Contents

Aries - Spring/Summer 2010

Editorial

Welcome to this edition of Aries.

First of all I feel that I must, once again, apologise to you all for the length of time between the last edition of Aries and this Spring Summer 2010 edition. Once again events and circumstances have overtaken me. I had every intention of producing an Aries for Spring/Summer and Autumn/Winter of 2009, and was in the process of gathering Society News items, Astro News stories and a number of articles together, but, unfortunately, events got in the way.

As you are all probably aware, last year, 2009, was a very busy year for the Society and the astronomical community at large, 2009 were designated as the International Year of Astronomy (IYA2009) by the United Nations Educational, Scientific and Cultural Organization (UNESCO). It was called to celebrate the 400th anniversary of the first use of the telescope to make an astronomical observation, which was made by the great Italian astronomer Galileo Galilei in 1609, or, English observer Thomas Harriot, who made the first observation of the Moon with a telescope on 26th July 1609, a full four months before Galileo performed his observation. Also 2009 was a special year for another reason and that was that 2009 was the 40th anniversary of the first manned lunar landing by the crew of Apollo 11. In addition to these two anniversaries, 2009 saw the 200th anniversary of the birth of Charles Darwin.

So 2009 had a number of scientific anniversaries within it. I took the view, in 2008 as Chairman, that the Derby and District Astronomical Society should become involved in the IYA 2009 and Apollo 11 events. I was of the opinion that it would have been a huge mistake for the Society not to become involved in marking these anniversaries and be involved in IYA 2009. So plans were drawn up which saw the Society involved in four IYA2009/Apollo 11 events during the year, they were:

27th June 2009 – Derby Quad – Well Dressing Ceremony in the Market Place to mark the Apollo 11 40th anniversary.

11th July 2009 – Aston on Trent – Apollo 11 40th Anniversary Well Dressing Event

18th July 2009 – Barton Gate Steam Rally

6th September 2009 – Darley Park Concert – Derby City Centre

Also at the beginning of the year, the Society was invited to have a display at a Charles Darwin 200th Anniversary event at the University of Derby. The University of Derby's Festival of Science, which was held on Saturday 14th March 2009. The Society became involved in this event with the kind assistance of Society member Graham Ensor. An article detailing these events appears in this edition of Aries.

I was heavily involved in the negotiating and planning for these events and gathering the people and materials needed to take part in these events, in addition to that, I was also preparing my own Apollo 11 anniversary 'tribute', I was generating a lecture on the Apollo Programme, which was due to be presented to the Society at the June 2009 meeting. As part of my preparations for this lecture and the upcoming events, I decided that I needed to purchase some 'props.' So with that in mind, I purchased a 1/98th scale model kit of the Apollo/Saturn V booster and a 1/48th scale model kit of the Apollo Lunar Module. So I was somewhat 'busy' during this period, so the production of an Aries 'slipped' somewhat. I apologise for that again, maybe my reach exceeded my grasp. But, given the choice, I would do the same again. It was vitally important that we had a presence during the IYA 2009/Apollo 11 period and we had a good year and we managed to raise our public profile.

IYA 2009 finished in a very appropriate way, first off, the guest speaker for our 4th December 2009 meeting was Dame Jocelyn Bell Burnell. Jocelyn Bell (Dame Bell Burnell was known by her maiden name at that stage) was the discoverer of a complete new class of radio sources that were to become known as 'Pulsars' in 1967. Dame Bell Burnell was making her fourth visit to the Society to present her lecture, which was entitled 'In Pursuit of Pulsars.' A brief report on this meeting appears in the Society News pages in this edition of Aries. Dame Jocelyn Bell Burnell was not the last 'big name' to visit Derby during December 2009.

Wednesday 9th December 2009 saw the University of Derby's annual Flamsteed Lecture take place. This Flamsteed Lecture had an IYA 2009 flavour to it; the Guest Speaker was Professor Jeffrey A. Hoffman, former NASA astronaut, who has made five flights on the Space Shuttle. Professor Hoffman was a crewmember of the mission that formed the Hubble Space Telescope 'repair' mission in December 1993. Professor Hoffman was a member of the space-walking team who actually went out into the Space Shuttle Discovery's Payload Bay to physically repair Hubble and install new instruments to improve its optical performance.

So 2009 had been a very busy time, in more ways than one. And it has been quite controversial as well. There have been too many things going on during 2009-2010 to list here, some will more than likely be the focus of future Aries articles.

But the main one, at least to my mind, has been the decisions taken regarding what will replace the Space Shuttle (if anything – Ed) following its retirement in February 2011. The Constellation Programme, NASA's 'Return to the Moon' programme has been scrapped, it is still waiting for the final death blow to dealt as the American Congress has still to vote upon its cancellation. This comes in the wake of the report from the Augustine Committee, which reported its findings last August to the Obama Administration in regards to where they think NASA should go and what kind of future US human spaceflight has. That report made for depressing reading (no doubt Anthony will be writing an article on that in the very near future! – Ed). The upshot of that report is that the Constellation Programme is cancelled; the Aries 1 and Aries V launch vehicles are scrapped, even though the Aries 1 vehicle had a test flight from Kennedy Space Centre in October 2009 with a dummy upper stage and Orion crew vehicle sitting on top. This was a test of the performance of the five segment Solid Rocket Boosters (SRBs) that comprise the first stage of the Aries 1. It is very unlikely that there will be a further Aries 1 test flight. Indeed design work on the Aries V has been stopped, also has design work on the Altair lunar lander, which would have been Aries V's primary cargo. Further work on the Orion spacecraft has also been scaled back, work will still be done on it, but Orion will probably be converted into a crew escape system for the ISS, so it looks like it will never be the next crew exploration vehicle.

The Augustine Committee and the Obama Administration are proposing a different role for NASA and for Human exploration of the Solar System, there will be more private companies involved in providing launch services, including launch vehicles and spacecraft, the obvious example is SpaceX which recently had a successful test of its Falcon 9 launch vehicle from the Kennedy Space Centre about a month ago. SpaceX also have a four-man capsule called 'Dragon' to sit atop the Falcon 9, a dummy version was sitting at the top of the Falcon 9 for the test a month ago. It is proposed that Falcon 9 and Dragon is the vehicle of choice to get astronauts to and from low earth orbit and the International Space Station, once the Space Shuttle completes it final mission in February 2011. This has come out of an existing NASA programme called COTS (Commercial Orbital Transportation Services). This is an initiative to get the private sector to deliver crew and cargo to the International Space Station.

So what does this mean for exploration? Well, thankfully, the unmanned programmes seem to be unaffected by the changes, in the main. It is the Human exploration programme that will feel the changes the most. First is the increased utilisation of the private sector in Human spaceflight, not just in infrastructure, but in launch services and supplying the launch vehicles and the manned spacecraft. I question how much oversight NASA will have when it comes to these 'private' launch vehicles and spacecraft, I worry about crew safety. NASA and the US Air Force use 'private' rockets all the time, but NASA and the USAF have a direct input into the development and operation of these rockets and spacecraft that are built by outside contractors, but I doubt that NASA will have as much oversight and influence in the future, and that makes me worry.

Another effect of the Augustine Committee Report is where do we go? It would seem that Augustine and the Obama Administration wants to leave the Moon behind, a case of 'been there, done that.' The Report does not advocate a return to the Moon with Humans, despite the recent findings that seems to suggest that the lunar surface contains far more water that was previously thought, and could help in establishing a Human base on the Moon. Oh no! They want a manned mission to 'orbit' Mars, not to land, probably land on Mars' largest Moon Phobos. Why? Also they think it would be absolutely spiffing to have a manned landing on a Near Earth Asteroid (NEA), again, the question, WHY?

I realise that getting to an NEA is a little easier than getting to the surface of the Moon, or landing on Mars, fine, but why would you want to send a manned mission to an asteroid? Why? There is nothing there to see! You could say that about the Moon, but I would challenge you to do so! What sets the Moon and Mars apart and makes them especially interesting targets? For one, the Moon and Mars are more geologically diverse; they both have landscapes, terrains to explore. Mars has an atmosphere (we can't breathe it, but it is there! – Ed), it has abundant evidence on the surface that once, in it's past; it had liquid water on the surface. We know for a fact now that if you dig beneath the Martian surface (not very deep beneath the surface, the Phoenix lander at the Martian North Polar Regions proved that! – Ed) and you can discover deposits of permafrost. Mars still has water, but it is in the form of ice beneath the surface. Mars is crying out for human exploration and settlement, where there is water, we humans stand a change of establishing a foothold. The same holds true for the Moon apart from the possession of an atmosphere. It has recently been discovered that the Moon holds far more water, locked up in its surface rocks, than was previously though, and this water can be extracted from the lunar rocks and regolith. This resource can be used to support a human base on the surface, it can provide for life-support, fuel and drinking water. We can 'live off the land' on the Moon, these findings make a lunar base more plausible, if not entirely possible. But the Moon has other resources that can help establish it and make it a sustainable operation, all we have to do is go out there and grab it. The Moon has every bit as much grandeur as Mars; it has rilles, mountains, craters and plains.

So why send a manned mission to an asteroid? Who will watch such a mission to an asteroid? I must admit I would, because I would be curious as to how they would actually land on an asteroid and how they would intend to stay on the surface of said asteroid due to the extremely low gravity of such a body. But it would not be the Moon or Mars.

The Moon and Mars inspires, that's the other thing that exploration does, it inspires and excites. I watched Armstrong take his first step upon the lunar surface 41 years ago; I was two years old at the time. Two years old! Something 'clicked' inside me at that moment, I was 'unconsciously' inspired by that one image, a grainy black and white image on the TV screen of a white balloon figure bouncing around a grey landscape under a blacker than black sky. I was inspired, I was switched on, and I was there with Armstrong! I was far too young to articulate it or understand it, but the feeling grew as I got older. I never left the Moon. That two year old boy is still there, he's still inside me. If he wasn't I would not have been a member of the DDAS for 23 years, and I certainly would not be writing this editorial now. I would not have had the passion for the Universe that I have and I certainly would not have gone to University and studied a science degree. So you see how one event can change a person, how one event can inspire a person, in a sense, shape their life.

Can the same be said about a manned mission to an asteroid or a manned flyby/orbit of Mars? I rather think not, will another two year old be similarly affected by imagery from the surface of an asteroid, or by the view of Mars out of a spacecraft window or a camera mounted outside? No, the answer would be no. We are in danger of losing our passion for exploration for establishing ourselves in new areas, doing new things, finding ways of living in new ways to cope with a new environment. If the Augustine/Obama plan is followed to the letter, then the West will have all but given up on the Human expansion into the Solar System and left it to commercial interests to not 'boldly go where no man has gone before.' We need the Moon and a manned landing on the Mars to remain a focus of NASA's manned exploration plans, I was lucky, I've had my Apollo, since then we've spent the last 38 years messing about in low earth orbit with the Space Shuttle. What inspiration have the generations that have followed me had in low earth orbit? What inspiration will future generations have to look forward to if the Augustine/Obama plan is proceeded with? Will the private sector even be interested in exploration missions such as Apollo, I rather think not, where's the money it that?

Ladies and gentlemen, I think that we are in for lean times in regards to Human exploration of the Solar System. Let's hope the Chinese, Japanese, Indians or the ESA think differently, but in these cash-strapped times, could they generate such inspirational programmes? Only time will tell.

So what's in this issue of Aries?

We have two articles from Malcolm Neal. I should have published them in an Aries for quite some time now; I've had the articles for about to years now! Sorry Malcolm. The articles that Malcolm has submitted are both short biographies of two prominent figures in astronomy and manned spaceflight, the first is a piece on the discoverer of the planet Uranus in 1781, William Herschel, and the second one is a small biography of Soviet Cosmonaut Alexei Leonov, who was the first person to leave his spacecraft in Earth orbit and go for a 'spacewalk.'

I have an article in this issue. It is the first part of a two-part review of all the International Year of Astronomy 2009/Apollo 11 Anniversary events that we were involved with in the summer of 2009, there were four of them. A very busy year indeed!

Also we have the usual Astro News Desk and Society News sections as well. So once again, sorry for the long wait for this issue of Aries and I hope the wait has been worth it. Also this issue of Aries will be the first issue of Aries to have a downloadable version on the Aries website in pdf format, so you can download it and print off a copy yourself if you so wish. The pdf version of Aries will be in A4 page format.

I hope you enjoy reading this edition of Aries and apologies for the long wait.

Thank you

Anthony Southwell (Aries Editor)

July 2010

Society News

Meetings

Friday 1st May 2009

Annual General Meeting

Society Committee Members 2009/2010

The election of the Society Committee members were as follows:

Committee Officers:

Chairman	-	Anthony Southwell
Vice-Chairman (Acting)	-	Tony Razzell
Secretary	-	Dave Selfe
Treasurer	-	Adrian Brown
Site Curator	-	Mike Dumelow
Editor	-	Anthony Southwell

Ordinary Committee Members

Mike Lancaster
Malcolm Neal
Tony Hubbard

If you have any questions, comments or suggestions regarding the Society, then please talk to any of the above at one of the general meetings.

5th June 2009

Apollo: Tranquility Base and Beyond – Anthony Southwell

To get the Society in the mood for IYA 2009 and the upcoming 40th Anniversary of the first manned landing on the Moon by the crew of Apollo 11, the DDAS Chairman, Anthony Southwell, took the DDAS membership on an audio/ visual trip to the Moon in the footsteps of the Apollo astronauts. The lecture itself consisted of a PowerPoint presentation, a number of video clips and a 1/96th scale model of the Saturn V booster and a 1/48th scale model of the Lunar Module, which were used as visual props.

The presentation itself was very comprehensive and it was obvious to all present that Apollo is a subject very close to Anthony's heart. The audience was taken through the entire history of the Apollo Programme, its inception, building the infrastructure, the Apollo 1 fire, the Apollo 13 in-flight explosion and flying the rest of the Apollo missions. For the lunar surface missions, from Apollo 11 to Apollo 17, Anthony took the audience on a virtual lunar 'fieldtrip' with the Apollo astronauts, via the use of actual imagery taken on the lunar surface by the Apollo astronauts.

All in all this was a very comprehensive and detailed presentation and showed that Apollo was much more than Armstrong's 'One Giant Leap', it was a singular achievement in Human history, will we ever see such an event again in our lifetimes? That is one question that this author cannot answer.

4th July 2009 – DDAS BBQ

July again saw the Annual DDAS Barbecue. This year's event was very well attended and there was lots of food and drink available, many thanks to Mike Lancaster who once again offered his services as the BBQ Chef.

7th August 2009 – The Ghost Book of Manchester – Kevin Kilburn

Despite the title of this talk, the DDAS had not suddenly turned into a paranormal investigation group! No. The Ghost Book of Manchester refers to a copy of an astronomical atlas, which has been in the possession of the Manchester Astronomical Society since before the Second World War. So what is remarkable about this astronomical atlas? Well, as Manchester Astronomical Society Member Kevin Kilburn explained in his presentation to the DDAS, the Manchester Society had no idea of how important and rare this particular atlas was. The atlas is a Bevis Atlas, one of twenty-three copies known to exist and it is one of the most complete copies. This extremely rare atlas was compiled by Dr John Bevis, an eighteenth century physician - turned astronomer, whose other claim to fame is as the discoverer of the Crab Nebula. Dr John Bevis' intended Uranographica Britannica, is a very rare star atlas that should have been published in about 1750, but tragically, became lost to science.

The copy discovered by members of Manchester Astronomical Society in 1997 consists of original plates sold anonymously for a quick sale as 'Atlas Celeste' in 1786. The atlas includes the first recorded pre-discovery observation of the planet Uranus by the first Astronomer Royal, the Rev. John Flamsteed, in 1690. This 'star' is clearly shown on the Taurus chart within the Atlas. There are also suggestions that Bevis himself may have observed the planet Uranus over forty years before William Herschel, who officially discovered it in 1781.

4th September 2009 – The Biggest Bangs in the Universe – Dr Nial Tanvir

The September meeting of the DDAS saw the Society welcome back Dr Nial Tanvir, Nial, who used to be a member of the DDAS in his youth, is a researcher at the University of Leicester. Dr Tanvir's main research area is Gamma Ray Bursts, which is the topic of his talk for this meeting of the DDAS. In 2002 Dr Tanvir was part of the team that was awarded with European Union's Decartes Prize, for "The Universe's biggest explosions since the Big Bang."

Dr Tanvir was part of the team using the European Southern Observatory (ESO) to pinpoint Gamma Ray Burst (GRB) events. On April 23 2009, NASA's SWIFT satellite detected a Gamma Ray Burst from the most distant object ever observed. Within hours of the SWIFT discovery, telescopes around the world were looking for the object that produced the observed GRB. It was the team at the ESO, that Dr Tanvir was a member of, who made the distance calculation for the object that produced the GRB event on 23rd April 2003, catalogued as GRB 090423, this object was 13 billion light years distant, the previous record holder, GRB 080913, was 12.8 billion light-years distant.

In his presentation, Dr Tanvir explained what Gamma Ray Bursts were, what the current theory of their origins are, and what would happen to the Earth if such an energetic event happened relatively close to the Earth. This was a very fascinating lecture given by an expert in his field and was very well presented.

2nd October 2009 – Meteors – From Comet to Cameras – Dr Colin Steele

A frequent visitor to the DDAS, Dr Steele was making his fifth (I think it was the fifth – Editor) visit to the Society for the October 2009 meeting. This time Dr Steele was talking to the members of the DDAS concerning meteors. Dr Steele's talk covered what meteors are, how they appear to come from particular points in the sky (that's how they get their names – Orionids, Persieds and so on – Editor), How to observe them properly and how you can photograph them successfully, and as it turns out, you do not need much in the way of expensive equipment to be able to produce some very good meteor trail images.

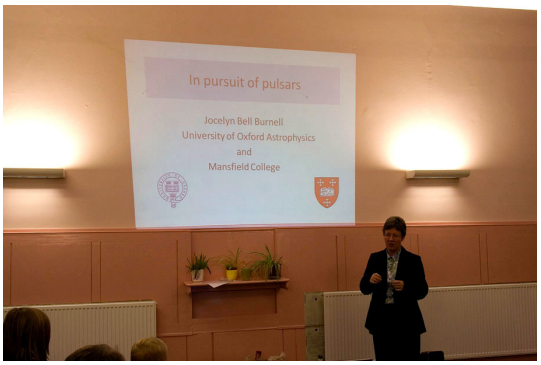
6th November 2009 – Planetary Landers: Exotic Spacecraft for Strange Places – Dr Andrew Ball

I was looking forward to this lecture, being I'm a spaceflight buff, who delights in his knowledge of unmanned space programmes (No surprises there then! – Ed). Dr Ball presented to the DDAS membership a very detailed and sometimes quirky insight into the world of interplanetary probes and space science in general. He even managed to come up with one or two facts that even I was unaware of! (That cannot be possible! – Ed) Dr Ball described

how such robotic missions are planned and how you design spacecraft to orbit and land on the various bodies of the Solar System. To highlight this, Dr Ball looked back at some previous spacecraft, such as the Viking Landers, the Soviet Venera landers, Galileo, Cassini, the Magellan Venus Radar Mapper and so on. This was a fascinating and well presented lecture.

4th December 2009 – In Pursuit of Pulsars – Dame Jocelyn Bell Burnell

Wow! I have never been so nervous in my life! As Chairman of the DDAS I had to introduce Dame Jocelyn Bell Burnell at the December meeting. I had never introduced anyone of such importance before, a legend in a very real sense. This lady co-discovered the first Pulsars via radio astronomy techniques in 1967. As far as I'm concerned, Dame Bell Burnell should have received the Nobel Prize for her significant contribution to the discovery of the first Pulsars, Dame Bell Burnell would probably argue that point, but the Nobel Prize should have been awarded to her.



Dame Jocelyn Bell Burnell during her lecture to the DDAS at the December 2009 meeting.

Image Credit: Chris Newsome

Dame Bell Burnell has achieved such a level of excellence in her career, it was staggering to read out her accomplishments and awards in my introduction, I was so nervous, I was desperate not to make a mistake during that introduction!

Dame Bell Burnell's presentation was brilliant, fascinating, informative and entertaining. Dame Bell Burnell's interest and enthusiasm for her subject (and it was Pulsars – Ed), was infectious and captivated the audience. That was especially apparent at the question and answer session at the end of the presentation. The questions came thick and fast and Dame Bell Burnell was more than happy to answer them, no matter how involved the questions were, in fact Dame Bell Burnell was enjoying the question and answer session as much as the assembled membership were! Dame Bell Burnell discussed what a Pulsar is, how fast they spin, the current theories on how they are formed, what the physical properties of a Pulsar are and what it would be like to stand on the surface of a Pulsar.

This was Dame Bell Burnell's third visit to the DDAS and this author hopes that we will be able to have Dame Bell Burnell back to speak to us in the not too distant future.

8th January 2010 – Cosmic Casuality: Farce and Fortuity in the Exploration of Space – Doug Ellison

Here we were, in the grip of the worst winter in recent years, the snow was on the ground, temperatures were well below zero and the roads were like skating rinks! And we had a DDAS meeting with a guest speaker to boot! We were expecting Mr Doug Ellison to come and talk to us about how luck and good/bad fortune can help or hinder space missions. Unfortunately, the winter weather had other ideas and Mr Ellison contact our Secretary and said that it was extremely difficult to get from where he was, which was Leicester to Derby for the meeting, as it had started snowing again and the roads were getting bad again. So we did not have a speaker, so we all turned up for the meeting and after a few minutes of head-scratching wondering what we were going to do for the evening, when a DDAS member came to the Society's rescue.

DDAS member Graham Ensor, who has a very extensive collection of meteorites and is somewhat of an expert on them now, volunteered to give the Society an impromptu lecture on meteorites. Graham had thought that we may have problems with the weather for this meeting, so he got his presentation together on a laptop and decided to give this lecture in case our booked speaker could not make it. Graham's presentation was very, very good, well researched and presented. Graham looked at the history of meteorites, how they finally came to be recognised as rocks from space and not something that was thrown down to Earth by angry Gods. Graham described where meteorites come from, the different types of meteorites, how to track a meteor as it comes through the atmosphere, and how you can use that track to find pieces of the meteorite that have survived the plunge through the atmosphere and landed on the ground, how you can distinguish a meteorite form an ordinary rock and so on, Graham finished off by talking a little bit about collecting meteorites. A very good talk for saying it was a spur of the moment thing.

5th February 2010 – Annual Society Quiz

Once again February brought the annual torture (Er, I mean enjoyment! – Ed) of the Society Quiz. As always Arthur Tristram was the Quizmaster, who was ably assisted by Adrian Brown as the scorekeeper, in fact Adrian was responsible for PowerPoint presentation for the picture round portion of the quiz. The assembled members were split up into three teams, and if memory serves me correctly, the teams were named after Space Shuttles, there were Discovery, Atlantis and Endeavour. I can't remember what team won, but it was not the team I was on (Anthony must be slipping! – Ed). Once again Arthur produced a very well researched and presented quiz which challenged even the most astronomically minded brain! I must say that I had a headache after it

Many thanks to Arthur for keeping up this Society tradition and for all the hard work he puts into it. Also thanks must go to Adrian Brown for his assistance in producing picture round segment of the quiz and be being the score keeper on the night. What challenges await us all for the February 2011 quiz? Only Arthur knows.

5th March 2010 – Five Ways to Find a Black Hole – Dr Somak Raychaudhury

The March 2010 meeting of the DDAS saw Dr Somak Raychaudhury come to visit, who is a Senior Lecturer in Physics in the School of Physics and Astronomy at the University of Birmingham, to present a lecture to the DDAS titled 'Five Ways to Find a Black Hole.'

One of Dr Raychaudhury's major contributions to Astronomy is the discovery of the Shapley Supercluster the largest and most massive structure of galaxies in the local Universe. It is the largest concentration of galaxies in the nearby Universe which forms a gravitationally interacting unit, thereby pulling itself together instead of expanding with the rest of the Universe. It can be found in the constellation of Centaurus and is 650 million light years distant.

Dr Raychaudhury's current research interests include:

Feedback in Galaxy Groups and Clusters

Superclusters of Galaxies

Designer Algorithms in Astronomy

Groups of Galaxies

Gravitational Lensing

Normal Galaxies

Clusters of Galaxies

But for the March 2010 DDAS Meeting the focus of Dr Raychaudhury's attention was on Black Holes. Dr Raychaudury expalined what Black Holes are, how they form, and how they can be dectected, as light cannot escape their grvitational infliuence, they are not exactly easy to find, also Dr Raychaudhury also explained how Black Holes can come in different 'sizes' due to their masses, such as 'Super-Massive Black Holes at the centre of galaxies, to the more 'classical' Black Holes to 'Mini Black Holes,' also how you can detect them, which included detection based upon their gravitational influence on nearby stars.

2nd April 2010 – The 2009 Total Solar Eclipse – Chris Newsome and Malcolm Neal

Two DDAS members, Chris Newsome and Malcolm Neal presented a short talk each based on their experiences when the went to see the 2009 Total Solar Eclipse in China. The Total Solar Eclipse was to take place on July 22 and could be seen from a narrow corridor through northern Maldives, northern Pakistan, northern India, eastern Nepal, northern Bangladesh, Bhutan, northern Philippines, the northern tip of Myanmar, central China and the Pacific Ocean, including the Ryukyu Islands, Marshall Islands and Kiribati.

This eclipse was described as the longest of the 21st Century, with totality lasting for 6 minutes 39 seconds. Totality could be observed from the following locations in China:

Chengdu, Nanchong, Chongqing, Yichang, Jingzhou, Wuhan, Huanggang, Hefei, Hangzhou, Wuxi, Huzhou, Suzhou, Jiaxing, Ningbo, Shanghai, Chapai Nawabganj as well as over the Three Gorges Dam in China.

Chris was in Shanghai for the eclipse, but he did not see much of it due the amount cloud around at the time. But Chris did manage to produce a rather striking video clip of the Eclipse. Chris set up his camera outside his hotel and pointed it skywards and produced a time-lapse video of the entire event. In that video clip you see the sky grow steady darker and darker, then we get to totality, then the sky grows brighter until the Sun reappears, behind the clouds it must be stressed! Chris showed the clip during his presentation to the DDAS and impressed all who saw it, in fact, Chris had the clip played on the BBC's 'Sky at Night' when they discussed the Eclipse, quite an achievement.

Malcolm, on the other hand, had a slightly better view of the eclipse. Malcolm was in Shanghai as well, but he watched the eclipse from the Tidal Bore Park in Souhzou. After the eclipse everyone was stayed to watch the tidal bore which followed the eclipse, Malcolm had a front row seat to witness the tidal bore entering the Yellow River, the pictures Malcolm presented during his presentation of the eclipse and the tidal bore were very impressive.

7th May 2010 – DDAS AGM

The election of the Society Committee members were as follows:

Committee Officers:

Chairman	-	Anthony Southwell
Vice-Chairman	-	John Holmes
Secretary	-	Dave Selfe
Treasurer	-	Adrian Brown
Site Curator	-	Mike Dumelow
Editor	-	Anthony Southwell

Ordinary Committee Members

Mike Lancaster
Malcolm Neal
Robert Seymour
Ian Bennett

If you have any questions, comments or suggestions regarding the Society, then please talk to any of the above at one of the general meetings.

4th June 2010 – Cosmology: What Do We Really Know About the Universe? – Dr Anne Green

The June meeting of the DDAS saw Dr Anne Green who is a lecturer in Theoretical Particle Physics at the University of Nottingham and is also a astroparticle physicist, visited the Society to present a lecture titled 'Cosmology: What do we Really Know About the Universe?'

The lecture took the audience on a review of the current level of understanding of Cosmology, which is the study of the origin, evolution and eventual fate of the Universe. Dr Green covered everything from the Big Bang, the inflation and expansion of the Universe, Dark Matter and Dark Energy, to what the Universe's eventual fate will be, which did not sound too appealing! But don't worry we've got another 20 billion years to worry about the end of the Universe.

This was a very interesting view of the current level of scientific knowledge concerning our Universe, the question and answer session at the end was very lively indeed, in fact it went on for almost as long as Dr Green spoke for! This author hopes that we did not tire Dr Green out too much!

Events

March 14th 2009 – Festival of Science, University of Derby

This was the event that was to provide the 'dry-run' for the events that the DDAS had lined up for the International Year of Astronomy 2009. The Festival of Science was organised by the University of Derby and was primarily called to celebrate the 200th anniversary of the birth of Charles Darwin. The prime mover for the DDAS in regards to this event was DDAS member Graham Ensor. Graham was approached by the University of Derby and invited to attend the festival of science and to display his remarkable collection of meteorite specimens.

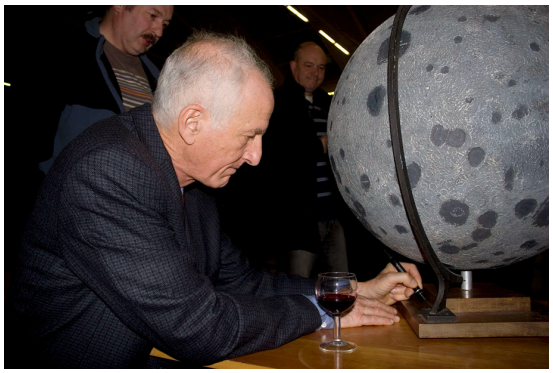
Graham then approached a few DDAS members (including the Chairman – Ed) and asked if the Society as a whole would like to become involved in the event. The answer was yes and the Chairman got a few items together for a small DDAS display.

The day itself was brilliant and a more expansive report, written by the DDAS Chairman, appears on the 'Past Activities' page on the DDAS website. But in short, there were two displays that were connected to the DDAS. Graham had his 'main' display in the Atrium at the Kedleston Road campus of the University of Derby. The display included several meterorite samples, both in display cases and open on the display table, including one huge sample, or lump, of nickel-iron which weighed in at around 14 pounds! There were information posters concerning meteorites and Graham was running a 'meteorite or meteorwrong' competition for children and the prize was a small meteorite. The 'combined' display was upstairs in a small room next to the 'Courtrooms' on the Atrium balcony. Here, Graham had a number of display cases with even more examples of Graham's collection of meteorites, the DDAS display provided by the DDAS Chairman consisted of a laptop running a PowerPoint presentation, which included astrophotos taken by DDAS members, Society information leaflets and books.

All in all the Festival of Science at the University of Derby was a huge success and the Chairman (and the Editor), once again, would like to say thank you to Graham inviting the DDAS to become involved in this event. It was brilliant, the amount of people that came to our displays and came to talk to us was amazing. There is far too much to detail here in this article, please do have a look at the Festival of Science piece that appears on the Society website (An article that covers the other IYA 2009 events that the DDAS attended appears in this issue of Aries – Ed).

9th December – University of Derby Annual Flamsteed Lecture – The Hubble Space Telescope: Past, Present and Future – Professor Jeffery A. Hoffman

The 2009 Flamsteed Lecture was a real treat and a spectacular way to end the International Year of Astronomy 2009. The University of Derby really pulled out all the stops for this one. We were feeling really rather spoilt at this point, we had just had a visit to the Society from Dame Jocelyn Bell Burnell, and now former NASA and Space Shuttle astronaut Professor Jeffery A. Hoffman was going to be giving the 2009 Flamsteed Lecture at the University of Derby a few days later, how good is that!



Professor Hoffman siging the DDAS Moon Globe during the Reception at the 2009 Flamsteed Lecture.

Image Credit: Chris Newsome

I was really looking forward to this one, I was really excited (Really? You, excited Anthony? I can't think why? – Ed). Because spaceflight is a topic that is very close to my heart, I was really looking forward to the 2009 Flamsteed Lecture. And what better way to complete such a brilliant and busy year than to attend a lecture given someone such as Professor Hoffman, and his subject was very appropriate as well, to fit in with the theme of the 400th anniversary of the first use of the telescope for astronomical observations, what better subject to cover than the Hubble Space Telescope, an instrument that Professor Hoffman has intimate knowledge of.

Professor Hoffman is currently Professor of the Department of Aeronautics and Astronautics at MIT. He was selected as a NASA astronaut in 1978 and has flown five missions aboard the Space Shuttle, one of which was STS-61/Endeavour in December 1993, which was the mission that was sent to 'repair' the Hubble Space Telescope in order to restore its 'vision.' Professor Hoffman was part of the space-walking repair team which worked on the Hubble Space Telescope in Endeavour's Payload Bay. STS-61/Endeavour was professor Hoffman's fourth space Shuttle mission and it took five space-walks to complete the 'repairs' to Hubble. Thanks to Professor Hoffman and the crew of STS-61 we would not enjoy the cosmological vistas that Hubble has accessed for us.

Professor Hoffman described the Hubble Space Telescope, his mission to it, what it was like to work in Earth orbit on the Hubble Space Telescope and his general thoughts and feelings during the mission. He even gave a potted history of the Hubble Space Telescope and discussed its future (Hubble's replacement, the James Webb Telescope will not be deployed until around 2015 – Ed). There was some amazing footage of the repair mission and of the Earth from space. Especially memorable was a stunning view of the Earth at night, including the lights of cities, the flashes of thunderstorms and even a meteor streaking through the atmosphere *below* the shuttle!

After the lecture everyone went down into the Kedleston Road Campus Atrium for a reception and some food and drink. As usual, the DDAS had a display in the Atrium which included the Society's Moon Globe, which is held by DDAS member Mike Dumelow. Professor Hoffman was very interested in the Moon Globe and we even got him to sign it for us! We are starting to get quite a collection of signatures on that globe (maybe the globe and its signatures may become the focus of an article in the future? – Ed).

The 2009 Flamsteed Lecture at the University of Derby was a real treat, a huge success. We had been in the company of a former NASA astronaut who helped restore one of, if not the most important scientific instruments ever constructed by Mankind, and who was a very nice man to boot, very approachable and loved to talk. We chatted to Professor Hoffman for quite some time, until his wife had to remind him that they had to get back to Leicester for a dinner appointment (Professor Hoffman had presented this lecture to an audience at Leicester University the day before – Ed). Professor Hoffman was every bit as engaged and enthusiastic about space and astronomy as we were, it was real pleasure and privilege to speak to him.

Astro News Desk

BBC News Website 20th November 2009

Hubble Instruments Sent to Museum

Two instruments that served more than 15 years aboard the Hubble telescope have gone on display in the US.

Washington DC's National Air and Space Museum is the new home for the WFPC-2 and COSTAR, which once served as the telescope's eyes and its spectacles. The two instruments were replaced during a servicing mission in May (STS-125/Atlantis - Ed). They will depart in December for a brief tour of California before returning permanently to the museum in March 2010.

Astronaut removing the COSTAR instrument during the STS-125/Atlantis mission.

Image Credit: BBC News Website

The Corrective Optics Space Telescope Axial Replacement, or COSTAR, was a suite of optics providing the fix for a manufacturing fault that initially stymied Hubble's mission. A tiny flaw in the curvature of the telescope's main mirror meant its first images were blurred.

In 1993, COSTAR was installed to act as "spectacles" to correct the images for a range of Hubble's instruments and cameras. In addition, the Wide Field Planetary Camera 2 (WFPC-2) was installed, which already had the optical fix built into it. The rejuvenated telescope then began to produce some of the most stunning images astronomers - and the public - have ever seen.

The WFPC-2 was responsible for the ubiquitous image of the Eagle Nebula, dubbed the "Pillars of Creation", among 135,000 others during its 15 years in space. The two instruments were removed in the final Hubble servicing mission in May and returned to Earth.

"This was the camera that saved Hubble," said Dr Ed Weiler, associate administrator for Nasa's science mission directorate. "I have looked forward for a long time to stand in front of this very instrument while on display to the public." The Smithsonian's National Air and Space Museum holds thousands of artefacts from the history of aviation and spaceflight.

BBC News Website 2nd March 2010

Ice Deposits Found at Moon's Pole

A radar experiment aboard India's Chandrayaan-1 lunar spacecraft has identified thick deposits of water-ice near the Moon's north pole.

The US space agency's (NASA) Mini-Sar experiment found more than 40 small craters containing water-ice. But other compounds - such as hydrocarbons - are mixed up in lunar ice, according to new results from another Moon mission called LCROSS. The findings were presented at a major planetary science conference in Texas.

The craters with ice range from 2km to 15km (one to nine miles) in diameter; how much there is depends on its

thickness in each crater. But NASA says the ice must be at least a couple of metres thick to give the signature seen by Chandrayaan-1.

Dr Paul Spudis, from the Lunar and Planetary Institute in Houston, estimated there was at least 600 million metric tonnes of water-ice held within these impact craters.

The equivalent amount, expressed as rocket fuel, would be enough to launch one space shuttle per day for 2,200 years, he told journalists at the 41st Lunar and Planetary Science Conference.

What all these craters have in common are large areas of their interiors that never see sunlight.

Extreme Cold

Temperatures in some of these permanently darkened craters can drop as low as 25 Kelvin (-248C; -415F) - colder than the surface of Pluto - allowing water-ice to remain stable.

"It is mostly pure water-ice," said Dr Spudis. "It could be under a few tens of centimetres of dry regolith (lunar soil)." This protective layer of soil could prevent blocks of pure ice from vaporising even in some areas which are exposed to sunlight, he explained.

In February, President Barack Obama cancelled the programme designed to return Americans to the Moon by 2020. However, Dr Spudis said: "Now we can say with a fair degree of confidence that a sustainable human presence on the Moon is possible. It's possible using the resources we find there.

"The results from these missions, that we have seen in the last few months, are totally revolutionising our view of the Moon." Chandrayaan-1 was India's contribution to the armada of unmanned spacecraft to have been launched to the Moon in recent years. Japan, Europe, China and the US have all sent missions packed with instruments to explore Earth's satellite in unprecedented detail.

In Nasa's LCROSS mission, a rocket and a probe were smashed into a large crater at the lunar south pole, kicking up water-ice and water vapour. Spectral measurements of material thrown up by the LCROSS impact indicate some of the water-ice was in a crystalline form, rather than the "amorphous" form in which the water molecules are randomly arranged.

Water Source

"There's not one flavour of water on the Moon; there's a range of everything from relatively pure ice all the way to adsorbed water," said the mission's chief scientist Anthony Colaprete, from Nasa's Ames Research Center.

"And here is an instance inside Cabeus crater where it appears we threw up a range of fine-grained particulates of near pure crystalline water-ice."

Overall, results from recent missions suggest there could be several sources for lunar ice.

One important way for water to form is through an interaction with the solar wind, the fast-moving stream of particles that constantly billows away from the Sun. Space radiation triggers a chemical reaction in which oxygen atoms already in the soil acquire hydrogen nuclei to make water molecules and the simpler hydrogen-oxygen (OH) molecule. This "adsorbed" water may be present as fine films coating particles of lunar soil.

In a cold sink effect, water from elsewhere on the lunar surface may migrate to the slightly cooler poles, where it is retained in permanently shadowed craters.

Scientists have also reported the presence of hydrocarbons, such as ethylene, in the LCROSS impact plume. Dr Colaprete said any hydrocarbons were likely to have been delivered to the lunar surface by comets and asteroids - another vital source of lunar water.

However, he added, some of these chemical species could arise through "cold chemistry" on interstellar dust grains accumulated on the Moon.

In addition to water, researchers have seen a range of other "volatiles" (compounds with low boiling points) in the impact plume, including sulphur dioxide (SO2) and carbon dioxide (CO2).

The results from the Mini-Sar instrument are due to be published in the journal Geophysical Research Letters. The team is currently analysing results for craters at the Moon's south pole.

BBC News Website 4th March 2010

Closest Phobos Flyby Gathers Data

The European Mars Express (Mex) probe has made its closest flyby of the Martian moon Phobos, passing just 67km (42 miles) from its surface.

No manmade object has ever been so near to the natural satellite. The approach is one of a series being made by Mex as it seeks to understand the origin of the moon. Previous flybys have indicated that Phobos has an extremely low density, suggesting that its surface probably hides many large interior voids.

Scientists suspect the moon is simply a collection of planetary rubble that coalesced around the Red Planet sometime after its formation. The Mex latest measurements will test this idea further. Very precise radio doppler data was gathered during the pass which will provide additional information on the moon's gravity field. Knowing the gravity field will help scientists to better understand the distribution of mass inside the moon.

Phobos is very slowly falling in towards Mars and tidal forces are expected to tear it apart one day. The European Space Agency's Mars Express satellite has been in orbit since 25 December 2003. It has made many discoveries including measurements of previously unrecognised methane in the planet's atmosphere.

BBC News Website 5th March 2010

Probe May Have Found Cosmic Dust

Scientists may have identified the first specks of interstellar dust in material collected by the US space agency's Stardust spacecraft.

A stream of this dust flows through space; the tiny particles are building blocks that go into making stars and planets. The NASA spacecraft was primarily sent to catch dust streaming from Comet Wild 2 and return it to Earth for analysis. But scientists also set out to capture particles of interstellar dust.

The material was gathered by the Stardust probe in a seven-year, 4.8-billion-km (2.9 billion miles) interplanetary voyage. It extended a retractable device containing cells filled with a material called aerogel, a porous substance designed to trap dust molecules. A capsule containing the precious samples was then returned to Earth in January 2006.

Team members have now reported the possible discovery of two contemporary interstellar dust grains in the Stardust Interstellar Dust Collector (SIDC) deployed during the mission. Dr Andrew Westphal, from the University of California, Berkeley, announced the find at the Lunar and Planetary Science Conference (LPSC) in The Woodlands, Texas.

‘Cautiously Excited’

The discovery was made by a member of the public, using the Stardust@Home internet application, which invited participants to search the aerogel collection medium for tiny particles of the dust. "There are two particles, but they are in the same track. So when they hit the aerogel, they were together - they are two components of the same particle," Dr Westphal told BBC News.

"But they are very different from each other. That in itself is interesting, because if this does turn out to be interstellar dust, then it is a bit more heterogeneous than people thought."

The initial speck, known as particle 30, was spotted by Bruce Hudson, from Ontario in Canada. Under the agreement made between the science team and participants in Stardust@Home, Mr Hudson was allowed to choose a name for the particle; he called it Orion.

After preliminary analyses, the scientists found another grain upstream, which Bruce Hudson named Sirius. But Dr Westphal stressed that the find "could be a false alarm". "The right way to say it is we're cautiously excited," he told me.

"We have very limited data on it so far and the reason is deliberate. The analyses we are doing have the potential to do some minor damage to the particles. We don't think it will and we'll be careful to limit our analyses. "So far this particle is unique... if we drop it on the floor, it will cost $300m to get another one."

Heavy Atoms

Scientists have identified 28 definite impact "tracks" in the interstellar dust collector. But most of these come from angles indicating they are little particles of debris from impacts with the spacecraft's solar panels. However, particle 30 is one of seven with ambiguous trajectories.

Interstellar dust is formed when gas is ejected from stars and condenses to form grains. This dust then has to survive in the interstellar medium - the matter which exists between stars - where it is battered by cosmic radiation and shock processes.

It carries with it the heavy atoms that go into making the stars and planets. Our own Solar System was also constructed with these building blocks. The possible dust grains were collected as Stardust travelled with the interstellar dust stream which passes through our Solar System.

The spacecraft's chief scientist, Dr Don Brownlee from the University of Washington in Seattle, told BBC News: "All the heavy atoms in this room were in interstellar dust... so we want to know what this stuff is." He added: "This dust, once it's formed, and once it's heated or changed [initially] it is set for billions of years. Dr Westphal told BBC News: "It is very fine-grained material, which is what you'd expect for interstellar dust. It has an elemental composition which is consistent with what you would expect for interstellar dust. And it has a composition for other elements which are not inconsistent, but a bit surprising."

The researchers have so far analysed magnesium, aluminium, iron, chromium, manganese, nickel, copper and gallium from the particles. A new mineral found in a type of particle known as interplanetary dust has recently been named Brownleeite after Dr Brownlee, who is regarded as a founder of the field of cosmic dust research. The discovery has been published in the journal American Mineralogist.

Though highly prized by Stardust's team, interstellar dust can be a nuisance in optical astronomy, because it can obscure objects in regions of the sky targeted for observation.

BBC News Website 23rd March 2010

'Muscular' UK Space Agency Launched

The new UK Space Agency (UKSA) will take over responsibility for government policy and the key budgets for space, according to ministers. The agency, which comes into being on 1 April, will also represent Britain on space matters in all negotiations with international partners.

The UKSA's name, logo and remit were announced at a conference in London. Its establishment should bring more coherence to space policy - something critics say has been missing for years. In particular, it is hoped an executive agency that can champion British interests abroad will help an already successful space industry to grow still further.

"People in the UK are not aware of just how good Britain is both at space research and in terms of our space industry; [a space agency] is going to make people more aware of that," Lord Drayson, the minister for science and innovation, told BBC News.

"But in practical terms, it's going to make the decision-making by government in all aspects of space policy much more joined up, better co-ordinated - a single point within government which has responsibility for making sure that we get everything in alignment such that the space research we do, the space industry that we're building, fulfils its true potential."

British space policy and budgets have until now been devolved to a partnership of government departments and science funding councils. The UKSA will, step by step, assume control of these partners' monies (about £230m per year) and their management functions. It will start in the areas related to Britain's membership of the European Space Agency (Esa), where most of the civil space budget is spent.

It will then extend to areas that engage with the EU, which has begun in recent years to develop major space projects of its own, such as the Galileo satellite-navigation system.

In addition to the UKSA announcement, the government says £24m will be put into an International Space Innovation Centre (ISIC) at Harwell in Oxfordshire, the site of a new ESA technical facility. This is in addition to £16m from industry.

Ministers say the ISIC will help establish hubs of excellence in the UK to:

• exploit the data generated by Earth Observation satellites,
• use space data to understand and counter climate change and
• advise on the security and resilience of space systems and services.

The announcements are part of the government's response to a major report produced last month by industry and academia on the future prospects for Britain in space The Space Innovation and Growth Strategy (Space-IGS) laid out a path it believed could take the UK from a position where it currently claims 6% of the global market in space products and services to 10%, by 2030, creating 100,000 new hi-tech jobs in the process.

The government says it agrees with most of the Space-IGS recommendations, including developing a National Space Technology Strategy. One key area of dissent however is the call to double UK spending on ESA programmes over the next decade. The Space-IGS wanted Britain to try to initiate and lead at least three missions between now and 2030. Ministers say they cannot make such commitments in the current economic climate.

"We will require a compelling business case for each proposal or mission," said Lord Drayson. The government says it also wants more information from industry on how satellite broadband services could be expanded, and on the feasibility of establishing a UK-based Earth observation (EO) programme.

At the moment, the UK buys Earth imagery acquired by foreign spacecraft. The Space-IGS said there was a case for the UK to have its own EO fleet. Space-IGS chairman and Logica CEO Andy Green welcomed the government response to the report.

He conceded ministers would find the Esa funding issue difficult but hoped that as economic conditions improved, the question could be raised again. "They've been swift, I think they've been serious; they've put a lot of effort into it," he told BBC News.

"But as I've said today, we really have to concentrate on making a reality of this - [it's a] big ambition to go from 6% to 10%, create 100,000 jobs. That will need investment from industry, investment from government; and we'll see how that goes as we go up to the next spending round." The creation of a space agency is just the latest in a series of initiatives affecting British space interests.

In July last year, ESA finally opened a technical centre in the UK - the only one of the agency's major subscribers not to have such a showcase facility. It also appointed a British national, Major Tim Peake, to its astronaut corps in May.

Universe Today Website 4th April 2010

Magnetic Fields in Spiral Galaxies – Explained at Last?

That spiral galaxies have magnetic fields has been known for well over half a century (and predictions that they should exist preceded discovery by several years), and some galaxies' magnetic fields have been mapped in great detail. But how did these magnetic fields come to have the characteristics we observe them to have? And how do they persist?

A recent paper by UK astronomers Stas Shabala, James Mead, and Paul Alexander may contain answers to these questions, with four physical processes playing a key role: infall of cool gas onto the disk, supernova feedback (these two increase the magnetohydrodynamical turbulence), star formation (this removes gas and hence turbulent energy from the cold gas), and differential galactic rotation (this continuously transfers field energy from the incoherent random field into an ordered field). However, at least one other key process is needed, because the astronomers' models are inconsistent with the observed fields of massive spiral galaxies.

"Radio synchrotron emission of high energy electrons in the interstellar medium (ISM) indicates the presence of magnetic fields in galaxies. Rotation measures (RM) of background polarized sources indicate two varieties of field: a random field, which is not coherent on scales larger than the turbulence of the ISM; and a spiral ordered field which exhibits large-scale coherence," the authors write. "For a typical galaxy these fields have strengths of a few μG. In a galaxy such as M51, the coherent magnetic field is observed to be associated with the optical spiral arms. Such fields are important in star formation and the physics of cosmic rays, and could also have an effect on galaxy evolution, yet, despite their importance, questions about their origin, evolution and structure remain largely unsolved."

This field in astrophysics is making rapid progress, with understanding of how the random field is generated having become reasonably well-established only in the last decade or so (it's generated by turbulence in the ISM, modeled as a single-phase magnetohydrodynamic (MHD) fluid, within which magnetic field lines are frozen). On the other hand, the production of the large-scale field by the winding of the random fields into a spiral, by differential rotation (a dynamo), has been known for much longer.

The details of how the ordered field in spirals formed as those galaxies themselves formed – within a few hundred million years of the decoupling of baryonic matter and radiation (that gave rise to the cosmic microwave background we see today) – are becoming clear, though testing these hypotheses is not yet possible, observationally (very few high-redshift galaxies have been studied in the optical and NIR, period, let alone have had their magnetic fields mapped in detail).

"We present the first (to our knowledge) attempt to include magnetic fields in a self-consistent galaxy formation and evolution model. A number of galaxy properties are predicted, and we compare these with available data,"
Shabala, Mead, and Alexander say. They begin with an analytical galaxy formation and evolution model, which "traces gas cooling, star formation, and various feedback processes in a cosmological context. The model simultaneously reproduces the local galaxy properties, star formation history of the Universe, the evolution of the stellar mass function to z ~1.5, and the early build-up of massive galaxies." Central to the model is the ISM's turbulent kinetic energy and the random magnetic field energy: the two become equal on timescales that are instantaneous on cosmological timescales.

"One of the most important sources of energy injection into the ISM are supernovae," the authors write. "Star formation removes turbulent energy," as you'd expect, and gas "accreting from the dark matter halo deposits its potential energy in turbulence." In their model there are only four free parameters – three describe the efficiency of the processes which add or remove turbulence from the ISM, and one how fast ordered magnetic fields arise from random ones.

Are Shabala, Mead, and Alexander excited about their results? You be the judge: "Two local samples are used to test the models. The model reproduces magnetic field strengths and radio luminosities well across a wide range of low and intermediate-mass galaxies."

And what do they think is needed to account for the detailed astronomical observations of high-mass spiral galaxies? "Inclusion of gas ejection by powerful AGNs is necessary in order to quench gas cooling."
It goes without saying that the next generation of radio telescopes – EVLA, SKA, and LOFAR – will subject all models of magnetic fields in galaxies (not just spirals) to much more stringent tests (and even enable hypotheses on the formation of those fields, over 10 billion years ago, to be tested).

BBC News Website 7th April 2010

First Image of Star's Eclipse Captured by Scientists

The first close-up image of an eclipse beyond the solar system has been captured by scientists. Astronomers at the

University of St Andrews worked on an international study of the star Epsilon Aurigae, from the Auriga constellation. Every 27 years it becomes dimmer, a phenomenon which lasts for two years. The physicists combined light from four telescopes to get the first image of the eclipse, which is 140 times sharper than images from the Hubble telescope. The team described the discovery as a "terrifying image, like something from a Tolkein book".

Kill the Light

The eclipse was first observed by the German astrologer Johann Fritsch in 1821. Dr Ettore Pedretti and Dr Nathalie Thureau, from St Andrews, took part in the research, which was led by Brian Kloppenborg from the University of Denver. Dr Pedretti said: "From the image, we can confirm that the eclipse of Epsilon Aurigae is caused by a thin disc of opaque dust trailed by a massive and unseen companion.

"Like David, tiny particles of dust are able to kill the light of this 'Goliath' star."
Dr Thureau designed some of the optics for the light-combining technique used to view the star, which is called optical interferometry.

Astronomers Puzzled

"With this image we have solved a 180-year-old mystery," she said. "Astronomers have been puzzled for more than a century about this star and we took two pictures that may finally solve the mystery. "In fact we will continue to capture images since the eclipse lasts about two years." The two academics intend to form the first group in Scotland to build instruments for optical and infrared interferometry. "Our aim is to exploit existing interferometers around the world in order to take detailed pictures of distant and interesting astronomical objects that are not achievable even with the largest single telescopes," explained Dr Pedretti. The research will be published in the journal, Nature.

Universe Today Website 7th April 2010

Mystery Object Found Orbiting Brown Dwarf

Big planet or companion brown dwarf? Using the Hubble Space Telescope and the Gemini Observatory, astronomers have discovered an unusual object orbiting a brown dwarf, and its discovery could fuel additional debate about what exactly constitutes a planet. The object circles a nearby brown dwarf in the Taurus star-forming region with an orbit approximately 3.6 billion kilometers (2.25 billion miles) out, about the same as Saturn from our Sun. The astronomers say it is the right size for a planet, but they believe the object formed in less than 1 million years — the approximate age of the brown dwarf — and much faster than the predicted time it takes to build planets according to conventional theories.

Kamen Todorov of Penn State University and his team conducted a survey of 32 young brown dwarfs in the Taurus region.The object orbits the brown dwarf 2M J044144 and is about 5-10 times the mass of Jupiter Brown dwarfs are objects that typically are tens of times the mass of Jupiter and are too small to sustain nuclear fusion to shine as stars do.

While there has been a lot of discussion in the context of the Pluto debate over how small an object can be and still be called a planet, this new observation addresses the question at the other end of the size spectrum: How small can an object be and still be a brown dwarf rather than a planet? This new companion is within the range of masses observed for planets around stars, but again, the astronomers aren't sure if it is a planet or a companion brown dwarf. The answer is strongly connected to the mechanism by which the companion most likely formed.

The Hubble new release offers these three possible scenarios for how the object may have formed:

Dust in a circumstellar disk slowly agglomerates to form a rocky planet 10 times larger than Earth, which then accumulates a large gaseous envelope; a lump of gas in the disk quickly collapses to form an object the size of a gas giant planet; or, rather than forming in a disk, a companion forms directly from the collapse of the vast cloud of gas and dust in the same manner as a star (or brown dwarf).

If the last scenario is correct, then this discovery demonstrates that planetary-mass bodies can be made through the same mechanism that builds stars. This is the likely solution because the companion is too young to have formed by the first scenario, which is very slow. The second mechanism occurs rapidly, but the disk around the central brown dwarf probably did not contain enough material to make an object with a mass of 5-10 Jupiter masses.

"The most interesting implication of this result is that it shows that the process that makes binary stars extends all the way down to planetary masses. So it appears that nature is able to make planetary-mass companions through two very different mechanisms," said team member Kevin Luhman of the Center for Exoplanets and Habitable Worlds at Penn State University.

If the mystery companion formed through cloud collapse and fragmentation, as stellar binary systems do, then it is not a planet by definition because planets build up inside disks. The mass of the companion is estimated by comparing its brightness to the luminosities predicted by theoretical evolutionary models for objects at various masses for an age of 1 million years.

Further supporting evidence comes from the presence of a very nearby binary system that contains a small red star and a brown dwarf. Luhman thinks that all four objects may have formed in the same cloud collapse, making this in actuality a quadruple system. "The configuration closely resembles quadruple star systems, suggesting that all of its components formed like stars," he said.

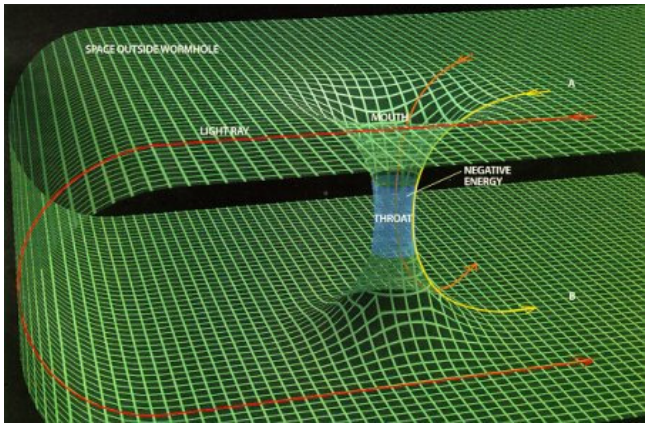
The team's research is being published in an upcoming issue of The Astrophysical Journal.

Universe Today Website 8th April 2010

Is Our Universe Inside Another Larger Universe?

A wormhole is a hypothetical "tunnel" connecting two different points in spacetime, and in theory, at each end of the wormhole there could be two universes. Theoretical physicist Nikodem Poplawski from Indiana University has taken things a step further by proposing that perhaps our universe could be located within the interior of a wormhole which itself is part of a black hole that lies within a much larger universe.

As crazy as the concept of wormholes sounds, it does offer solutions to the equations of Einstein's general theory of relativity. In fact, wormholes – also called an Einstein-Rosen Bridge — offer such a great solution that some theorists think that real wormholes may eventually be found or even created, and perhaps they could even be used for high-speed travel between two areas in space, or maybe even time travel.



An artist's impression of a Worm Hole connecting two points in spacetime

Image Credit: Universe Today

However, a known property of wormholes is that they are highly unstable and would probably collapse instantly if even the tiniest amount of matter, such as a single photon, tried to travel though them.

But would it work – and could matter exist — if we were inside a wormhole inside a black hole inside another universe? Poplawski thinks so. He takes advantage of the Euclidean-based coordinate system called isotropic coordinates to describe the gravitational field of a black hole and to model the radial geodesic motion of a massive particle into a black hole.

"This condition would be satisfied if our universe were the interior of a black hole existing in a bigger universe," Poplawski said. "Because Einstein's general theory of relativity does not choose a time orientation, if a black hole can form from the gravitational collapse of matter through an event horizon in the future then the reverse process is also possible. Such a process would describe an exploding white hole: matter emerging from an event horizon in the past, like the expanding universe."

"From that it follows that our universe could have itself formed from inside a black hole existing inside another universe," he said. By continuing to study the gravitational collapse of a sphere of dust in isotropic coordinates, and by applying the current research to other types of black holes, views where the universe is born from the interior of an Einstein-Rosen black hole could avoid problems seen by scientists with the Big Bang theory and the black hole information loss problem which claims all information about matter is lost as it goes over the event horizon (in turn defying the laws of quantum physics).

Poplawski theorizes that this model in isotropic coordinates of the universe as a black hole could explain the origin of cosmic inflation. Could this be tested? Well, there is the issue that to see if an object could travel through a wormhole, the observer would have to be inside the wormhole as well, since the interior cannot be observed unless an observer enters or resides within.

A possible solution is that exotic matter wouldn't collapse the wormhole, so we'd have to create – and be made of – exotic matter to keep the it open. But perhaps, as Poplawski proposes, if the wormhole is inside a black hole inside another universe it would work.

Anyone ready to give it a try?

BBC News Website 9th April 2010

Venus 'still volcanically active'

Data from Europe's Venus Express probe suggests that Earth's neighbour may still be able to erupt volcanoes. Relatively young lava flows have been identified on the planet's surface by the spacecraft's infrared instrument. The flows show up as having a different composition to the surrounding surface material.

Researchers estimate that they may have been erupted as recently as 2.5 million years ago - and probably much nearer in time than that. It is even possible these areas are currently active, says Suzanne Smrekar, from the Jet Propulsion Laboratory, California, US, and her colleagues. The team reports its assessment of lava flows in the Imdr, Themis and Dione regions of Venus in the journal Science.

"This is a significant result," commented Hakan Svedhem, the European Space Agency's Venus Express Project Scientist. The existence of active volcanoes on Venus has long been debated.

Researchers say a geologically dead planet would be expected to display far more impact craters. Some process on Venus must have reworked the surface. That process is assumed to be volcanism, although it is likely to work at a slow rate.

Feature Articles

Alexei Leonov

By Malcolm Neal

In my previous short biographies of people involved with astronomy and space I have concentrated on Americans so I thought it time to redress the balance with **Aleksei Arkhipovich Leonov** one of the Russian Cosmonauts and the first man to walk in space. Note the difference in spelling depending on which source you use.

Alexei Leonov

Image Credit: Wikipedia

Alexei was born in May 30th, 1934 in a town called Listvyanka, which is in Siberia. He is now a retired cosmonaut who has been deputy director of the Gagarin Cosmonaut centre. From all the internet sources I have been able to find out very little of his early life apart from where he was born, which is a shame.

He was a military fast jet pilot who was chosen for cosmonaut training in 1960. He eventually went into space on in March 1965. His space walk actually took place on March 15th. It should have occurred earlier but a cancelled Vostok 11 mission caused the delay and meant that it was a Voskhod mission (2) when he underwent his now recorded first space walk. It was not without its problems as during the walk his suit stiffened due to the air it held. This made it too large for him to re-enter the capsule so he had to bleed air from his suit to deflate it before regaining entry to the Voskhod 2 capsule.

He walked in space for just 12 minutes and had just a five foot lead / rope to attach him to the spacecraft. Not a very long distance but when you consider he was probably travelling at about 18000 miles and hour a 12 minute 'walk' took him approximately 3600 miles around the earth! The problems did not stop once he regained the capsule. Re-entry problems took them so far off course they landed in a forest and it took a long time to find the capsule and when their rescuers arrived they found the cosmonauts threatened by a wolf pack!! The Americans must be glad they landed in the sea.

He was a very lucky cosmonaut as he had various scrapes apart from the space walk problems. He was to have been the primary crew on the ill-fated Salyut 11 craft. This killed its crew after a seal failed and caused the death by asphyxia.

He was to have been commander of the Russian Moon shot before this but it was cancelled after Armstrong Aldrin and Collins made it there first in 1969. His life was saved by the illness of his fellow crew member Valery Kubasov who it was thought had contracted TB and so the whole crew were replaced in Salyut 11.

Eventually he was reassigned to the Apollo Soyuz link missions and so went to America to train. Here he learned English (or what the Americans call English). He was found to be a very humorous person with a great deal of charm. As it was he flew on the 1975 mission to link up Apollo and Soyuz. He was commander of the Soyuz 19 half of the mission that was in every way a success.

A still image from the TV Transmission of Leonov's time outside the Voskhod 2 spacecraft

Image Credit: NASA

From 1976 to 1982 he was commander of the cosmonaut crew and as mentioned deputy director of the Gagarin Cosmonaut centre where he was responsible for cosmonaut training. He retired from active cosmonaut duty in 1991.

Leonov was quite an athlete in his earlier life and has always been very interested in art. In fact from what little I can find about his early life he might have become a professional artist but the air force came into his life and so he has become a very accomplished amateur artist. He painted all through his life even whilst a cosmonaut and you can see many of his space images on various web sites if you are that way interested.

It is said that his "Near the Moon" image is reminiscent of the opening scene from the Arthur C Clarke Stanley Kubrick film 2001. Leonov painted it in 1968 well before the film was made. Did it influence Clarke or Kubrick? We will never know.

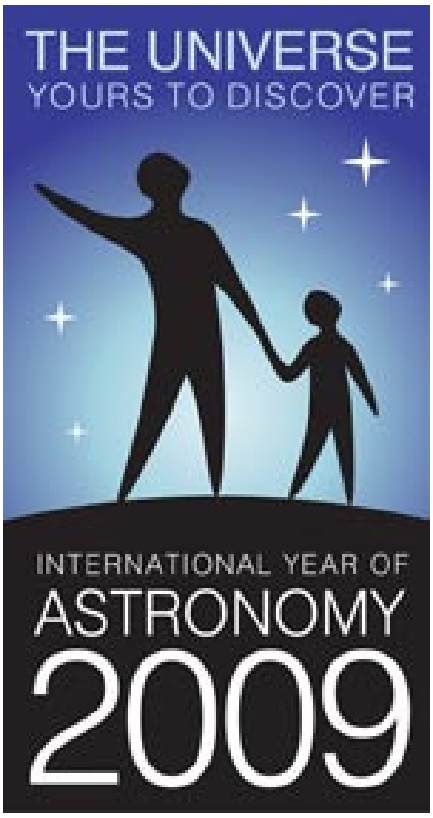
Leonov's "Near the Moon," which he painted in 1967

Image Credit: Wikipedia

International Year of Astronomy 2009 and Apollo 11 Anniversary Report - Part One

By Anthony Southwell

2009 proved to be a very busy year for the DDAS, and a very rewarding one too I think. For 2009 was designated the 'International Year of Astronomy' by the United Nations Educational, Scientific and Cultural Organization (UNESCO). It was called to celebrate the 400th anniversary of the first use of the telescope to make an astronomical observation, which was by the great Italian astronomer Galileo Galilei in 1609, or, depending on your viewpoint, English observer Thomas Harriot, who made the first observation of the Moon with a telescope on 26th July 1609, a full four months before Galileo performed his observation, but Harriot never published his findings, or there is no record of such observations in existence, at least to my knowledge, someone out there may know otherwise, if so please do tell me, my knowledge of Thomas Harriot is sparse at best.



The official Logo for the International Year Astronomy 2009

Image Credit: Wikipedia

UNESCO really pushed the public relations boat out on this event, there was a dedicated website for IYA 2009 inviting people and organisations all over the world to take part in the year long celebrations of all things 'astronomical', there was even a slick 'corporate' video released by UNESCO to publicise IYA 2009. In all, over 140 countries participated in the event. IYA 2009 has smaller 'projects' running under the wider IYA 2009 banner, these projects were set up to promote astronomical and scientific education and awareness to different groups in society as a whole, IYA 2009 had a number of cornerstone projects running, a brief précis of each project follows:

100 Hours of Astronomy

This was a 100-hour, round-the-clock, round-the-globe event, including live webcasts from research observatories, public observing events and other activities around the world. One of the key goals was to allow as many people as possible to look through a telescope, as Galileo first did 400 years ago. The 100 Hours of Astronomy took place from 2nd – 5th April. The Moon was at first quarter on 2nd April, so it was at good phase for early evening observing over this period, the event consisted of two elements:

1.Live observatory webcasts, observing events and other activities connecting large observatories around the world, coordinated by the European Southern Observatory (ESO).

2.A 100-hour "sidewalk" observing event to allow as many people as possible to look through a telescope, and see what Galileo saw, managed by Astronomers Without Borders (AWB).

Galileoscope IYA 2009

Observing through a telescope for the first time is an experience that shapes our view of the sky and the Universe. The IYA2009 programme wanted to share this observational and personal experience with as many people as possible across the world and collaborated with the US IYA2009 National Node to develop a simple, accessible, easy-to-assemble and easy-to-use telescope that can be distributed by the millions. Ideally, every participant in an IYA2009 event should be able to take home one of these little telescopes. This simple telescope would enable people to build and observe with a telescope that is similar to Galileo's. Sharing these observations and making people think about their importance is one of the main goals of IYA2009: *Promote widespread access to new knowledge and observing experiences.* A do-it-yourself Galileoscope could be the key to pursuing an interest in astronomy beyond IYA2009, especially for people who cannot afford to buy a commercial telescope.

From the Earth to the Universe

The fantastic images of the Universe captured by humanity's fleet of ground and space-based telescopes are largely responsible for the magical appeal that astronomy has on lay people. Indeed, popular images of the Cosmos can engage the general public not only in the aesthetics of the visual realm, but also in the science of the knowledge and understanding behind them. IYA2009 was an unprecedented opportunity to present astronomy to the global community in a way that has never been done before. The "From Earth to the Universe" project is an exhibition arranged by IYA 2009 that will bring these images to a wider audience in non-traditional venues such as public parks and gardens, art museums, shopping malls and metro stations.

Cosmic Diary

The Cosmic Diary is not just about astronomy. It was more about what it is like to be an astronomer, a scientist. The Cosmic Dairy aims to put a human face on astronomy. Professional astronomers would blog in text and images about their life, families, friends, hobbies, and interests, as well as their work – their latest research findings and the challenges that face them in their research. The bloggers would represent a vibrant cross-section of female and male working astronomers from around the world. They wrote in many different languages and came from five different continents. Outside the observatories, labs and offices, they are musicians, mothers, photographers, athletes, amateur astronomers. At work, they are managers, observers, graduate students, grant proposers, instrument builders and data analysts.

At some point during this project, all the bloggers will be asked to explain one particular aspect of their work to the public. In a true exercise of science communication with the public, these scientists would be asked to translate into a more popular language the nuts and bolts of their scientific research. This will be their challenge. The project ran from 2nd to the 5th April.

Dark Skies Awareness

Dark skies are found in rural areas that are free of urban light pollution. From a city centre location we might see fewer than 100 stars with our naked eyes. Under a dark sky we can see over 1,000 stars. We can even see our own galaxy, The Milky Way, stretching across the sky. Funding was being sought for the current Dark Sky Scotland project to be rolled out across the UK during 2009 and beyond, at this point in time, the Author is unsure as to the status of this project. In addition, IYA2009 is looking to establish a network of Dark Sky Parks across the UK, designated by the International Dark-skies Association, and happening in National Parks, forest parks and other areas of dark skies.

Portal to the Universe

The Portal to the Universe seeked to provide a global, one-stop portal for online astronomy content, serving as an index, an aggregator and a social networking site for astronomy content providers, laypeople, press, educators, decision-makers and scientists. The PTTU will feature news, image, event and video aggregation; a comprehensive directory of observatories, facilities, astronomical societies, amateur astronomy societies, space artists, science communication universities; and Web 2.0 collaborative tools, such as the ranking of different services according to popularity, to promote interaction within the astronomy multimedia community. In addition, a range of "widgets" (small applications) will be developed to tap live into existing "live data". Modern technology and the standardisation of metadata make it possible to tie all the suppliers of such information together with a single, semi-automatically updating portal. This project ran from 2nd to 5th April.

She is an Astronomer

IYA 2009 has the aim of contributing to four of the UN Millennium Development Goals, of which one is to "promote gender equality and empower women". Approximately a quarter of professional astronomers are women, and the field continues to attract women and benefit from their participation. However, there is a wide geographical diversity, with some countries having none, and others having more than 50% female professional astronomers. Also, the very high level of female dropouts shows that circumstances do not favour female scientists. Gender equality is of a major concern to the whole scientific community regardless of its geographic location. The problems and difficulties are different in all regions and continents. IYA 2009's She is an Astronomer programme offered platforms that address some of these problems.

Galileo Teacher Training Program

The International Year of Astronomy 2009 (IYA 2009) provided an excellent opportunity to engage the formal education community in the excitement of astronomical discovery as a vehicle for improving the teaching of science in classrooms around the world. An incredibly rich store of useful astronomy resources is available for such an effort, much of it in digital form and freely available on the Internet. However, experienced educators and outreach specialists identify a critical impediment: many teachers lack the training to understand these resources or use them effectively in their curricula. To address this problem and to sustain the legacy of the IYA 2009, the IAU — in collaboration the National Nodes and leaders in the field such as the Global Hands-On Universe project, the US National Optical Astronomy Observatory and the Astronomical Society of the Pacific — is embarked upon a unique global effort to empower teachers by developing the Galileo Teacher Training Program (GTTP). The GTTP goal is to create a worldwide network of certified "Galileo Ambassadors" by 2012. These Ambassadors will train "Galileo Master Teachers" in the effective use and transfer of astronomy education tools and resources into classroom science curricula. The Galileo Teachers will be equipped to train other teachers in these methodologies, leveraging the work begun during the IYA2009 in classrooms everywhere.

Universe Awareness

Universe Awareness (UNAWE) was an international programme that exposed very young children in under-privileged environments to the scale and beauty of the Universe. Universe Awareness illustrates the multicultural origins of modern astronomy in an effort to broaden children's minds, awaken their curiosity in science and stimulate global citizenship and tolerance. Using the sky and children's natural fascination with it as common ground, UNAWE creates an international awareness of our place in the Universe and our place on Earth. This project ran from 2nd – 5th April.

Developing Astronomy Globally

This Cornerstone project acknowledged that astronomy needs to be developed in three key areas: professionally (universities and research); publicly (communication, media, and amateur groups) and educationally (schools and informal education structures). The focus was on regions that do not already have strong astronomical communities. The implementation was centred on training, development and networking in each of these three key areas. This Cornerstone will use the momentum of the IYA2009 to help establish and enhance regional structures and networks that work on the development of astronomy around the world.

These networks will support the current and future development work of the IAU and other programmes and should ensure that developing regions can benefit from the IYA2009 and the work of the other Cornerstone projects. It should also address the question of the contribution of astronomy to development. This project ran from 2nd – 5th April.

Galilean Nights

The Galilean Nights was a worldwide astronomy event that ran from April 2nd to 5th, project involved both amateur and professional astronomers around the globe taking to the streets with their telescopes and pointing them as Galileo did 400 years ago. The sources of interest will be Jupiter and its moons, the Sun, our Moon and many other celestial objects. The event actually took place on 22-24 October 2009. Astronomers shared their knowledge and enthusiasm for space by encouraging as many people as possible to look through a telescope.

In addition there was:

Universal Astronomy Day – unanimous support for the commemoration of the 40th anniversary of the Apollo landing, July 21st.

The week between July 21 and 26 turned out to be a key week because of the lunar landing, the total solar eclipse in China (22nd) and the (British) Thomas Harriot celebration (26th), all fell within that period.

There were a number of UK IYA 2009 events that were organised they were:

Telescope400

This UK IYA 2009 event was organised to bring public attention to the importance of the telescope in astronomy today and in the past. It was also called to highlight the unique contribution to UK astronomy made by Thomas Harriot (1560 - 1621). Telescope400 was also called to celebrate the 400th anniversary of the first-ever telescope observations of the Moon made and recorded by Harriot at Syon Park in Middlesex on July 26th 1609.

Spring Moonwatch

This national observing event ran from Saturday 28th March through Sunday 5th April 2009. The week offered good opportunities for viewing the first quarter Moon and also the planet Saturn. It was anticipated that many events organised by local astronomical societies, science centres etc will take place during this week, weather permitting of course! The DDAS did not get involved in this event.

Autumn Moonwatch

This event took place from Saturday 24th October through Sunday 1st November 2009. The week offered good opportunities for viewing the Moon and also the planet Jupiter and the Galilean satellites. It was anticipated that many events organised by local astronomical societies, science centres etc will take place during this week, again, weather permitting! The DDAS did not get involved in this event.

In addition to these IYA 2009 events, it was also the 40th Anniversary year of the first manned landing on the Moon by the crew of Apollo 11 in July 1969. So all in all, 2009 was shaping up to be a busy year for Astronomy. And it was a year that I felt that the DDAS could not afford to miss out on. I came to the conclusion that it would be a good thing for the Society as a whole to become involved in IYA 2009/Apollo 11, it is one of the things that the Society does after all! It's in our mission statement, and I quote, "To familiarise the people of the Derby & District area with the science and hobby of Astronomy," end quote. To bring the wonders of the Universe to the general public, also, by getting involved in IYA 2009, it would help the raise the public profile of the Society, and, who knows, we may get a few new members out of it!

So with IYA2009/Apollo 11 in mind, I generated an IYA 2009 PowerPoint presentation for the Society to raise awareness of this upcoming event, I delivered the presentation to the Society at the June 2008 general meeting. This short presentation covered topics such as 'What is IYA 2009?', 'Why is it being called?', What Global and National Activities Will be Running During IYA 2009?', How Can the DDAS Get Involved?', What Events and Activities Can We Run During IYA 2009?', What Are The Next Steps?'

The kind of events that I had in mind that the DDAS could get involved with included:

• Observing Sessions – at both the Flamsteed Observatory and organised public observing events (could run throughout the year)
• Public DDAS meetings with 'big name' speakers
• Special Public DDAS meeting to mark the 40th Anniversary of Apollo 11
• DDAS displays at the Derby Museum and Art Gallery or the Silk Mill Industrial Museum (these displays can run for as long as the Museum authorities want)
• Display stand and a major DDAS presence at the 2009 Flamsteed Lecture at the University of Derby, we could also help out the University to get an 'appropriate' speaker
• The DDAS should approach the organisers of the Darley Park Concert in order to ascertain if we could run 'joint' concert, a Holst 'The Planets' concert maybe?

In relation to these ideas, not all of them were followed through. There were no public observing sessions, public events or organised events at the Flamsteed Observatory during IYA 2009.

There was a meeting of the DDAS that was opened up to the public, that was the June meeting, when the Author presented an audio/visual retrospective of the Apollo programme to mark the upcoming 40th Anniversary of Apollo 11 landing on the Moon on the 20th July 1969 (a report on this meeting can be found in the 'Society News' section within this issue of Aries – Ed).

The DDAS did not have any organised displays at either the Derby Museum and Art Gallery or the Silk Mill Industrial Museum, although the Society was invited to have a display at the Derby Quad event, more on that later.

The Society did have its usual display stand at the 2009 Flamsteed Lecture at the University of Derby (a report concerning this event can be found within this issue of Aries – Ed).

In regards to the Society having a number of 'big name' speakers to visit during IYA 2009, we pretty much kept to the programme we had, but that programme included Dame Jocelyn Bell Burnell, who came to visit us in December.

I did make approaches to the Darley Park Concert organisers to find out if they would like to become involved in IYA 2009 and make the 2009 programme a 'space-themed' concert. The feedback I received was very positive and after a number of further phone calls and a meeting to thrash out the details, the Darley Park Concert organisers were very keen for the DDAS to become involved. They even invited us to have a display at the concert, more on the Darley Park Concert later on.

As it turned out, we were involved in four events, two events that I had helped organise and two further invitations. The events that the DDAS eventually became involved for IYA2009/Apollo 11 were:

Apollo Well Dressing Event at the Derby Quad, Market Place, Derby 27th June

Aston on Trent Apollo 11 Well Dressing - Aston on Trent 11th July

Barton Gate Steam Rally - Barton under Needwood, Staffordshire 18th July

Darley Park Concert, Darley Park, Derby 6th September

A brief description of each event will now follow.

Well Dressing Event at the Derby Quad, Market Place, Derby 27th June

This was one of the events that the DDAS was invited to participate in. The Author can't quite remember who contacted who, but if memory serves, an e-mail was received from a member of the Quad staff to the DDAS Chairman asking if we would like to become involved in the Well Dressing event for 2009, as it was to have a space theme, perhaps with the possibility of a DDAS display of some kind. The Chairman, after a brief conversation with a number of committee members, responded to the e-mail and expressed the Society's interest in taking part in the event. A meeting between a Derby Quad representative and the DDAS Chairman was set up and the details were thrashed out. The Well Dressing event was going to shape up like this:

The DDAS was to have a display inside one of the Quad's 'participation' rooms, we could have a wall mounted display of DDAS members astrophotos and Society information, a small wall mounted display of imagery from the Apollo programme, we could also have items on display on tables, they would include books, a 1/96th scale, three-foot tall model of the Saturn V launch vehicle (which took the Author about two months to build and paint! – Ed), a 1/48th scale model of an Apollo lunar module, the Society laptop running a slideshow of astronomical imagery, the Society Moon Globe would be there too and Graham Ensor brought along some examples from his superb meteorite collection. Also the Society LX-90 telescope would be there, it was planned to do some solar observing if the weather was good, but on the day it was cloudy, so the LX-90 formed part of the indoor display.

It was even suggested that the Society could get some imagery displayed on the Big Screen in the Market Place on the day of the Well Dressing event. So I got to work on selecting a number of images from the mission of Apollo 11 to be displayed on the screen, I also got some video clips of the launch of Apollo 11, Armstrong's first step and Aldrin's 'Magnificent Desolation' quote as he stepped onto the lunar surface. DDAS member Chris Newsome also decided to prepare something for the Big Screen too, a kind of DDAS 'promotional video', but, unfortunately, that was not used on the day, much to my disappointment as Chris had put a great deal of work into it.

So the plans were laid and all we had to do is prepare. The wall-mounted DDAS/Apollo display was set up a week before the Well Dressing event, it was thought by the Quad people that it would be a good idea to have that in place for the week leading up to the event, because they would invite people to come and work on well dressing during that week in the participation room and they could look at the display also. The rest of our display would be set up on the day. Later the author was to learn that the DDAS Chairman (who is also the author of the very article you are reading – Ed) was to be invited to give a small speech in front of the Well Dressing on the day! Oh Boy! A public speech!

So June 27th came and we all descended on the Quad to set up, I arrived first with the Saturn V and the lunar Module models, the Society LX-90, books and so forth. Then Mike Dumelow and Mike Lancaster arrived with the Moon Globe and Society laptop respectively, then Graham Ensor arrived later with his meteorite collection.

Then Chris Newsome, Adrian Brown and Barry Ashforth arrived to help out during the day, so the DDAS team was complete! The Well Dressing itself was already taken out of the room and was in place in the Market Place ready for the dedication ceremony at 11:00am.

We got busy organising the indoor display, I was very gingerly setting up my Saturn V model, Mike was setting the Society laptop up, Mike Dumelow was arranging the Moon Globe, Graham was tending to his meteorites, and Chris was helping to set up the LX-90. Once I had arranged the Saturn V and the Lunar Module models and the Apollo related books I had brought, I decided to go outside and see what was on the Big Screen, boy, was I in for shock! All the Apollo imagery was there! The Big Screen people had even included the video clips, and there was sound, suddenly the roar of a Saturn V at lift-off filled the Market Place! I stood there staring up at the Big Screen grinning like a fool, and I must admit, there were tears in my eyes! The Apollo 11 lift off sequence looked beautiful on the Big Screen! I waited for the Apollo items to cycle through and see if Chris' DDAS 'promo' video was also included for display on the Big Screen. It was not. The rest of the Big Screen presentation was a selection of children's animations with a space theme. I did feel rather bad for Chris that he never got his video shown, but I suppose there is only so much content that they can put on the screen at any one time and they have got a schedule to keep to during the day.

I stood in front of the Big Screen with my little digital camera taking photos of the Apollo imagery we had managed to get displayed on the screen, I was really, really pleased with that. But one thing did strike me though, apart from me and one or two other DDAS members, very few people, who were in the Market place at the time took any notice! Even when you heard the last ten-second countdown for Apollo 11 and the roar of the Saturn V at lift off, very few people even battered an eyelid! I was amazed! 40 years ago, for the first time, Mankind set foot upon another celestial body, it was a pivotal moment in Human history! But now, no one gave it a second look, I was beginning to get a little bit nervous about this event and it was not just the thought of my impending public speech that was giving me the jitters! I went back inside the Quad to see how everyone else was getting on. Everything seemed to be ready, we were now on the countdown to 11am!

Around about 10:30am we left the DDAS display and made our way to the spot in the Market Place where the Well Dressing was and where the dedication ceremony would take place and this when I saw the most extraordinary thing. Before the dedication ceremony began, there was to be a couple of items. The first was a display of dancing by a troop of Morris Dancing Daleks! I know how that may sound, has your Author been drinking something he shouldn't have? Dancing Daleks, it was a group of ladies who were 'dressed' as Daleks. Their costumes consisted of a piece of material with slits for the eyes, and what seemed to be plastic rings of different sizes sown on the inside of the material covering to give the Dalek shape. They each had a colander on their heads, and they had a egg whisk in one hand and a sink plunger in the other! These utensils served as the Dalek's personal weapons, and what a strange sight there were too! The person who was to lead the Morris Dance was dressed in a long coat, a Trilby Hat and a very long, multicoloured, scarf, just like Tom Baker's Doctor. Whoa! I could not believe my eyes! In part two of this report find out if I survived my encounter with the Daleks and the rest of the IYA 2009/Apollo 11 events.

William Herschel

By Malcolm Neal

William Herschel was born in Hanover – Germany in 1738 on the 15th of November the son of a musician in the Hanoverian army. He was however christened Freidrich Whilhelm Herschel but on arriving in England anglicised his name to that by which we know him best. He was one of nine (some sources say 10) children but only 5 of these survived any length of time. We know very little about most of his siblings with the exception of Caroline his younger sister who also moved to England in 1772 to become his house keeper several years after William himself came to this country.

The Author standing next to one of Hershel's telescopes

Image Credit: Malcolm Neal

Herschel originally followed in his father's profession i.e. he joined the army in 1756 as a player in the band rather than a soldier proper, when he was just 14 years old. A somewhat tender age by our reckoning but not that unusual for those days. This was at the start of the Seven Years War. However he did not stay in the army for long leaving during the following year whilst he was in England with his regiment. This may seem strange but remember George II was a Hanoverian and so the two countries were intimately linked.

In England he became a teacher of music as he could play a variety of musical instruments such as the organ, violin and oboe. Apart from being a talented musician he was also a composer but many of his works have either been lost or are very rarely played today. However due to his interest in music his interests strayed first into maths, optics, telescopes and then to astronomy which is why we remember him today.

He was dissatisfied with the telescopes of the day and investigated the process of telescope making soon becoming one of the pre-eminent telescope makers of his age. Using his own instruments he discovered the planet Uranus but this was not the original name given to the planet. Herschel named it Georgium Sidus (George's Star) after the English king but the French were not very keen on that name and called it Herschel after its discoverer but several years later it was renamed Uranus after the god of the sky Ouranos.

For discovering the planet the King awarded Herschel the Copley Medal – the highest possible award for scientific discovery that the Royal Society is able to bestow. One of Herschel's telescopes is shown in the image (the picture appears at the top of this page - Ed) with yours truly standing by it.

As you can see it is mainly of wooden construction with an octagonal external tube. You can just see in the foreground of the picture a model of the massive telescope designed and used by Herschel and his sister many years later. This large telescope was however not the success it was hoped as it was very difficult to align and was powered by muscle pulling on rope and so was rather unstable.

Herschel's very large telescope the 40 foot telescope was very cumbersome but he did use it to discover a moon of Saturn and later another but whether this was using the large or the smaller telescope I do not know. The moons discovered were Mimas and Enceladus. However most of his observing work was done with the smaller 20 foot focal length telescope. Another of his observing / mathematical / optical discoveries was that an unfilled telescope aperture gives a high angular resolution and so it became the basis for interferometric imaging.

On the ground floor of the house at the rear is a kitchen and workshop. At the rear is a small garden where much of both his and Caroline's observing was done from. Of course there was rather less light pollution in Bath at that time. In the garden is a sun dial, whilst in the garden there were a couple of surveyors who were measuring up for some further work to be done on the garden and rear of the house.

In the house basement is a video room with a looped video DVD show of the history of Herschel and his work. This runs for 10 or so minutes and is quite informative. Upstairs there are musical instruments and furniture in the style of the time. Though not devoted to astronomy this small museum which has limited opening times – only in the afternoon and certain days is well worth a visit if you happen to be in Bath.

The Sundial in the rear garden of Herschel's house in Bath.

Image Credit: Malcolm Neal