the moment, Tim was "hugely excited" at the prospect of returning to space. "It's what every astronaut wants to do". In fact, all his 2009 classmates will receive mission assignments, which will mean future missions for Samanatha Cristoforetti, Axelender Gerst, Andreas Morgenson, Luca Parmitano, Thomas Pesquet as well as our own Tim Peake.

After a rocky end to 2016, SpaceX returned to sparkling form with

two launches early in 2017. The 'Return to Flight' mission occurred on 14th January when a Falcon 9 rocket successfully launched a communications satellite from Vandenberg. Then on 19th February, after a couple of attempts, and from an extensively modified Launch Complex 39A, SpaceX launched a Falcon 9, carrying a Dragon capsule full of supplies for the ISS. Both launches were accompanied by the successful return of the first stages to the launch sites. It is being reported that a previously launched first stage SpaceX rocket will be re-launched as early as April/May of this year. Watch this space.

The Celebrity Death 'curse' of 2016 continued and after the death of Edgar Mitchell in February 2016, the last three months saw us lose a number of icons in the spaceflight community. First, on 8th December was John Glenn. The man really needs no introduction, but I'll try. A true American hero, being the first American to orbit the Earth, and many years later, became the oldest man in space, when he returned to orbit as a mission specialist in 1998, aboard the Space shuttle Discovery. Also a highly decorated Navy Pilot, and a 25 year Senator. Just before Christmas, Piers Sellers, aged 61, passed away after being diagnosed with pancreatic cancer. Piers was a climate scientist, originally born in Sussex, who became an American citizen to fulfil his dream of becoming an astronaut. He flew on three Space Shuttle missions, amassing

more than 35 days in space. He missions on the Shuttle coincided with intensive construction of the ISS, and during his six EVA's, spent more than 41 hours helping to construct the outpost. Early in January, the death was reported of Gene Cernan, who in 1972, became the last man to walk on the Moon. A passionate advocate for space exploration, and Man's place in it, Gene was a veteran of Gemini 9A, as well as Apollo 10, before finally setting foot upon the Lunar surface in Apollo 17. If you haven't seen the Documentary "Last Man on the Moon", reviewed by Theresa in Issue 175, now is the time. On the 22nd February, NASA's John C. Stennis Space Center, performed a full duration, 380 second, test of an RS-25 engine. The test was in support of the work being done by NASA with its SLS launch vehicle, which will use four RS-25 engines in its core stage. It is being reported that President Trump (through his 'pick' of acting NASA Administrator) has asked NASA whether packing astronauts aboard the first launch of the SLS rocket in late 2018, is a viable option. He has also asked the agency to investigate using an Orion Capsule to dock to the ISS. The request is made in the **NASA Transition Appropriation Act of 2017.** There is also growing support among some US lawmakers to name the first SLS flight, scheduled to launch in late 2018, after Gene Cernan.

The British Government has agreed to provide grants up to £10 million to further discuss the feasibility of creating a UK Spacesport before the end of the Parliament. At the "Launch UK" event. organised by the UK Space Agency, and attended by UK Minister for Universities and Science Jo Johnson (yes, the younger brother of Boris), offered the money to help develop a commercial launch facility for spaceflight, both suborbital, and perhaps eventually a full

UK launch capability. At the same time as the funding announcement, Mr. Johnson announced the new legislative timetable which will enact the laws to make this happen. Llanbedr, in Snowdonia is the only Welsh site who presented at the meeting. The majority of sites are in Scotland, with one in Newquay, and the other in Manston in Kent.

On the subject of Commercial space, Virgin Galatic SpaceShipTwo successfully completed its third glide test on the 24th February, as was witnessed by Sir Richard Branson, as well as Professor Brian Cox (presumably taking the long way to Australia before presenting Stargazing Live in March.)

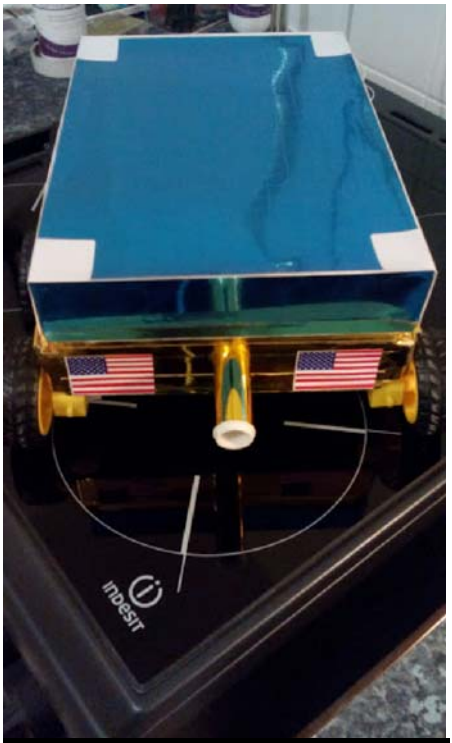
The last Soyux-U variant rocket, a **Progress MS-05/66** flew its 768th, and final flight, in late February, to provide more supplies to the ISS. The missions success was in marked contrast to the previous mission, when the Progress MS-04 crashed before reaching orbit in December 2016. Progress MS-05 successfully docked to the PIRS module 2 days later, carrying fuel, supplies, consumables and water.

Picture from the 'JunoCam'

Juno, the NASA probe orbiting Jupiter, completed its 4th orbit of Jupiter in early February, when it flew just over 2600 miles above its cloud tops, offering stunning vistas of the clouds. While all the instruments worked correctly on this orbit, there are still concerns, and some potential course corrections, relating to thruster issues. Do you want to be involved in the Juno Mission? Well, before a perijove insertion (where Juno gets very close to Jupiter), NASA creates a community discussion page, where areas of potential interest can be suggested by members of the public. If yours is chosen then it will be imaged by JunoCam, the on-board camera. The subsequent images are released to the public, who can

My Model Making Phill Edwards

I have been interested in space exploration since I was about eight years old. I got into my hobby when I watched a TV documentary, back in 1979. There were a series of two documentaries, presented by James Burke that marked the 10th anniversary of the first Moon landing, and the Apollo programme in general. He interviewed key players in the Moon missions, including the astronauts themselves. I was hooked straight away. I would go outside and look at the moon and marvel at the fact that men had walked on it. The Moon became my favourite sky object. I own a number of Apollo DVD box sets: 8,11,14 and 15 missions, My favourite Apollo mission is Apollo 14. Alan Shepard was 47 when he piloted the lunar module to the surface, and quite an age to walk on the moon!

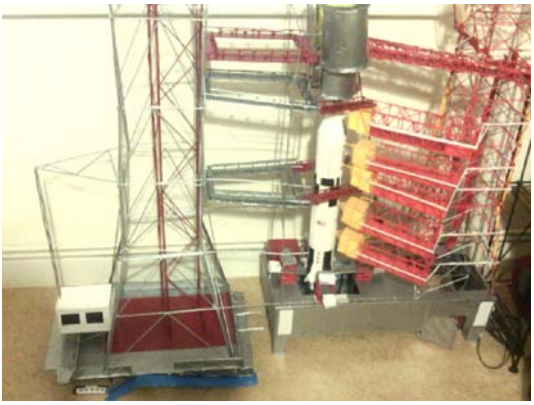


Some of the models that Phill has made

From an earlier age, one of my other heroes is John Glenn. He was a true legend in space exploration, having been the first American to orbit the Earth, and also, 36 years later, when in 1998, at the age of 77, he became the oldest person to fly in space, aboard the Space Shuttle Discovery.

I started model making in 1988, aged 17 years old. I started small, making kits to begin with, such as the model of the Saturn V shown on the following page. When I was 30, I decided to take the plunge and build my own. I did though find it difficult to start with. The Saturn V tower is one of the models I've made myself, along with a couple of the probes currently travelling the surface of Mars. Normally I use wood, PVC glue and paint. When I make a model from scratch, I tend not to do any drawings,

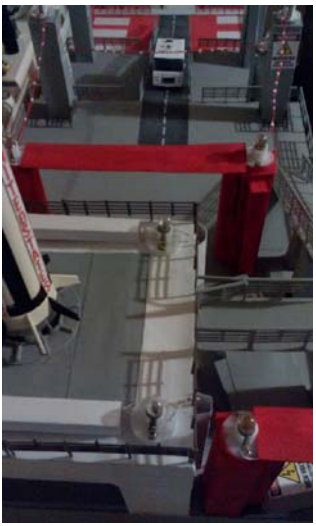
and just "go with the flow". Depending on the complexity of the model, it can take me between a few weeks and a few months to create a fully completed model. I have lived in Cardiff most of my life, though I was born in Glasgow in 1971. I have been a member of the Society since 1997, and I enjoy going to the lectures, which I have always found to be very informative, and very well presented.



Model of the Mars Pathfinder

I have been to the Science Museum in London a few times and seen the Apollo 10 Command Module. Whenever I do see it, I am always aware of how very small it looks inside, how they got three people in there for almost two weeks, I will never know. They also had to train in it!!

Saturn V



I have never been to America, but would like, at some point, to see the Kennedy Space Centre in Florida.

The Society's change to a Charitable Incorporated Organisation - What does it all mean? by the CAS Trustees

We hope that all members received the notifications the Society sent out toward the end of 2016 advising that its application to become a Charitable Incorporated Organisation (CIO) was approved by the UK's Charity Commission on 31 October 2016 and, thus, the Society became a CIO on that date. This article is aimed at providing background to the change to a CIO and explaining the way in which the Society will now operate. **We think you will see that very little has changed, or will change, in terms of the facilities you enjoy as a member of the Society!**

Why was it necessary for the CAS to become a charity? - The Society has effectively operated as a charity for many years in that it was an organisation which provided advice, information and facilities related to astronomy to people in south Wales who wished to receive such help. However, the Society felt - around the time of its 40th anniversary in 2015! - that it was appropriate to seek to become a registered charity in view of the benefits that would be gained. Also, formal registration as a charity had become obligatory by virtue of the Society's annual income exceeding £5,000. After much work by the Committee to determine the best way forward a proposal to seek registration as a CIO was debated by Society members at an Extraordinary General Meeting on 21st July 2016 and was overwhelmingly agreed.

What are the benefits of registered charity status? - There are several, mainly financial. Registered charities are eligible to claim Gift Aid in respect of membership subscriptions and donations and so there will be a significant ongoing increase in the Society's income. In addition, as it is possible to claim tax retrospectively going back up to four years, a sizeable sum of money should in due course be going into the Society's funds. All this would clearly mean that additional astronomical equipment could be purchased and monies, otherwise not available, could be spent in other priority areas.

Official charity status also means that it should be easier for the Society to raise funds from the public at large due to the positive image of integrity and credibility charitable status presents.

In addition, the Society will, as a registered charity, be eligible to claim funds and grants from appropriate bodies (e.g. from, we think, the Big Lottery Fund Wales) but we know this will not be easy as there are many other charities who are nearer the front of the queue. Certain sources of grant funding are, of course, open only to organisations with charitable status and, in some cases, conditions will be attached to any grants made.

Naturally, there is a price to pay - something good is rarely free! - and so the Society, like all other organisations with charitable status, must comply with regulatory requirements, including those relating to the preparation of annual accounts and returns, and there will be a need for greater financial robustness with increased monitoring of expenditure. This will put more an onus on the Society's Treasurer and its Trustees (see below) but we feel it is a good thing - we all want to ensure that the Society, which has now been in existence for over 40 years, continues to run on a sound financial basis. This will mean that we will spend YOUR MONEY wisely and in the best way possible to satisfy the needs of members.

Why was the CIO model chosen? - The Society's Committee spent many months trying to determine which type of registered charity would best suit the Society's and its members' needs. There were several options but we ultimately decided that a CIO structure should be recommended to members for the reason that it would suit a small organisation much better than other, more bureaucratic models, and the CIO registration process, requiring sign-off only by the Charity Commission (and not Companies House as well) would be much simpler. It is early days right now but it seems that the Committee and Society members made the right decision. However, this does of course need to be monitored as our experience of operating as a charity grows.

To register as a CIO the Society needed a new Constitution. The basic form of the new Constitution was agreed by Society members

at the Extraordinary General Meeting in July 2016. It was based on a model CIO constitution provided by the Charity Commission, and this helped with the approval and registration process. We urge you to read the new Constitution and the one-page summary of it that we have now produced - both documents are accessible via the Society's website: http://www.cardiff-astronomical-society.co.uk/

Why have Trustees and a Committee? - The move to registered charity status meant that the Society became a legal entity (but not a company) and so, under UK charities law, its officers became legally responsible for all actions (and inactions) of the Society. Prior to the application being made to the Charity Commission the Society's Committee discussed which organisational structure would work best for the Society and its members in terms of ensuring that minimal material change was made to the way in which the Society conducted its business, provided services to its members and met its new charitable objectives. The standard arrangement within a charity is that its Trustees (the officers of the charity who are in a position of trust or responsibility for the benefit of others) have overall control of the charity and are collectively and legally responsible for making sure that it is doing what is was set up to do. The Trustees are, it should be noted, not responsible for any of the Society's debts but they would be responsible for any misuse of CAS funds.

There are various ways in which the Trustees could be organised - all the officers of the Society (in the case of CAS this would be all the Committee members) could be elected as Trustees or only a small number could be elected and they would then delegate the day-to-day running of the Society to others (again, in the case of CAS this would be all the Committee members). The Society's Committee decided in 2016 - mainly because of the unusually large number of Committee members - that the latter option would be the best way forward as it would mean that a small number of Trustees could carry out the main financial and legal obligations of the Society whilst leaving the actual operation of the Society in the hands of the experienced Committee members.

Who is responsible for what? - Under the terms of a letter and an accompanying delegation document sent to the Society's Committee by its six Trustees (all of whom were elected by Society members at the Extraordinary General Meeting held in July 2016) the Committee was given wide responsibility for the day-to-day running and administration of the Society.

Some of the CAS Trustees are also members of the Committee which ensures there is a close link between what the Trustees are required to do - oversee the Society's operations and satisfy the reporting and legal responsibilities - and the Committee - which can focus its energies on putting on the show!

What has changed in practice? - Since the Society's conversion to registered charity status, there has, as stated at the start of this article, been no noticeable change to what the Society actually does but the new set-up for the Society has of course put it onto a (not too steep) learning curve.

Things have carried on as before at the Society's own Observatory at Dyffryn Gardens, the various star parties and outreach events have continued, fortnightly talks are still taking place at Cardiff University (with increased attendances), and a new programme of talks is currently being devised by the Committee. The Society's library of over 300 astronomical books and DVDs is always open before and after the fortnightly talks, trips to places of organisational interest carry on being planned, and the Society's website continues to be maintained by the Committee in order to keep members informed of CAS events and make available other pertinent information. The Society's annual handbook was issued by the Committee in December and, last but not least, the quarterly newsletter remains under the editorial control of the Committee.

The Cardiff Astronomical Society marches on!

Up-coming CAS Public Events

Date	Time	Event	Venue
31st March	Contact Dyffryn Gardens	Free Public Event - BBC Stargazing Live	Dyffryn Gardens
6th May	10am - 4pm	Cardiff Astronomy Festival	National Museum of Wales

Some of our events are organised at short notice, so for further details of events we are organising, please regularly visit the CAS web site (address is on page 2 of this newsletter)

CAS Lectures March to May

Date	Title	Lecturer
16th March	"Herschel and ALMA find Supernovae as dust factories"	Dr Mikako Matsuura/Cardiff University
30th March	Black Hole Jets at Work	Professor Diana Worrall/Bristol University
13th April	Annual General Meeting	
27th April	The Expanding Universe and its Dark Side	Prof Malcolm MacCallum/ Queen Mary College, London
11th May (1st Talk)	Kepler: the Universe, the Wife and the Witch	Prof Mike Edmunds
11th May (2nd Talk)	DustPedia - a Multi-Wavelength Study of Galaxies	Prof Jon Davies (Cardiff University)
25th May	The Winter Star Party:All Night Observing from 26 Degrees North	Mark Radice

Observing Sessions

Date	Day	Time	Venue
24th or 25th March	Fri or Sat	20:30 - 00:00	Dyffryn Gardens
21st or 22nd April	Fri or Sat	20:30 - 00:00	Dyffryn Gardens
28th or 29th April	Fri or Sat	20:30 - 00:00	Dyffryn Gardens
19th or 20th May	Fri or Sat	21:00 - 00:00	Dyffryn Gardens
26th or 27th May	Fri or Sat	21:00 - 00:00	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 07535 718 669 for more information.

Almanac Compiled by John Richards

Sun Rise/Set & Twilight

Date	Astronomical Twilight Begins	Sun Rise	Sun Set	Astronomical Twilight Ends
1st March	05:07	06:58	17:51	19:42
8th March	04:51	06:42	18:04	19:55
15th March	04:34	06:27	18:16	20:08
22nd March	04:16	06:11	18:28	20:22
29th March	03:58	05:55	18:39	20:36
1st April	03:49	05:48	18:44	20:43
8th April	03:29	05:32	18:56	20:59
15th April	03:08	05:17	19:08	21:16
22nd April	02:46	05:02	19:19	21:35
29th April	02:22	04:48	19:31	21:57
1st May	02:15	04:44	19:34	22:03
8th May	01:49	04:32	19:46	22:28
15th May	01:18	04:21	19:57	22:59
22nd May	00:28	04:11	20:07	23:49
29th May	--:--	04:03	20:16	--:--

Meteor Showers

Date	Meteor Shower	RA	DEC	ZHR
12th April	Virginids	14h04m	-9^0	5
22nd April	Lyrids	18h08m	32^0	12
28th April	alpha-Scorpiids	16h32m	-24^0	5
6th May	eta-Aquarids	22h20m	-1^0	35
13th May	alpha-Scorpiids	16h04m	-24^0	5

Star Party and Observers Club Meetings

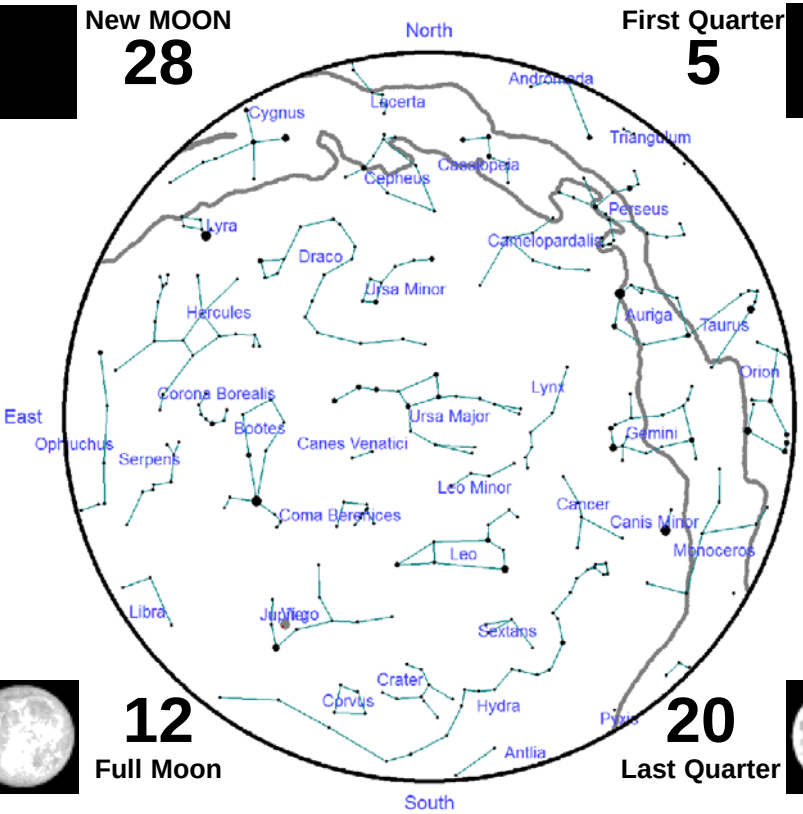
Date	Day	Time	Venue
24th March	Friday	19:30 - 21:30 GMT	Dyffryn Gardens
28th April	Friday	19:30 - 21:30 GMT	Dyffryn Gardens
26th May	Friday	19:30 - 21:30 GMT	Dyffryn Gardens

We always hope for clear skies,but the Star Party will go ahead as planned, regardless of the weather, and are held at Dyffryn Gardens unless otherwise stated.

Almanac March

New MOON
28

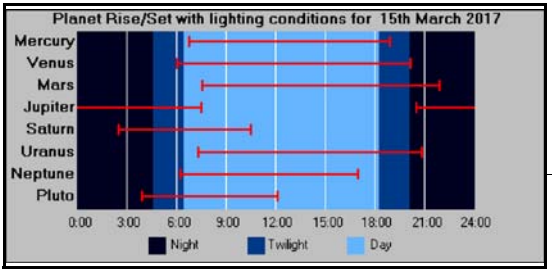
First Quarter
5



12
Full Moon

20
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Pisces	00h09m13s	+00°14'33"	06:44	18:51	-1.5
Venus	Pisces	00h26m33s	+11°53'22"	06:01	20:09	-4.3
Mars	Aries	02h05m08s	+12°53'40"	07:33	21:53	+1.4
Jupiter	Virgo	13h20m26s	-06°48'02"	20:28	07:29	-2.4
Saturn	Sagittarius	17h48m41s	-22°05'18"	02:27	10:29	+0.4
Uranus	Pisces	01h25m09s	+08°20'00"	07:18	20:48	+5.9
Neptune	Aquarius	23h02m17s	-07°08'53"	06:14	17:07	+8.0
Pluto (Dwarf)	Sagittarius	19h27m39s	-21°31'40"	04:02	12:11	+14.3



Planet Events

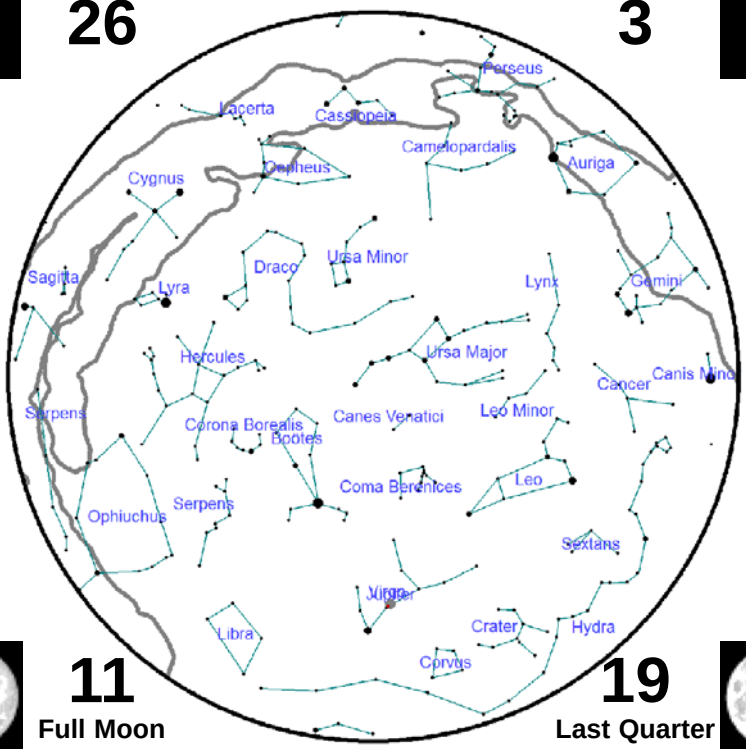
2nd Neptune at Conjunction.
7th Mercury at Superior Conjunction.
23rd Mercury at Perihelion(0.31 A.U.).
25th Venus at Inferior Conjunction.

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

Almanac April

New MOON
26

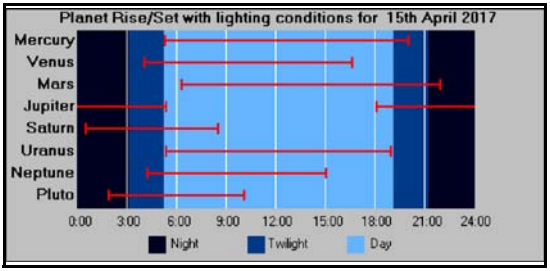
First Quarter
3



11
Full Moon

19
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Aries	02h01m34s	+15°16'03"	05:15	20:01	+3.6
Venus	Pisces	23h41m30s	+02°55'17"	04:01	16:35	-4.5
Mars	Taurus	03h32m15s	+19°38'45"	06:18	21:58	+1.5
Jupiter	Virgo	13h06m25s	-05°21'22"	18:05	05:20	-2.5
Saturn	Sagittarius	17h50m10s	-22°03'42"	00:26	08:29	+0.3
Uranus	Pisces	01h31m37s	+08°58'26"	05:19	18:56	+5.9
Neptune	Aquarius	23h02m25s	-07°08'01"	04:12	15:06	+8.0
Pluto (Dwarf)	Sagittarius	19h27m45s	-21°31'33"	02:00	10:10	+14.3



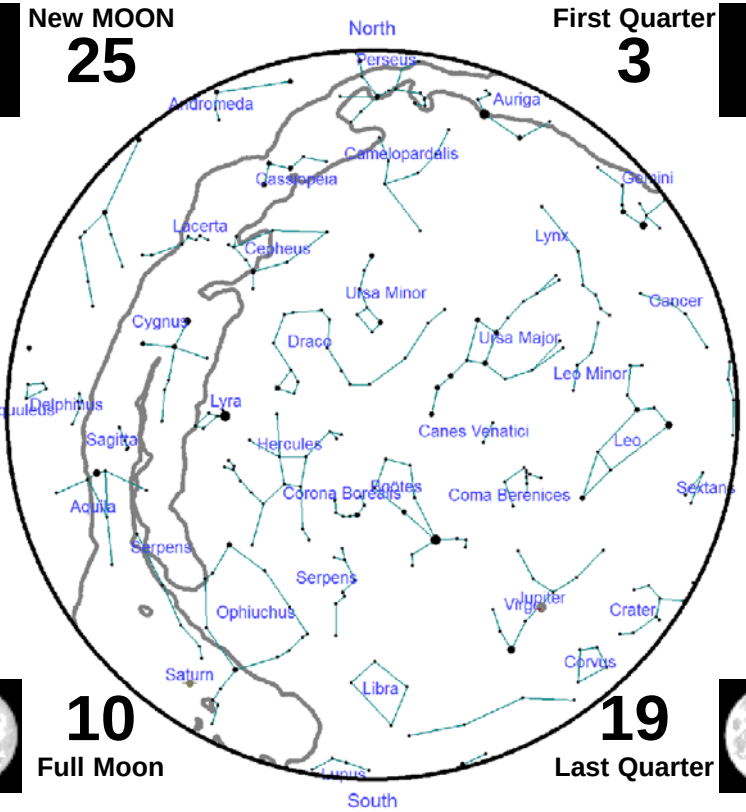
Planet Events

7th Jupiter at Opposition.
13th Uranus at Conjunction.
20th Mercury at Inferior Conjunction.

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

Almanac May

New MOON
25

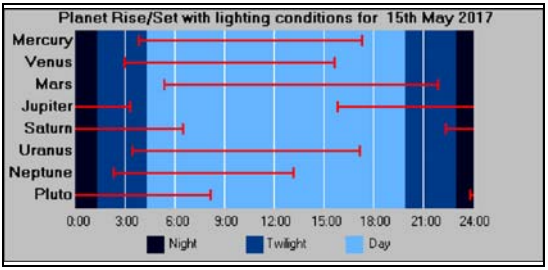


First Quarter
3

10
Full Moon

19
Last Quarter

	Constellation	R.A	Dec	Rises	Sets	Mag.
Mercury	Pisces	01h52m38s	+08°03'20"	03:47	17:14	+0.7
Venus	Pisces	00h38m40s	+03°23'21"	02:57	15:37	-4.5
Mars	Taurus	04h59m24s	+23°28'13"	05:21	21:53	+1.6
Jupiter	Virgo	12h54m36s	-04°12'35"	15:49	03:16	-2.3
Saturn	Sagittarius	17h45m26s	-22°01'16"	22:19	06:26	+0.2
Uranus	Pisces	01h37m54s	+09°34'46"	03:24	17:08	+5.9
Neptune	Aquarius	23h02m34s	-07°07'08"	02:15	13:08	+8.0
Pluto (Dwarf)	Sagittarius	19h27m50s	-21°31'26"	23:58	08:12	+14.3



Planet Events

18th Jupiter at Aphelion (5.46 A.U.).
20th Venus at Perihelion (0.72 A.U.).

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

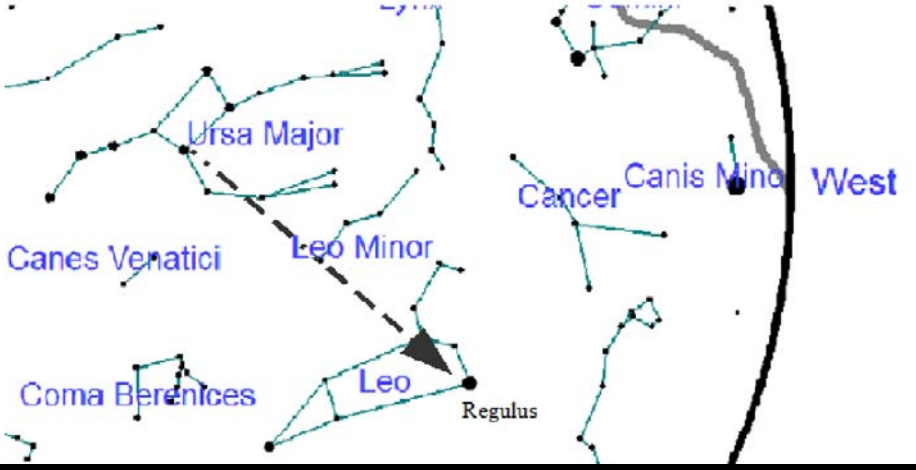
The Night Sky:The stars Hugh Lang

On March 20th, at midnight, the sun crosses from South to North on the elliptical plane at RA 00:00:00 marking the Vernal equinox. Due south at this time we are looking at RA 12:00:00 which is situated between the tail end of Leo and Coma Berenices, and the day and night period is of equal length, the hours of day and night time change most rapidly at this time of the year.

The month of mid-March, mid to late evening, will find Ursa Major high with the pole star situated below the pointer stars. Looking overhead, we will see the constellation of **Auriga** with its conspicuous pentangle shape in the early evening. We are now actually peering through ever deeper portions of our galaxies' Orion arm, so the number of stars and galactic clusters are increasing in number. If you get the chance, have a look at Auriga on a dark clear night you should be able to spot a number of bright star clusters, especially **M36**, **M37** and **M38**. Looking toward the southeast, **Taurus** will be setting, while due south **Orion** the hunter will still be distinctive. To the lower left of Orion and its great nebulae **M42**, you will see bright Sirius. The star that represents the eye of **Canis Major**; otherwise known the Great Dog. Sirius, translated from Greek, means scorching. At a distance of 8 light years it's one of the Sun's closest neighbours. Scattered throughout Canis Major and rising toward Orion are many open clusters just waiting for the keen observer to search them out. Residing to the east of Auriga will be found the constellation of **Gemini** with the bright stars Castor and Pollux, each star representing the head of one of the twins. Further over to the east, the bright star Regulus in the constellation of **Leo** is now ascending into the night sky. Leo, is pursued by the constellation of **Virgo** rising in the east. Between these two constellations are many galaxies of the Virgo cluster, a deep sky observers dream. It's a well known telescopic hunting area for many deep sky objects, of which more later. **Perseus** is sitting on Auriga's west side, also accompanied by the constellations of **Cassiopeia** and **Taurus**. Toward the north of Auriga are the faint constellations of **Camelopardalis** (The Giraffe) and **Draco** (The Dragon). **Andromeda** is now approaching the north western horizon, while

Cetus the whale is sinking into the northwest. As the month progresses,Taurus slowly sinks below the western horizon, followed by the Pleiades open cluster

Moving through to mid April, Orion slips toward the southwest horizon and Leo takes its place. The constellation of Cepheus, which has the appearance of a steeple, lies across the border of the Milky Way and is more or less due north with the distinctive 'W' shape of **Cassiopeia** in the west. To the east of, and just below Cepheus, peaking above the eastern horizon is the first magnitude star **Deneb**, whilst looking further north east Vega should be seen. Overhead lies the distinctive shape of the Plough asterism, part of the Great Bear constellation. Using the two stars in the pan, closest to the line of stars forming its handle, as pointers, find Regulus, the brightest star in Leo and amongst these stars, the bright planet Jupiter currently resides.



Navigating from the Plough 'asterism' to Regulus in Leo

Below Leo, the largest of the 88 constellations, **Hydra** the snake can be located along with the **Sextant**, **Crater** and **Corvus** the crow. Above, and to the east of the tail of Leo can be found **Coma Berenices**, a faint grouping of stars more generally known as 'Berenices Hair'. In the north east the brilliant orange star Arcturus in the constellation of **Bootes** is making its presence known. As we move through to early-mid April, Virgo will be positioned close to the south meridian. Above the head of Virgo is placed Coma Berenices.

Between these two constellations is an area known as the 'Realm of the Galaxies'. It's a deep sky observers delight with 17 Messier galaxies to observe! These are the brightest objects in the Virgo cluster of Galaxies and there are hundreds more, though you will need a reasonable sized telescope to see some of them, and a CCD camera will easily reveal many more. Toward the east, **Hercules** has appeared above the horizon, while in the north east the distinctive white blue star Vega, in the constellation of the Lyrae, has appeared. **Ophiuchus** and **Libra** (The Scales), are appearing in the south east.

We move to the month of early May, and we will see that the constellation of **Hydra** the great sea serpent will have practically cleared the southern horizon. The constellation of **Virgo** is now completely visible in the early evening, its brightest star Spica and the planet Jupiter, close by, very conspicuous in a dark sky. The constellation of Serpens is now rising above the eastern horizon. Above the serpent the constellation of **Bootes**, with the bright star Arcturus cannot be mistaken, whilst to the left of Serpens, the constellation of Hercules, who supposedly is kneeling on the head of Draco is now rising into night sky. Around early-mid May, late evening, the constellation of the **Lyrae** with the brilliant star Vega is now seen rising in the north east. Andromeda has disappeared below the north western horizon closely pursued by Perseus. Orion has all but disappeared though you may just glimpse the bright red star Betelgeuse. Castor and Pollux, the two principal stars of Gemini are still visible toward the west. Also just above, but disappearing over the south western horizon, **Canis Minor,** the lesser of Orion's two hunting dogs, can be seen. Due south of Virgo lies the small constellation of **Corvus** the Crow, with Virgo's bright star Spica shining above. Toward the east, Ophiuchus is rising. Between Ophiuchus and Virgo now in the south resides Serpens. Looking toward the south east the constellation of Libra is appearing, been closely followed by the summertime constellation of Scorpio.