

FAS Newsletter

Federation of Astronomical Societies

<http://www.fedastro.org.uk>

'Stargazing Live' - a great opportunity



Members of the Liverpool AS youngsters astronomy club pictured with Prof Brian Cox

Whilst some of the more traditionalist amateur astronomers get a bit 'sniffy' about the razzmatazz that surrounds the BBC's Stargazing Live, many others feel it is the best thing ever, by bringing the delights of astronomy to the general public.

This year in conjunction with the RAS and STFC there were grants of just under £100 available to societies for use in running events. Only about 40 societies applied, which was surprising as there were no strings attached. Perhaps the short notice was a problem.

It is hoped that similar grants may be available if the BBC run such an event in 2013.

Liverpool AS played a significant part

This year, members of the Liverpool AS *youngsters astronomy club* and society members who have helped out at the club were invited along to the Tuesday evening event live from Jodrell Bank.

Well done to the society members; Steve Southern, Dave Galvin, Chris Banks, Rob Johnson, Graham Roberts and Pam McAdam. Plus very well done to the youngsters; Nathan Wilkinson, Emily Gardner, Luke Donnachie, Holly Davies, Jack Bailey, Hannah Moen and Bethany Ingham for taking part and having a wonderful time. Hopefully some of you will have recognized them in the observing field when we went live to Mark Thompson outside at the observing site and then inside in the studio as part of the audience hosted by Prof Brian Cox, Dara O'Briain and John Culshaw. All the youngsters in the audience were from Liverpool AS.

Some of us set up telescopes, binoculars and cameras to use in the observing field. Graham Roberts helped out John Culshaw with his brand new 12" dobsonian. Last time I looked, Graham was "adjusting" John's new Dobs with

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For your diary

2012 FAS Convention

The 2012 FAS Convention and AGM will be held on Saturday 6th October and will again be at the Institute of Astronomy, Cambridge.

It is to be hoped that this year will be even better than in 2011, which will take some doing. At the time of going to press the speakers and subjects were still being established.

Keep an eye on the FAS website, where an announcement will be made as soon as the details are finalised.

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Presidents Spot

I hope you are well and enjoying your astronomy. Let me begin this month with the subject of communication. FAS Council members including myself have always encouraged member societies to communicate with us and we will continue to do so. We routinely use this newsletter, the FAS website, the e-mail distribution to members and the annual convention to make appeals encouraging member societies to communicate with us.

So once again please let us know if there is anything your society wants to communicate and/or would like the FAS to consider doing for member societies. You can use the contact links on the FAS website. The FAS was formed nearly 40 years ago and a lot has changed since that time, including the advent of the internet and e-mail. Today astronomical societies may have different or additional requirements from the FAS and we need your help to help us remain relevant to your society's needs. Please put this communication appeal onto the agenda of your next society committee meeting for discussion.

I will take this opportunity to say thanks on your behalf to the Royal Astronomical Society for providing a grant of £2000 to help societies run public outreach events during Star Gazing live week back in January. The RAS asked us to arrange distribution of the funds to interested societies and I'm pleased to report that the FAS not only did that but also increased this funding in two ways. Firstly we applied for and got a grant of £1000 from the Science & Technology Facilities Council. The FAS then added a further £1000 to the pot making a total of £4000 all of which was distributed. A total of 43 societies applied for and received a grant which in the end was £95 each. We will aim to do the same next year and would encourage even more societies to apply for any grants then on offer.

Hopefully you read my comments in the last newsletter on the PLI scheme arranged by the FAS. In which case you will know that the recent PLI payment request was for renewal of the cover in June. The new schedule and policy will then be sent out after we have checked the correct listing of societies on the schedule issued by the Insurers at the end of June. If your society subscribed for PLI last year your existing insurance paperwork applies to the PLI cover up to the next renewal in June. The FAS has significantly subsidised this year's renewal charge to societies using the reserves in the PLI fund. We shall continue to subsidise the annual PLI renewal charge until the fund reserves have reduced to the target level set.

I would like to publicly thank our webmaster Samuel George for the excellent job he has done improving the FAS website and adding the Twitter and Facebook 'companions'. Sam has incorporated many improvements

Erratum

Unfortunately in compiling the 2011/2012 edition of the Astrocalendar, I forgot that 2012 was a leap year, meaning that the calendar inside the back cover is incorrect after 28th February.

Many apologies for this error, I hope it doesn't cause you too many problems.

Frank Johns

including the on-line renewal and society information update systems. If it doesn't already do so I'd like to encourage your society to use the FAS website facilities which allow societies to post details of their future events and provide write-ups of their past events and meetings which may be put on the website or in the FAS newsletter.

Finally I am pleased to report that there are currently 187 astronomical societies in the FAS and the FAS Council thanks them for their continuing support. These societies have a total of approximately 11000 members.

Clear skies!

Richard Sargent

Publicise your events

The FAS offers all societies the chance to publicise their events through our website. See the diary at:

<http://www.fedastro.org.uk/diary.php>

Many of you already do this and we have seen a steady increase since the move to a unified login system. We really would love to see all of our societies using this, as it's good to have all UK astronomy society events in one place. Not only is this published on the FAS website but it gets "tweeted" to our twitter account (@fedastro), where we have over 400 followers, and onto our new Facebook page. This is a great and easy way for the FAS to allow you to reach a larger audience.

To access the diary system you will need to have your FAS login details, the same as those for MARS, and go to:

<http://www.fedastro.org.uk/diarysubmit.php>

..... and why not make some income?

FAS publications—the annual Astrocalendar, together with the range of Starter Series booklets are available to member societies at heavily discounted rates, enabling you to make a significant contribution to society funds for each item sold.

These publications should find a ready outlet for members, to the general public at star parties and other events and can be ordered through the FAS website.

FAS Notice

The FAS Council regrets to report that following investigations into a formal complaint received from Hampshire Astronomical Group against HantsAstro concerning abusive e-mails, it was left with no choice but to expel HantsAstro from the FAS. Expulsion would have been suspended had HantsAstro been prepared to issue an apology.

Because of their previous (non-FAS) involvement with the two societies involved in the complaint, the FAS Membership Secretary and the SAGAS Rep to the FAS, left the meeting room and, did not take part in the discussion, the Council's judgement of the complaint or the decision making at its conclusion. The judgement and decision of the FAS Council was unanimous.

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a pair of pliers - go for it Graham! Conditions were freezing and clear so great for observing. Some soft light was required so the area was not completely dark but sufficiently dark to observe OK.



Telescopes in the observing field. In the background is the Jodrell Bank dish

The weather forecast for the evening was not good and after the few nights of very good clear skies we feared the worst as the conditions clouded up around 6:30pm. Thankfully though by 7:30 the clouds had disappeared and the stars looked wonderful in the Cheshire night sky. We watched Venus setting earlier over the huge dish at Jodrell Bank which was a great sight to see. The Liverpool AS group then observed several objects during the evening; Jupiter the the red spot visible, Andromeda galaxy M31, Orion Nebula, M42, M45 star cluster, M35 open cluster, M1 Crab Nebula and Auriga clusters M36, M37, M38. We then had a quick dash from the observing field into the studio for the live session "Back to Earth".

In the studio some of our members shared a bottle of meteorite Chilean wine with Dara O'Briain and Brian Cox, held a funny substance called aerogel and had their 5 minutes of fame on TV! When the show came off air we met with Brian Cox, chatted with him about the youngsters club, took some photo's and Brian signed plenty of autographs. Luke Donnachie showed Brian Cox his astrophoto's of Saturn, Moon, Orion Nebula and constellations which Brian autographed. Many thanks to Brian for being so accommodating, he was delighted to meet our youngsters. Also in the studio were Dr Lucie Green, Dr Tim O'Brien and Dr Andrew Pontzen.

We were very well looked after with food and drink being provided during the evening. The final thing to do was pack up all the telescopes from the observing field and say our goodbyes. See you next year.

A final word to say many thanks to our wonderful young astronomers who were brilliant all evening. Once again they did us proud and represented the society wonderfully - well done to them all.

The week before the start of the Stargazing live on BBC, local TV cameras came along to film some Liver-



Filming Gerard Gilligan with a member of the public for the TV how Inside-Out

pool AS members observing outside Liverpool World Museum. The weather let us down, cloud covered most of the night sky with just a glimpse of Jupiter. The film crew and some of the Liverpool AS members then went to Pex Hill, Leighton Observatory to continue filming. Altogether about 8 hours of filming took place. A short film clip went out on BBC North West programme Inside-out on Monday 16th January 2012.

And finally.....

Not only did our youngsters and members take part in the shows above but a few weeks ago for Blue Peter yet more filming of our young astronomers took place. And if that's not enough some of the members appeared in the BBC Sky at night programme March 2012 edition.

Steve Southern Liverpool AS



Members of Liverpool AS with the public outside the Museum



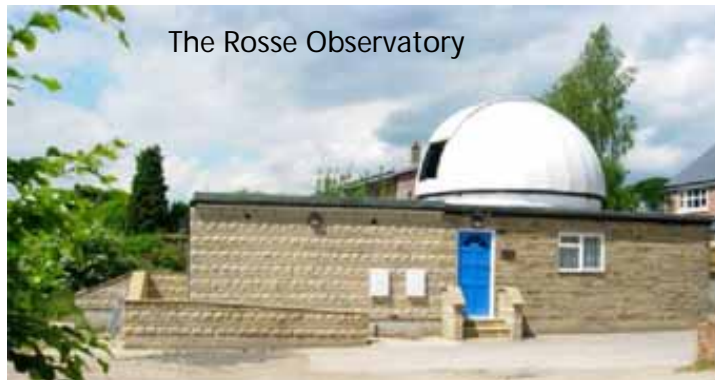
'Stargazing Live' in - West Yorkshire

The Rosse Observatory, run by WYAS in Pontefract, was open on all three designated nights of the 16th - 18th January 2012. In 2011 we participated and had about 150 people attend. This year was totally different and, although the event was advertised as starting at 7.30pm, people began to queue at 6pm. By 7.30pm both large car parks were full and so was the observatory. The dome was full, the meeting room with 35 seats where the talk was taking place was packed and the new large observing platform at the rear of the observatory was overflowing with people. We estimated that just over 100 people had attended on the first night.

The second night also provided a clear sky and this time we were ready for the crowds with a rotation system for each area of the observatory. Even more people attended with a total of about 150.

The third night was cloudy with Jupiter just visible through thin cloud. Nevertheless 60 people turned up and the same rotation system was put into practice to maximise their enjoyment.

In total over 300 people enjoyed the use of the 14-inch SCT in the dome. They then used the 18-inch Dobsonian, the Televue 102 refractor and the 6-inch JMI reverse binoculars on the observing platform to view a whole host



The Rosse Observatory

of planets, a comet and deep sky objects before retiring to the meeting room to warm up and get a hot drink.

"In our opinion Stargazing Live events are one of the best things that has happened to astronomy in a long time."

One thing was very clear that the Prof. Brian Cox effect is very powerful indeed. Hopefully the event will be run again in 2013. If so we will have to consider using one of the ballrooms in the mansion house next to the observatory for the talk just so that the sheer volume of people can be better

accommodated. In our opinion Stargazing Live events are one of the best things that has happened to astronomy in a long time.

www.wyas.org.uk

'Stargazing Live' in - Stirling

During the week of **Stargazing Live** we publicised three public activities and also provided Astronomy to a Bo'ness Scout Troop, two Falkirk Cub Packs, two Primary Schools in (Stirling and Callander) and a Youth Group from Alloa's Church of the Latter Day Saints. *Friday 13th Jan.* Our monthly public lecture advertised as



The SCOTTISH Solar System—eh?

'The Leviathan', was changed at the last minute due to the speaker's illness, so an Open University tutor, Dr Alan Cayless, talked about the Birth, Life and Death of Stars, using examples from the January sky.

Saturday 14th Jan. The 'Reach for the Stars' display was set up in Stirling's Shopping Centre from 0800 to 1800 hrs. Over 700 people talked to us; we ran out of the BBC/OU Starguides by 1330hr: took more than 200 bookings for our telescope viewing nights the following week and boosted our membership by around 50%. Some Primary School children, who had seen the display, returned to school on Monday and asked their teacher to get us to come to their school. As a result of this promotion, four primary schools and four youth groups have contacted us and we will be busy to the end of April!

Wed 15th to Sat 21st Jan. 'View the Night Sky' through the Old High School Telescope. The 12.5 inch Newtonian Reflector is more than 122 years old and attracted a lot of interest with many local people unaware that it existed. We booked 220 people and about 30, who couldn't be catered

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FETTSS - Astronomy in the Sun

The Costa Blanca Astronomical Society (CBAS) is based in Denia, Spain. It recently completed its largest project to date when, in association with NASA and the Spanish Asociación Astronomía de Marina Alta, it held a very successful exhibition of high resolution images of the Solar System. The project was called 'From Earth to the Solar System' (FETTSS) and the CBAS was the first group in Spain to complete the project.

The main aim of the project was to stage an exhibition of the high resolution images of the Solar System provided by NASA in a public area to inspire and inform the general public about our Solar system and the latest missions to investigate objects within it. The location chosen was a local shopping centre called Portal De La Marina and the exhibition took place in the first



week of December.

As well as the images themselves members of the group were available each day to answer questions from the public and a film about the moons of the Solar System was shown to over 100 school children from a local school in the centre's cinema complex. We also had a little activity for the children in the crèche, making a representation of the Solar system. Several thousand people passed through the centre during the 10 days that the exhibition was on, so we feel that the objective of bringing astronomy to the people was successfully met.

We look forward to further successful events in 2012, with visiting lecturers from the UK, star parties and away days. Anyone visiting from the UK would be welcome to come to our meetings or events as a guest.

We can be contacted at:

cbastronomy@gmail.com or you can check out our website at costablancastronomers.wordpress.com.

'Stargazing Live' in - Stirling (continued)

(Continued from page 4)

for, were added to viewings arranged for schools, etc., later in the month.

Weather was variable, with four seasons in one night, but many people saw Jupiter, the Red Spot and Galilean Moons, Venus and Moon (at end of month).

Local papers in Alloa, Falkirk and Stirling mentioned the Society's activities and this together with the BBC event was responsible for the great public interest.

The year ended with 10% increase in visitors (796). In five months since, we have had a total of 640, with 340 in January alone. The interest in Astronomy has never been higher.

Stirling AS : Albert Mackenzie (Chairman)



BOOK REVIEWS

Turn Left at Orion

By Guy Consolmagno and Dan M. Davis

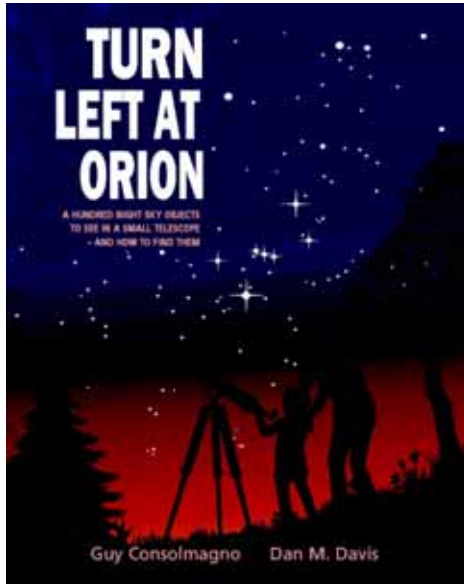
Published by Cambridge University Press ISBN:9780521153973 £22.99

This is the fourth iteration of what was already a great book, and probably the best book for the amateur astronomer starting out to get an appreciation of the wonders of the night sky. Have the changes been for the better? An unreserved YES.

The principal strength of *Turn Left* has always been the clear and easy to follow descriptions of How to see, What to see and How to find it. In this latest format the most obvious change is the binding - the large format, spirally bound book is very easy to use in the field, the pages stay flat, even when folded on itself.

The book opens with a comprehensive 'How to Use' section. This not only covers 'how to' of the contents of the book but should prove useful to those wanting to learn about night sky observing generally. This part also covers details of setting up and using telescopes. In my opinion, for the beginner, it is worth buying the book for this section alone.

The Moon and the planets are then covered in some detail. The detailing of



the Moon is particularly important for the beginner as it is easy to find and is in the sky for a lot of the time. I particularly like the way Moon observing is covered by taking you through what you will see as the lunar month progresses.

The rest of the book is about the night sky more generally and its structure is in the form of a calendar. Starting with January-to-March, a series of targets are gone into in some detail and each are

rated in terms of how easy is it to find by telescope (refractor and dobsonian) or binoculars and whether high power is required. Each suggested target is rated using telescope symbols - the more symbols the easier/better the target. Very useful for the beginner. It also suggests what filter to use, if appropriate.

A particularly nice, and useful, touch is the use of sketches instead of super-duper colour images which bear little resemblance to what you actually see in the eyepiece. These drawings are aimed at the user, in that there is one covering what you will see in a finderscope, as well as that through a small telescope and also a dobsonian.

All types of stellar objects are covered from nebulae to galaxies and clusters to double stars.

This is a great book for the beginner and also has a lot to recommend it for the seasoned observer. Worth its place in any collection and should be the first choice for those starting out.

Frank Johns

The Cambridge Photographic Star Atlas

by Axel Mellinger and Ronald Stoyan. First English edition 2011
Published by Cambridge University Press, ISBN 978-107-01346-9
Hard Back £ 30.00

This is a large format book 340 X 250 mm weighing in at 1.41 kgrs.

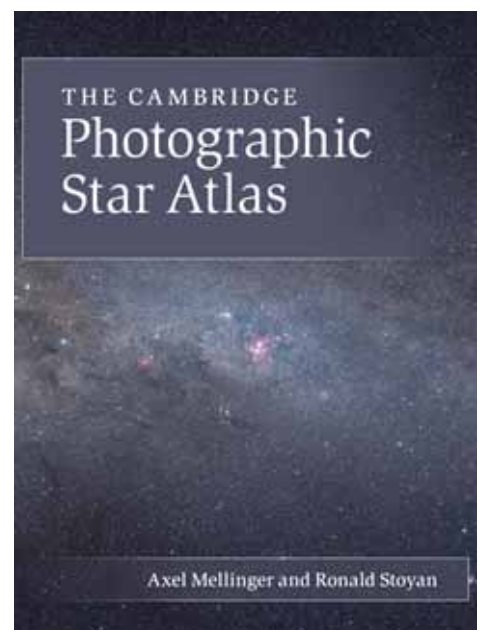
At first sight this book is a revised version of the long established Cambridge Star Atlas. This however a completely new book. The 82 charts cover the entire sky with stars being shown down to 14th magnitude. With such an ambitious project the first part of the book is dedicated to a detailed description of the equipment and processing procedures employed to capture in a seamless way the vast expanse which is our own sky.

With the making of this atlas in a two year time scale it was impossible to avoid

imaging Uranus and Neptune, several asteroids and at least two comets! At first sight each image looks like a blackout curtain that has received the attention of a shotgun blast. However a close examination of the accompanying Map all the useful targets can be identified.

Ten different object types are marked these are Emission nebula, Reflection nebula, Dark nebula, Globular cluster, Open cluster, Asterism, Planetary nebula, Galaxy, Variable Star, Double Star. NB no distinction is made between Double

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The Complete Guide to the Herschel Objects

Sir William Herschel's Star Clusters, Nebulae and Galaxies By Mark Bratton.

Published by Cambridge University Press ISBN:9780521768924 £45.00

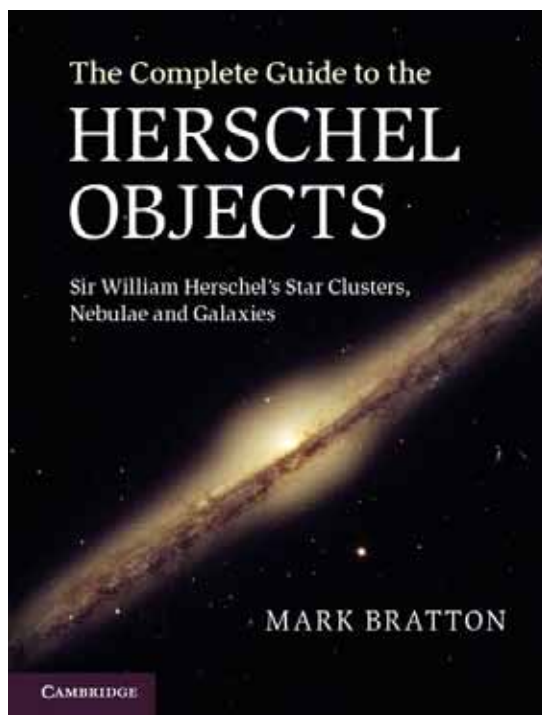
Being a bit of a collector of the printed object catalogue, I was pleased to have the opportunity to view this new title, published at the back end of 2011. Sir William Herschel's contributions to astronomy during the late eighteenth century are unrivalled. His lasting legacy is his dedicated all sky survey of star clusters and nebulae and these objects continue to be among the most studied in the night sky.

Mark Bratton has more than two thousand hours of observational experience and he is one of the few amateur astronomers to have succeeded in observing every one of the Herschel objects. Quite a feat as the original catalogue contains some 2511 entries.

The book is divided into two primary sections. The first contains a brief history of William Herschel's life from his birthplace in Hanover in 1738, to his move to Bath in England as a freelance musician in 1757, where he lived with his sister Caroline – an interesting and accomplished astronomer in her own right.

It was here that his interest in astronomy became his passion and led to his full time effort to observe and catalogue the night sky. How this was achieved is also covered explaining how William compiled his three major sky surveys between 1786 and 1802. Within this section the author covers the various telescopes William constructed for his observations, which included the diminutive 7ft reflector to the monstrous and rather unsuccessful 40 ft completed in 1789.

This first section really gives the reader a feel for the difficulties faced by the 17th century astronomer and puts William's achievements into historical perspective and really makes you realise how easy we modern day astronomers have it!



The second section is the catalogue itself. The author describes how and where he carried out his mammoth task of personally observing the whole catalogue between 1992 and 2010. The original three catalogues contain 2511 observed objects, but with a lot of detective work the author found a number of duplicate objects, or observations which William thought may be nebulous but were in fact single stars, as well as various other errors. He finally concludes that the list actually contains 2435 individual objects.

Whatever the number, this book's second section contains all the objects in William's original catalogue, whether they exist or not. The observations were all made through various scopes, which range from an 8" Cassegrain right up to and including a 15" Dobsonian. All were observed without the aid of Go-To and make this visual achievement all the more remarkable.

The listing itself is sectioned by Constellation and contains the usual references including NGC number, Herschel number, size, RA & Dec, object type, magnitude and classification type.

A description from the authors own observations is given for each object and where applicable Herschel's own observation notes. Some objects have the authors own hand drawn illustrations or DSS Images all sized at a common scale of 1' = 7.5mm. There are no star or finder charts to be found anywhere in the book. While the beginner might find this disappointing, this book is really aimed at the astronomer who is quite capable of finding any of these objects on their own.

All in all, this is a very impressive offering from Mark Bratton and I'm happy to have found a place on my bookshelf for it.

Nick Tonkin

(Continued from page 6)

Stars and Binary Stars. Each of the non stellar objects is colour coded which is great. With an atlas of this size some of the Key is in lettering that requires a magnifying glass for older observers although it is easier to read in red light. The photograph covers a wider area than the map and the RA and Dec scales have only a basic representation.

It is not a stand alone book – none are of course – and this one benefits by being used in conjunction with CUP's Patrick Moore's Data Book of Astronomy. There is no doubt that it will be found useful when meeting the requirements of the Observing Challenge set by Patrick Moore to celebrate 55 years of Sky at Night.

An excellent compliment to other books when searching the heavens for new and exciting objects to image and study.

*Brian Sheen
Roseland Observatory.*

GIFTED & TALENTED ASTRONOMY EVENT

In conjunction with St Columb Major Academy, Brannel Astronomy ran the third annual astronomy event for Gifted and Talented children attending schools in the local area, including St Columb Minor, Major, Summercourt and Trevisker. Over 20 children attended the event at St Columb Major, where they learnt about various aspects of astronomy and related technical activities.

Telescopes were set up in the playground, but unfortunately after a very sunny day the clouds rolled in just after sunset and observing was limited to occasional glimpses of the Moon. The children were formed into four groups and each group spent about half-an-hour on each of four topics.



A Moon Session

sky and prominent stars. Then the children were given a print-out of the constellation Cygnus the Swan and asked to create their own depiction using the stars. The best example in each group was selected and the creator was given the prize – appropriately a MARS bar.

The third session concentrated on the Moon where a short video of a suggested origin of the Moon was shown. Then Phil Brotherhood took them through the lunar features such as craters, mountains, rilles, etc., as well as the astronaut landing sites. The children were then let loose on the computers and using the freeware, Virtual Moon Atlas, they had to locate specific features and mark them on charts provided.



A group making scopes

Mike Thompson, equipped with lots of lenses, bits of pipe and sticky tape, went through the theory of telescopes and then the children spent a while making scopes and trying them out. Great fun was had by all and they were all surprised how effective these little scopes proved to be.

Another session, run by Brian Parsons, dealt with constellations, what they are and how they came about and why they have such strange names, together with details of the changing



Nick Tonkin showing how the iPad can help In astronomy

The final section was due to conduct the star gazing outside, but if cloudy to cover photography particularly related to astronomy. The first two groups, did manage to get the occasional look at the Moon, but by mid-evening the cloud cover was total. Glynn Bennallick, assisted by Nick Tonkin, conducted the photography sessions, where the basic science was covered as well as showing examples of images taken by members of Brannel Astronomy.

Michael Haines, the lead teacher from St Columb Major Academy, later said afterwards:

"Please do thank your team for me - I know it's not just those two or three hours on the night but all the preparation beforehand... but it really was a fantastic night! I went around each of the groups last night and both the children and the adults were totally absorbed in what they were learning. As they walked down the path at the end of the night there was a real buzz! I have spoken to the children this morning from this school who attended and they were full of it and are very keen to come to the star party to be held in April."

One of the pupils, Joe Quest said *"It was awesome"*



Engrossed in constellations

'Stargazing Live' in - Shropshire

Once again NASA's *Space Place* has acknowledged our work in the wider community and awarded us a certificate of appreciation.

We have been awarded this because of all the work the members do willingly and freely at our public events, giving as many people as possible a chance to look through a telescope and just being there to answer the questions as well as all the other visits and talks our committee members and STEM ambassadors do and so much more besides. We should all be very proud of the international recognition the members' dedication and enthusiasm has gained for the Society.

A prime example of this is the wonderful *BBC Stargazing Live* event we did. We easily had over 150 people along that night, well done all for making that a huge success.

Mandy Bailey



'Stargazing Live' in - East Anglia

We at LYRA have had a remarkable week. A fine public turn out, a fine night and a cheque from the FAS to defray our costs.

To a small society like LYRA this nationally advertised and BBC promoted Stargaze was a great incentive to try and make a special occasion of this event. Our Chairman, Leonard Brundle, Secretary Richard Chilvers, Treasurer John Perring and Publicity Officer Ron Larter got into gear and were pleasantly surprised by the success of the occasion.

Posters were displayed about town, handbills were printed and left in the Library and volunteers posted stuffer in letter-

boxes near the venue. Our venue for Stargazing was Pakefield Cliffs, overlooking the sea behind the Trowel & Hammer public house. Ron Larter contacted the Lowestoft Journal who asked to meet us there the week before and after a photo shoot to show members with telescopes gazing keenly at the sky gave us a half page spread in the Friday issue.

Local radio stations made announcements of our intended meeting. We arrived at 6pm Monday evening on the 16th of January, set up 5 telescopes ranging in size from 4.5" to 8", hoping that we might have a respectable turn out. Two members of the public also came along with their own scopes.

A respectable turnout, we hoped? Within the first half an hour 60 to 70 people were with us, moving from telescope to telescope as Richard Chilvers called out the names of the objects being viewed. As people came and went through the evening the number must have been close to 100 visitors.

Monday evening was one of the best skies we have seen here for many months, very clear and the weather was mild. The main attractions were Venus, which was with us for the first hour. Jupiter was a favourite with three moons visible and later a fourth moon came clear of the planet. The Orion Nebula was clearly visible as was the Andromeda Galaxy. Variable stars and double stars were also found. Tuesday was less busy and unfortunately Wednesday was a complete non starter. Monday will stay in our memories for some time to come.

It was very satisfying to hear the "WOW" factor from people looking through a telescope for the first time and seeing a planet like Jupiter with orbiting moons. This very good response has encouraged us to attempt future gatherings

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Children building the orrery

'Stargazing Live' in - East Anglia (continued)



David Gwynn proving size matters



Leonard Brundle (right) with 6inch reflector

(Continued from page 9)

of this nature. The cheque gratefully received from the F.A.S. will also fund some advertising for the future.

Thanks also to those who added support by bringing telescopes, large binos on tripods, managing crowd control, explaining what we do to the public, dropping leaflets and providing transport.

We have also increased our outreach to local schools.

Leonard Brundle our Chairman has built a fine orrery and we have so far in January visited 2 Lowestoft schools and have a third presentation planned for the 24th January. As each planet is discussed the children assemble the orrery and enjoy the countdown at the end when Leonard Brundle activates the model and it whirs into action.

LYRA January 2012

Knowle AS Celebration



Knowle Astronomical Society celebrated its 10th birthday at its April 2011 meeting, when Tom Boles, the world record holding supernova hunter came to speak. Tom, pictured kneeling in the photograph, had just discovered his latest supernova the night before his talk.

The Society began when a small group of local enthusiasts began meeting regularly at the house of the Chairman, Mark Wright. After a few months the meetings moved to a local Church Hall and in the subsequent 10 years KAS has flourished into a thriving society of almost 50 members who have heard talks from some of the UK's leading astronomers and enjoyed trips to venues as diverse as the Spaceguard Centre and the homes of Herschel and Newton. It re-

ceived National Lottery funding to purchase a Meade telescope and IT equipment and was the first astronomical society to use the Faulkes telescope.

In 2009, to celebrate the International Year of Astronomy, KAS embarked on a series of star gazing events. Held in association with the Local Authority in public parks these have proved to be very popular with typical attendances of over 150. One event is held in spring and one in autumn each year.

KAS has always extended a warm welcome to visitors and new members and further details of its activities can be found on its website: www.knowleastro.org.uk

'Stargazing Live' in - Northern Ireland

IRISH ASTRONOMICAL ASSOCIATION

Monday 16th January. 2012

Jupiter Watch at Queen's University Belfast

After a very cloudy day, when we arrived at Queen's University the sky was beautifully clear in Belfast BBC Radio Ulster were already there. 8 of our members brought telescopes and we set up at the front of the main building. The lights around the university were turned off for the event. Members of the public started arriving at about 6pm. Some people just wandered in off the street to ask us what we were looking at.

We could clearly see the belts on the planet and Ganymede and Callisto were clearly visible. Some time later Io, which was eclipsed by Jupiter, appeared and before we left Europa appeared from behind the planet therefore completing the spectacular view of Jupiter and the visible satellites.

Our 16" Lightbridge proved very popular and there was still a long queue of people at 9pm when we were supposed to finish. They were encouraged to go and look through the other telescopes.

It was as if the weather was to order that night, because shortly after 9pm the clouds rolled in again.

This was a very successful event and about 500 members of the public attended. There was a lot of interest shown in our association.

Tuesday 17th January 2012.

Lough Neagh Discovery Centre – Oxford Island, Lurgan, County Armagh *By Jo Magill & Terry Moseley*

Lough Neagh Discovery Centre is in a beautiful nature reserve on the shores of Lough Neagh and it is managed by Craigavon Borough Council and the Northern Ireland Environment Agency. All the LNDC staff, under the direction of Andy Griggs, were extremely helpful and professional in making all the arrangements and providing all the necessary facilities for us.

We arrived at 2.30pm and proceeded to put up the big FETTU posters, and our own, around the room. Tables were arranged for the various groups that were attending the event: Queen's University Belfast. The Bat Conservation team, The Butterfly Conservation Group, RSPB, Museum Services, and Libby McKearney from Armagh Observatory

Some of our members also had displays: Dr. Mike Simms – meteorites, Barry Loane – Mirror grinding for telescopes, Lisa Magill (family member) - Comet making for children, and Derek Heatly who is flying into space with Virgin Galactic.

BBC TV were filming the whole event for Stargazing Live, though it didn't go onto their website until the next night. But BBC Ulster Newslines did a live broadcast just before the main 6.0 News – primetime coverage!

Unfortunately it was already cloudy and the weather forecast predicted cloud cover for the rest of the night. So our telescopes were arranged on display along one wall of the



room. We had 8 telescopes, including the 16" Lightbridge and giant binoculars.

The public started to arrive about 6pm and kept on arriving in their hundreds. At one time we could hardly see through the crowds. We ran out of styrofoam balls for comet making for children after about an hour and a half.

Our own Terry Moseley made a comet out of dry ice, ammonia and maple syrup. It was quite successful and attracted a large crowd of interested spectators.

Everyone was surprised and the children were delighted when some locals enthusiasts, dressed as Star Wars Storm Troopers, Buba Fett and Obi Wan appeared and mingled with the crowds. The BBC ran a live 'Radio Play' with an astronomy theme upstairs, in which visitors were encouraged to play



live roles. And a local school also did a series of TV interviews for their school media project. The place was buzzing.

Sandra Currie of the LNDC staff also ran a very popular project for children, making stars out of willow wands and translucent paper.

Two of our members brought large meteorites to show to the public and these were extremely popular.

There were 6 star shows in the Mobile Planetarium, presented by Mary Bulman from the planetarium and our member Dr. Andy McCrea. There could have been more but we ran out of time.

(Continued on page 14)

Royal Treasure to see Kent Stars

Stargazers' eyes nearly popped out when they heard the Royal Observatory Edinburgh had agreed to give one of its professional telescopes to Kent.

In January, thousands of people came out to look at the stars in parks and pavement astronomy shows as part of the BBC's Stargazing Live programmes. Many budding Brian Coxes came to these events and saw Jupiter and the mountains of the Moon for the first time. They were bowled over with what they saw and the response was so great that Mid-Kent Astronomical Society decided to apply for a professional telescope.

Said Noel Clark of the society: *"If people found the views through our other telescopes exciting; they will feel their brains being sucked into space by this baby!"*

The half-metre aperture telescope will be one of the largest in amateur hands; it was built to train students at Edinburgh University. However, the university are now upgrading their facilities and decided to give the scope away to the society that would make the best use of it. It will be sited at the Society's Observatory on the Canterbury Campus.

The superb optics of the half-metre, two-ton ROE Grubb Parsons telescope will be a window on the wonders of the universe for all who visit the observatory.

Mike Phillips of the Mid-Kent Astronomical Society said: *"We have big plans for this telescope; to provide views of our universe to school groups and all who are interested. We look forward to introducing many more people to the wonders of the night sky".*

Phil Karnavas, Principal of Canterbury Academy added; *"The Canterbury Academy is delighted to be involved with the Mid-Kent Astronomical Society in such an interesting and exciting venture - especially as star gazing has so successfully captured the public imagination at this time."*

Rochester based R Swain and Sons Ltd haulage were so impressed with the size of the undertaking and the potential of it that they offered to transport the telescope all the way from Edinburgh for free.

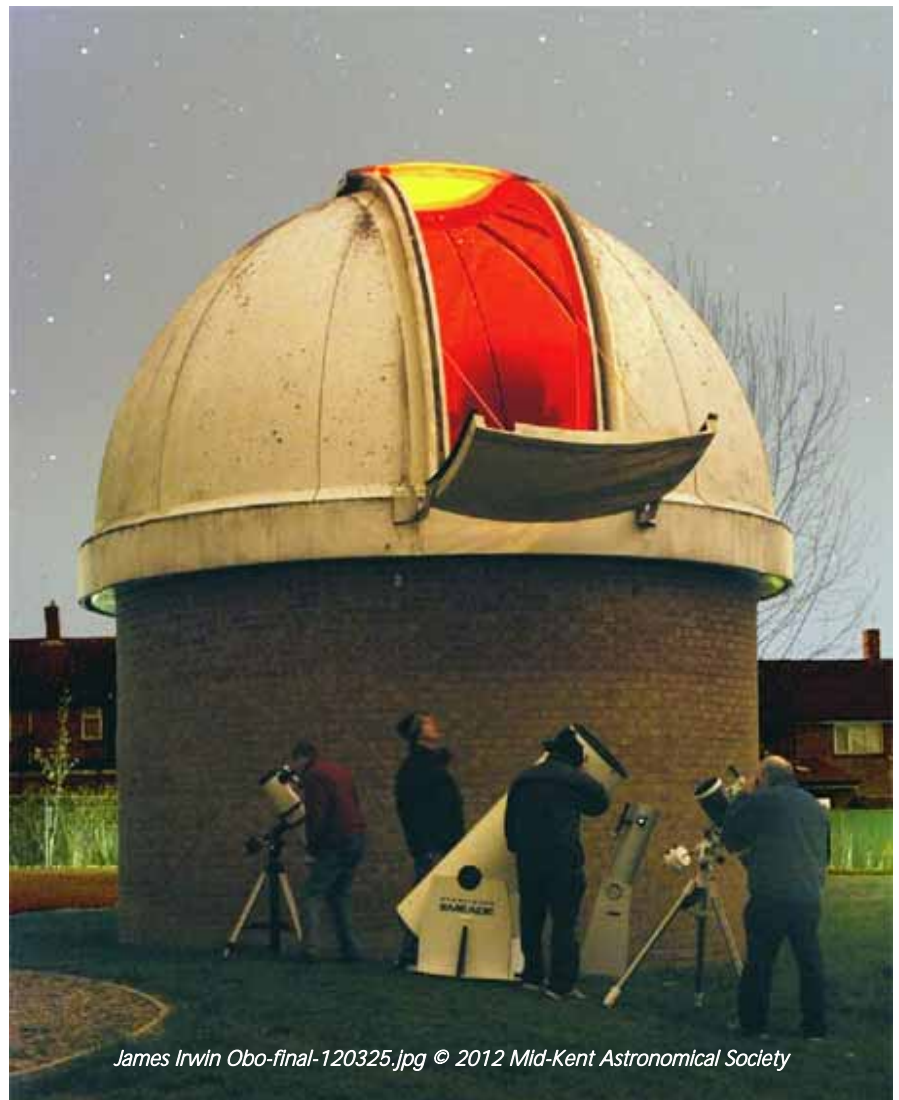
The Society operates from the James Irwin Observatory on the Canterbury Campus. The staff and students built the observatory but it is run on their behalf by the Mid-Kent Astronomical Society. Anyone wishing to look at the stars, or who are interested in the telescope should contact them through their website www.midkentaastro.org.uk.

The professional grade 0.5m telescope will be coming to the James Irwin Observatory in Canterbury for use by schools, community groups, astronomical groups and public viewing sessions.

The telescope, which has helped educate two generations of astronomers at the Royal Observatory in Edinburgh, will soon be heading south to its new home with the Mid-Kent Astronomical Society! The telescope, used by the University of Edinburgh's Institute for Astronomy, for teaching its students since 1967, was manufactured by Grubb Parsons who built telescopes for professional observatories worldwide. It has a main mirror of 0.5m and presently sits on top of the Royal Observa-

tory building in Edinburgh. To remove it, the dome will be lifted and a crane will lower it down in one piece, two-tons in all. From there it will travel to Kent courtesy of local Medway haulage contractors, R Swain and Sons Ltd. who have donated their removal skills and services freely to the project. The Royal Society for the Protection of Birds has offered vital support and a free secure storage facility whilst the telescope is being refurbished prior to installing at its permanent new home in Canterbury.

The Royal Observatory Edinburgh is owned and managed by the Scientific Technologies Facilities Council (STFC) and the site is home to both the UKATC (STFC) and the Institute for Astronomy (IfA). As part of a building refurbishment project it was decided to invite bids for the telescope, based on an active plan to bring astronomy to more people at a grass roots level. The superb optics of this telescope are capable of enhancing the activities of amateur astronomers and those interested in research. The Royal Observatory is interested in promoting and providing greater accessibility and better facilities for schools, social organisations and anyone who at present cannot access facilities. They received more than a dozen applications from Europe and America but the one from Kent stood out, resulting in a stunned Society Chairman receiving a telephone call to say that the bid had been successful!



James Irwin Obo-final-120325.jpg © 2012 Mid-Kent Astronomical Society

(Continued on page 13)

(Continued from page 12)

Now the work can begin, the plan to install the telescope into the James Irwin Observatory is going ahead. The observatory was opened by the Apollo 15 astronaut in 1990 and is run by the Society on behalf of the Canterbury Academy. It has been the focus of a great deal of successful activities by the group over the years. The Mid-Kent Astronomical Society had already begun to recognise that many people, and in particular, children are interested in stargazing but have no idea how to pursue the hobby and absolutely no way of financing a telescope. When young people lose interest, we lose the budding Professor Coxs of tomorrow. An ambitious programme was launched to bring stargazing to the public and several very successful events were held in and around Maidstone, Canterbury and the Medway Towns. This telescope will enhance that programme and enable the people of Mid-Kent to see images that previously were beyond the ability of amateur night sky observers. It will open a real window onto the universe for the people of Kent.

Mike Phillips the chairman of MKAS said, *“Being awarded this incredible telescope is a real privilege, our members’ many years of experience and joy at observing the night sky can be built on and research enhanced. It will harness enthusiasm as well as providing a much needed resource for educational establishments and societies interested in astronomy across Kent”*. To further these aims the society has plans to provide disabled access to its observatory and a live link for internet monitoring of observing sessions. A programme of talks and interactive observing sessions using the images captured by this telescope will take place.



WindowsOnTheCosmos2

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Mark Collins of the UK Astronomy Technology Centre (UKATC) at the Royal Observatory Edinburgh, who will oversee the removal, said, *“The Society made an excellent case for acquiring the telescope, and we are glad that it will continue to give service to UK astronomers for many years to come”*. The Society is researching the history of the telescope with a view to refurbishing it and will be helped in the project by Dr Giles Hammond of Glasgow University who refurbished the sister telescope last year.

Matt Swain Director of R Swain & Sons said, *“we are very pleased that we could play a small part in your success that will benefit local people and schools for many years to come.”*

A group of amateur astronomers seeking to share knowledge and experience formed the Mid-Kent Astronomical Society in 1976. From humble beginnings observing stars and planets, it has grown to be a friendly society with diverse interests. Activities include a programme of innovative talks and workshops with speakers appealing to all ages and abilities with a willingness to provide active help and advice to novices and the more experienced astronomer. The society supported the BBC Stargazing Live events in Maidstone, Canterbury and Bredhurst together with outside events held across the Medway Towns during the year. The Society, whose patron is Sir Patrick Moore, meets on Friday evenings, welcomes everyone and provides an opportunity for all to be actively involved in astronomy. For more information, visit their website

www.midkentaastro.org.uk.



WindowsOnTheCosmos1

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'Stargazing Live' in - Northern Ireland (continued)

(Continued from page 11)

Our webmaster Paul Evans had an astrophotography workshop which attracted lots of interested astronomers.

Altogether 1200 people attended this event, one of the most successful that we have ever been to. There were a lot of questions asked about our association and about instruction in setting up and using telescopes. We got quite a few members after the event.

Starry Starry Nights: at Delamont Country Park. *By Terry Moseley*

As part of Stargazing Live on BBC, I was approached by Producer Louisa McCartney about a 2-hour live broadcast for Radio Ulster. Even though we were already committed to doing the main event for BBC2 on Tuesday 17 Jan, I said 'Yes, in principle'. She suggested our Lunar Watch evening at Delamont Country Park (DCP) on Jan 27, so I said OK, as long as there would be somewhere to set up the Stardome in case it was cloudy.

Meanwhile all our efforts were being directed towards our main TV event on Tue 17th at LNDC, and the Jupiter Watch with QUB on the Monday even-

ing, where we brought along 10 telescopes, plus some of us also assisting Armagh Observatory (AO) and the NIEA at Beaghmore and An Creagan on the Wednesday.

display if cloudy, meteorites on display with local expert Dr Mike Simms, our local 'Ulsternaut' Derek Heatly, IAA members Colin Johnstone with a piece of Moon Rock from Armagh Planetarium



Phillip Baxter being interviewed on LIHS TV

But a 2-hour live broadcast on prime NI radio, from 8 to 10 p.m. was both a major commitment, and a fantastic opportunity. So we came up with a programme of events to cover all weather possibilities: the Stardome (with many thanks to Armagh Planetarium once again), telescopes for observing if clear, or

and staff from Queen's University and Armagh Observatory, and some pre-recorded interviews, done mainly at Beaghmore the previous week, and some local musicians playing and singing astronomy themed music and songs.

Our incantations must have worked, as not only did we have a fabulous clear sky that evening, we had a nice intro news



Storm Trooper commanding the clouds to go away!

'Stargazing Live' in - Northern Ireland (continued)

(Continued from page 14)

sky that evening, we had a nice intro news item interview with me on Evening Extra about a small asteroid 2012 BX34 which had whizzed by Earth that afternoon at a mere 5 Earth diameters away!

I arrived at about 2.30 to start putting up the posters etc, and agree with the BBC sound engineers what they could put where. Then the others started coming and setting up their scopes, then the Stardome, and everything started falling into place.

A beautiful crescent moon was soon joined by brilliant Venus, then Jupiter, and soon a black sky peppered with twinkling stars. IAA members really rose to the occasion, and soon we had about 15 telescopes trained on all the usual celestial highlights. And the public were arriving in droves!

Meanwhile the full BBC crew had arrived: the two presenters Anne-Marie McAleese and Darryl Grimason, the sound engineers, producer Louisa, assistants Amy and Caroline, Senior Producer Jackie Neill, and even the head of BBC radio in NI.

Anne-Marie and Darryl circulated doing exploratory interviews and soon the deadline for the live broadcast at 8p.m. approached. They started off with interviews with Philip and myself, and after that everything is a bit of a blur! I originally wondered how we would fill 2 hours of live broadcast on radio, but the time literally flew! They interviewed all the 'visiting experts', plus some of our members, plus ordinary members of the public, interspersed with the musical interludes. I have lost count of the

number of times I was on air - and it was so dark that they gave me a high-vis yellow jacket so they could find me among the crowds. You could hardly move for the number of people thronging round the telescopes! Simon estimated that we had about 500 people there!

And the response from the public was great - texts started pouring in, some of

Everyone was delighted with the views of the sky, both through the huge selection of telescopes, and with the naked eye: sometimes it looked like a battle scene from Star Wars with the laser beams criss-crossing the sky like light sabres! I was using mine so much that the on-off button gave out.

Highlights were of course Venus, the



which were questions about the sky which I tried to answer on-air. I saw Louisa sitting in the O/B van with a huge smile

*All told it was a HUGE success,
thanks to everyone in the IAA:
ordinary members as well
as council members.*

on her face during the whole programme - she couldn't believe how successful it was turning out to be!

Meanwhile Andy was busy doing 6 fully-booked shows in the Stardome - I don't know how his voice held out. Thanks also to his wife Shirley who acted as 'bouncer', getting everyone in and out of the stardome as quickly as possible.

lovely Moon with Earthshine, Jupiter and its four Galilean moons, the Pleiades, Andromeda Galaxy, the Orion Nebula and the Trapezium, other galaxies, nebulae, star clusters and double stars, and dear knows what else. It was a Cosmic Feast for everyone!

Particular thanks are due to Simon and Shane at DCP who did everything we asked in clearing the rooms and the site in advance, adjusting the lighting to a minimum, and generally being willingly helpful in every way.

And of course thanks to Louisa, Anne-Marie, Darryl, and all the others in the BBC for their consummate professionalism, and particularly to Louisa for her courage in undertaking such an ambitious venture, and for her faith in us to deliver: I think that we can honestly say that we didn't let her down.

All told it was a HUGE success, thanks to everyone in the IAA: ordinary members as well as council members. Adding those numbers to the 500 or so we had at QUB, plus the 1200 at DCP, gives a total of about 2,200 members of the public actually attending at the three events in which we were the major players in Stargazing Live.



Young Astronomers

We kicked off a trial of regular monthly youngsters astronomy evenings back in October 2010. Not sure how popular it would be nor had we any idea how successful our format would be for the youngsters, it is very satisfying to see just how much we have progressed since then to the levels we now enjoy. So as we concluded the 2011-12 Youngsters Club session on March 1st 2012 read on about just what we've managed to achieve since the start.....

2011 - 2012 session

For the 2011-2012 session we held 6 monthly clubs for the youngsters from October 2011 to March 2012. The youngsters club each month coincided with a 6 to 10 day old Moon making it a great object to observe for each of the evenings. That was very well received by the youngsters and parents alike. They learnt crater and Mare names plus Apollo landing sites.

Of course we've been lucky with planets too with Venus, Jupiter, Mercury and Mars all well placed to observe with telescopes. Then there were the Autumn and Winter deep sky objects that we could observe when the weather was being kind to us. Add to that a few ISS and Iridium passes and the youngsters (and parents!) thoroughly enjoyed

By Steve Southern

observing outside with several telescopes.

Back inside Pex Hill, each of the evenings had a theme. We started off with the Moon, it's phases and orbit of Earth. Then the follow on months were themed "Finding the planets", "Tonight's sky & buying a telescope", "Constellations & myths", "Astrophotography" and finally the "Size of our Solar System" measured with a toilet roll! We also had an astro-

a success story for Liverpool AS

photography competition with several winners taking home some great prizes. There were also card cut-out models of the Space Shuttle or a planisphere available for the youngsters to make. Each month additional information was put onto the youngsters wiki website and some months we set homework.

For example one month I asked them to find out about Drake's equation and extra solar planets whilst another month they had homework to find out about Charles Messier and what he was known for. See url below for youngsters wiki website;



<http://steveswikisite.wikispaces.com/LASyoungastronomerssite>

During this latest session we had talks from Dave Galvin on astrophotography, demonstrations from Brendan online about many things including the Supernova search project. Both Dave and Brendan have taken the evenings on to more technical discussions as we aim to move towards a more in-depth approach with the older youngsters.



Each young member received a membership badge and those that attended most of the events were given an "LAS Certificate of Astronomy". Without doubt the most memorable of the Youngsters Club activities was being outside looking through telescopes and without the help of Dave Owen, Geoff Regan plus Graham Roberts we would have struggled to achieve that, my thanks to them for being so helpful throughout the youngsters club evenings.

I have also arranged a trip to the planetarium during March.

.Young Celebrities!

During this session our youngsters club has grown in popularity and has certainly had the attention of the media especially the BBC and local newspapers.

It's very rewarding to know that the efforts of our members are being noticed more widespread and also on TV! We have had our youngsters appear on BBC's children's TV, Blue Peter. We have had some of our youngsters and

(Continued on page 17)



'Stargazing Live' in - Liverpool

Whilst there was an article about Stargazing Live activities in Liverpool, here are a number of images giving a flavour of the action.



(Continued from page 16)

members appearing on Stargazing live broadcast from Jodrell Bank. They were also delighted to meet some professional astronomers such as Brian Cox and Lucie Green. Not only that our own local BBC reporters from Inside Out have filmed and interviewed some of the youngsters and our own Gerard Gilligan for articles on BBC North West TV.

If that was not enough, the society had prime billing for March 2012's Sky at Night, BBC's premier astronomy programme which included members projects and a sidewalk event at Ainsdale - not strictly a youngsters event but there were plenty of our members and young'uns attending! Everyone has done the society proud so many congratulations to all those involved with the media in recent months.

Youngsters Numbers

When we started back in 2010, the first evening had 5 youngsters coming along. This quickly grew. For this 2011-2012 session we have had a combined number of over a 100 youngsters attending our Youngsters Monthly Club. We

now have over 40 young astronomer contact names available to us with ages ranging from 6 to 15 years old. Out of those 40 names over 20 have joined the LAS to become young astronomer members of the society, a number other societies would be very envious of I'm sure.

The monthly Youngsters Club had an average of 18 youngsters attending each month and along with parents it makes for a busy Pex Hill. Let's hope we can continue into the next session and those numbers continue too as I believe this is a success story the society should be proud of.

I have had lots of excellent feedback from the parents of our Young Astronomers saying how much they all had enjoyed the youngsters astronomy club.

My thanks to the following members who have greatly helped out during this session;

Brendan Martin, Graham Roberts, Dave Owen, Geoff Regan, Chris Regan, Chris Banks, Dave Galvin, Gerard Gilligan, John Knott, Rob Johnson, Pam McAdam and anyone else that has helped out.



'Stargazing Live' in - Liverpool (continued)



Near-Miss Asteroid Will Return Next Year, Even Closer!

ScienceDaily

An amateur team discovered the unusual asteroid, dubbed 2012 DA14, on 22 February. Its small size and orbit meant that it was spotted only after it had flown past Earth at about seven times the distance of the Moon.

However, current predictions indicate that on its next flyby, due on 15 February 2013, it will pass Earth at just 24,000 km -- closer than many commercial satellites.

"This is a safe distance, but it is still close enough to make the asteroid visible in normal binoculars," says Detlef Koschny, responsible for near-earth objects in ESA's Space Situational Awareness (SSA) office.

Astronomers in Spain spot 'slippery target'

The asteroid was discovered by the La Sagra Sky Survey observatory, in the southeast of Spain, near Granada, at an altitude of 1700 m, one of the darkest, least light-polluted locations on the European mainland.

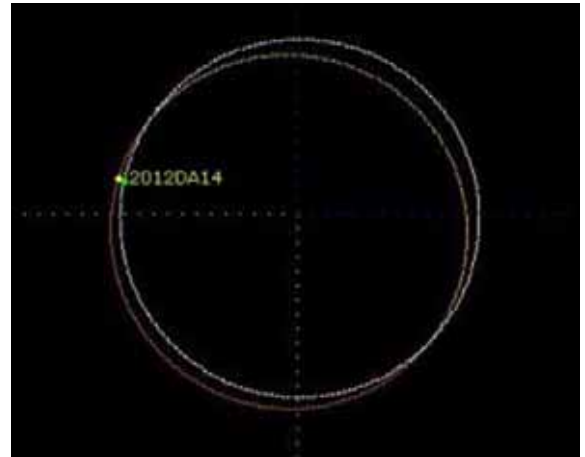
"Considering its path in the morning sky, its rather fast angular motion, the quite faint and fading brightness and its orbit high above the plane of Earth's orbit, it was a slippery target -- and easily could have escaped undetected during this Earth visit," says Jaime Nomen, one of the discoverers.

The team use several automated telescopes to scan the sky, and the discovery came somewhat serendipitously after they decided to search areas of the sky where asteroids are not usually seen.

"A preliminary orbit calculation shows that 2012 DA14 has a very Earth-like orbit with a period of 366.24 days, just one more day than our terrestrial year, and it 'jumps' inside and outside of the path of Earth two times per year," says Jaime.

While an impact with Earth has been ruled out on the asteroid's next visit, astronomers will use that close approach for more studies and calculate the Earth and Moon's gravitational effects on it.

"We will also be keen to see the asteroid's resulting orbit after the next close approach in order to compute any future risk of impact," says Detlef.



In this plot, the asteroid is the yellow dot, and Earth is green; the two orbits intersect twice per year. A preliminary orbit calculation shows that 2012 DA14 has a very Earth-like orbit with a period of 366.24 days, just one more day than our terrestrial year, and it 'jumps' inside and outside of the path of Earth two times per year. While an impact with Earth has been ruled out on the asteroid's next visit, astronomers will use that close approach for more studies and calculate the Earth and Moon's gravitational effects on it. (Credit: Deimos-Space)

Half a million undiscovered objects

The La Sagra Sky Survey is operated by the Observatorio Astronomico de Mallorca and has recently joined ESA's SSA programme. In the future it will provide observations to the asteroid data hub that ESA is developing.

Together with information on space weather and debris, its information will help European scientists and policy-makers understand and assess hazards, particularly if an Earth-threatening asteroid is ever found.

The discovery of 2012 DA14 is particularly significant for the Agency's SSA office, because it is typical of the estimated half a million undiscovered near-Earth objects up to 30 m across.

"We are developing a system of automated optical telescopes that can detect asteroids just like this one, with the goal of being able to spot them at least three weeks before closest approach to Earth," says Detlef.

To achieve this, ESA specialists supported by European industry are planning a network of 1 m-diameter telescopes with a combined field of view large enough to image the complete sky in one night.

The work is continuing under the Agency's Space Situational Awareness Preparatory Programme.

Glittering Jewels of Messier 9

The NASA/ESA Hubble Space Telescope has produced the so far most detailed image so far of Messier 9, a globular star cluster located close to the centre of the galaxy. This ball of stars is too faint to see with the naked eye, yet Hubble can see over 250 000 individual stars shining in it.

Messier 9 is a globular cluster, a roughly spherical swarm of stars that lies around 25 000 light-years from Earth, near the centre of the Milky Way, so close that the gravitational forces from the galactic centre pull it slightly out of shape.

Globular clusters are thought to harbour some of the oldest stars in our galaxy, born when the Universe was just a small fraction of its current age. As well as being far older than the Sun -- around twice its age -- the stars of Messier 9 also have a markedly different composition, and are enriched with far fewer heavier elements than the Sun.

In particular, the elements crucial to life on Earth, like oxygen and carbon, and the iron that makes up our planet's core, are very scarce in Messier 9 and clusters like it. This is because the Universe's heavier elements were gradually formed in the cores of stars, and in supernova explosions. When the stars of Messier 9 formed, there were far smaller quantities of these elements in existence.

Messier 9, as its name suggests, was discovered by the great French astronomer Charles Messier in 1764. Even through the most advanced telescopes of the day, none of the stars in the cluster could be seen individually. Messier, seeing only a faint smudge, therefore classified the object as a nebula -- or "cloud" in Latin. It was only later in the 18th century that astronomers, most notably William Herschel, began to spot stars within the cluster.

The contrast between Messier's equipment and the tools at the disposal of today's astronomers is stark. Hubble's

image, the highest resolution image yet made of Messier 9, is able to resolve individual stars, right into the crowded centre of the cluster. Over 250 000 of them are neatly focused on the detector of Hubble's Advanced Camera for Surveys, in an image which covers an area no bigger than the size of the head of a pin held at arm's length. As well as showing the individual stars, Hubble's image clearly shows the different

colours of the stars. A star's colour is directly related to its temperature -- counter-intuitively, perhaps, the redder it is, the cooler it is; and the bluer it is, the hotter. The wide range of stellar temperatures here is clearly displayed by the broad palette of colours visible in Hubble's image of Messier 9.

Messier 9's neighbourhood is interesting too, and is marked by two vast and dark nebulae. These pitch-black clouds of interstellar dust are known as Barnard 259 (to the south-east of Messier 9) and Barnard 64 (to the west), and are clearly visible in wide-field images of the cluster.

ScienceDaily



This image from the NASA/ESA Hubble Space Telescope shows the globular cluster Messier 9. Hubble's image resolves stars right into the centre of the cluster, and clearly shows they have different colours. Redder colours signify lower surface temperatures, while blue stars are extremely hot. (Credit: NASA & ESA)

Clues to 'Weird' Saturn Moon

by Denise Chow, SPACE.com



These two global images of Saturn's moon Iapetus show the extreme brightness dichotomy on the surface of this peculiar moon. The left-hand panel shows Iapetus' leading hemisphere and the right-hand panel shows the moon's trailing side. The images were created using data collected in 2004 and 2007 by NASA's Cassini spacecraft. CREDIT: NASA/JPL/Space Science Institute

Astronomers hoping to shed light on how Saturn's "weird" moon Iapetus developed over time are taking cues from climate research of icy surfaces right here on Earth.

Iapetus' bizarre two-toned appearance — with one dark side and one bright side — has puzzled astronomers since the moon was first discovered by Giovanni Domenico Cassini in 1671. To better understand how this oddball Saturn moon formed and evolved, researchers are now studying the temperature variation across Iapetus' differing surfaces by measuring the moon's microwave emissions.

Previous studies using data from NASA's Cassini spacecraft suggest that migrating ice makes half of Iapetus reflective and bright, while the other side is cloaked in dust and darkness.

"What makes Iapetus unusual is that it has one side that is dark and one side that is bright," said Paul Ries, a graduate student at the University of Virginia and a researcher at the National Radio Astronomy Observatory (NRAO). "There have been a couple attempts to look at the variation in temperature across the surface, but no one has actually done a rotational light curve. I was trying to get something continuous to look at the thermal variations."

To do this, Ries measured the amount of light produced by Iapetus and its pattern of microwave emissions. Essentially, most objects in the solar system are blackbody objects that absorb all the radiation that hits them, he explained.

"They follow this pattern of emission called a Planck curve, and as you go to longer wavelengths — infrared to radio — you have declining emissions," Ries told SPACE.com.

But Ries' observations of Iapetus showed a very different and unexpected pattern.

"What I found was that the emissions were what we call flat, which means that as you go from one radio wavelength to another, the emissions were the same when you expect them to be declining," Ries said. "What that corresponds to is a very steep absorption. I was expecting to find something, but I was not expecting to find something quite so strong."

To improve his models of Iapetus, Ries looked a little closer to home, at previous studies that measured microwave emissions and temperature signals from our own planet.

"It turns out that there's a lot of work in climate science with modeling the radio emissions from Earth at a wide range of wavelengths," Ries said. "This is important to astronomers because they're at wavelengths that are transparent, where you don't have too much interference from the atmosphere. My thought was: why not try to use the icy surfaces on Earth to model icy surfaces on bodies in the

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outer solar system?"

Land areas on Earth mostly follow the Planck curve, and scientists are able to translate microwave emissions into temperature signals without too much trouble, he explained. But, there are two main complications: oceans and ice.

"Salinity content changes the microwave emission properties of oceans," Ries said. "The other area of interest is icy surfaces, which can vary depending on the structure of the ice. If there's melting, the signature changes drastically, which is why climate scientists have done some extensive studies of emissivity variations in the microwave spectrum."

But ice on Earth behaves differently compared to ice in space, particularly as it melts into liquid water, he added.

"You can't have liquid water on a body with no atmosphere, which is what we think of Iapetus," Ries said. "If there's any gas hanging around, it's not hanging around for long. That's true for most of the icy bodies in the outer solar system, such as Kuiper Belt objects. You don't expect them to have an atmosphere, so there's no liquid water involved."

Ries is incorporating these limitations into his model, and he also plans to scrutinize how the size of the ice grains and their distribution affects measurements of a body's microwave emissions.

Still, the research represents a novel approach that Ries hopes to apply to studying other celestial bodies, such as the moons around Jupiter, asteroids and other objects in the Kuiper Belt, which is a zone beyond the orbit of Neptune.

"In the specific case of Iapetus, it can help shed light on what's going on in its formation and evolution," Ries said. "Iapetus certainly has some strange stuff that needs to be explained, so this is potentially very interesting for the future. But eventually, I'd like to do observations of the outer solar system — the Kuiper Belt and beyond."

NASA Sub-Scale Solid-Rocket Motor Tests Material for Space Launch System

ScienceDaily

A sub-scale solid rocket motor designed to mimic NASA's Space Launch System, or SLS, booster design successfully was tested today by engineers at NASA's Marshall Space Flight Center in Huntsville, Ala. The 20

-second firing tested new insulation materials on the 24-inch-diameter, 109-inch-long motor. The motor is a scaled down, low-cost replica of the solid rocket motors that will boost SLS off the launch pad.

Marshall is leading the design and development of the SLS on behalf of the agency. The new heavy-lift launch vehicle will expand human presence beyond low-Earth orbit and enable new missions of exploration across the solar system.

The test will help engineers develop and evaluate analytical models and skills to assess future full-scale SLS solid rocket motor tests. The next full-scale test, Qualification Motor-1 (QM-1), is targeted for spring 2013. Two five-segment solid rocket motors, the world's largest at 154-foot-long and 12-foot diameter, will be used in the first two 70-metric-ton capability flights of SLS.

Previous ground tests of the motors included carbon insulation to protect the rocket's nozzle from the harsh environment and 5000-degree temperatures to which it is exposed. QM-1 will include a new insulation material, provided by a new vendor, to line the motor's nozzle.

"Test firing small motors at Marshall provides a quick, affordable and effective way to evaluate the new nozzle liner's performance," said Scott Ringel, an engineer at Marshall and the design lead for this test. "We have sophisticated analytic and computer modeling tools that tell us whether the new nozzle insulation will perform well, but nothing gives us better confidence than a hot-fire test."

The test also includes several secondary objectives. The team introduced an intentional defect in the propellant with a tool designed



It was three-two-one to brilliant fire as NASA's Marshall Space Flight Center tested a small solid rocket motor designed to mimic NASA's Space Launch System booster. The Mar. 14 test provides a quick, affordable and effective way to evaluate a new nozzle insulation material for the SLS solid rocket booster. (Credit: NASA/

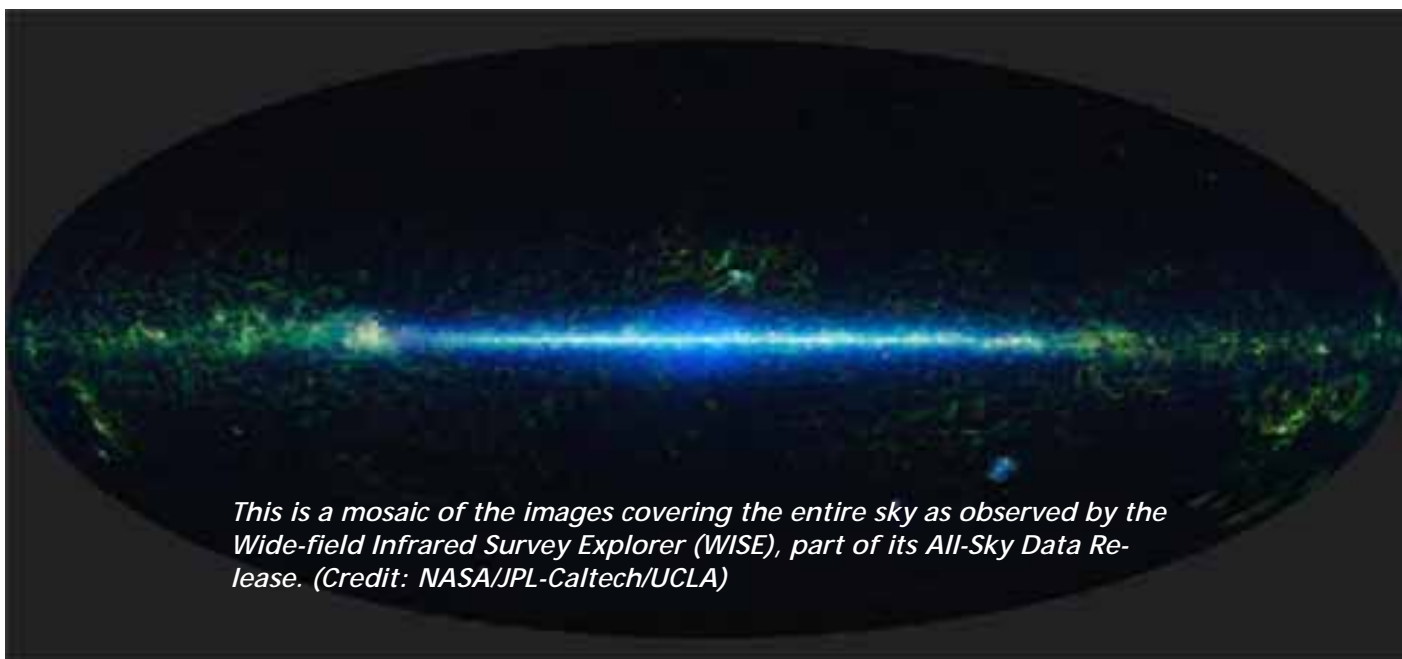
to create a specific flaw size. By measuring the temperature inside the motor at the flaw location, the team hopes to gain a better understanding for the propellant's margin for error. Test data also will help the team better understand acoustics and vibrations resulting from the rocket motor's plume.

In addition, NASA's Engineering and Safety Center will use test data to measure a solid rocket motor's plume and how it reacts to certain materials.

Engineers from Marshall's Engineering Directorate designed the test motor with support from ATK Aerospace Systems of Huntsville, Ala. ATK of Brigham City, Utah, the prime contractor for the SLS booster, is responsible for designing and testing the SLS five-segment solid rocket motor.

For more information about SLS, visit: <http://www.nasa.gov/sls>

NASA Releases New WISE Mission Catalog of Entire Infrared Sky



This is a mosaic of the images covering the entire sky as observed by the Wide-field Infrared Survey Explorer (WISE), part of its All-Sky Data Release. (Credit: NASA/JPL-Caltech/UCLA)

NASA unveiled a new atlas and catalogue of the entire infrared sky today showing more than a half billion stars, galaxies and other objects captured by the Wide-field Infrared Survey Explorer (WISE) mission.

"Today, WISE delivers the fruit of 14 years of effort to the astronomical community," said Edward Wright, WISE principal investigator at UCLA, who first began working on the mission with other team members in 1998.

WISE launched Dec. 14, 2009, and mapped the entire sky in 2010 with vastly better sensitivity than its predecessors. It collected more than 2.7 million images taken at four infrared wavelengths of light, capturing everything from nearby asteroids to distant galaxies. Since then, the team has been processing more than 15 trillion bytes of returned data. A preliminary release of WISE data, covering the first half of the sky surveyed, was made last April.

The WISE catalog of the entire sky meets the mission's fundamental objective. The individual WISE exposures have been combined into an atlas of more than 18,000 images covering the sky and a catalog listing the infrared properties of more than 560 million individual objects found in the images. Most of the objects are stars and galaxies, with roughly equal numbers of each. Many of them have never been seen before.

WISE observations have led to numerous discoveries, including the elusive, coolest class of stars. Astronomers hunted for these failed stars, called "Y-dwarfs," for more than a decade. Because they have been cooling since their formation, they don't shine in visible light and could not be spotted until WISE mapped the sky with its infrared vision.

WISE also took a poll of near-Earth asteroids, finding there are significantly fewer mid-size objects than previously thought. It also determined NASA has found more than 90 percent of the largest near-Earth asteroids.

Other discoveries were unexpected. WISE found the first known "Trojan" asteroid to share the same orbital path around the sun as Earth. One of the images released today shows a surprising view of an "echo" of infrared light surrounding an exploded star. The echo was etched in the clouds of gas and dust when the flash of light from the supernova explosion heated surrounding clouds. At least 100 papers on the results from the WISE survey already have been published. More discoveries are expected now that astronomers have access to the whole sky as seen by the spacecraft.

"With the release of the all-sky catalog and atlas, WISE joins the pantheon of great sky surveys that have led to many remarkable discoveries about the universe," said Roc Cutri, who leads the WISE data processing and archiving effort at the Infrared and Processing Analysis Center at the California Institute of Technology in Pasadena. "It will be exciting and rewarding to see the innovative ways the science and educational communities will use WISE in their studies now that they have the data at their fingertips."

NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif., manages and operates WISE for NASA's Science Mission Directorate in Washington. The mission was competitively selected under NASA's Explorers Program, which is managed by NASA's Goddard Space Flight Center in Greenbelt, Md. The science instrument was built by the Space Dynamics Laboratory in Logan, Utah, and the spacecraft was built by Ball Aerospace and Technologies Corp., in Boulder, Colo. Science operations, data processing and archiving take place at the Infrared Processing and Analysis Center at the California Institute of Technology in Pasadena. Caltech manages JPL for NASA.

For a collection of WISE images released to date, visit:
http://wise.ssl.berkeley.edu/gallery_images.html

An introduction and quick guide to accessing the WISE all-sky archive for astronomers is online at:

<http://wise2.ipac.caltech.edu/docs/release/allsky/>

For more information about WISE, visit:

<http://www.nasa.gov/wise>

ScienceDaily

Gravitational lens reveals details of distant, ancient galaxy

by Steve Koppes and Ray Villard
Space Daily

Thanks to the presence of a natural "zoom lens" in space, University of Chicago scientists working with NASA's Hubble Space Telescope have obtained a uniquely close-up look at the brightest gravitationally magnified galaxy yet discovered.

The imagery offers a visually striking example of gravitational lensing, in which one massive object's gravitational field can magnify and distort the light coming from another object behind it. Such optical tricks stem from Einstein's theory of general relativity, which describes how gravity can warp space and time, including bending the path that light travels.

In this case, gravity from the galaxy cluster RCS2 032727-132623 bent and amplified the light coming from a much more distant galaxy, 10 billion light-years from Earth. This "gravitational telescope" creates a vast arc of light, as if the distant galaxy had been reflected in a fun-house mirror. The UChicago team reconstructed what the distant galaxy really looks like, using computational tools that reversed the effect of gravitational lensing.

"What's happening here is a manifestation of general relativity," said Michael Gladders, assistant professor in astronomy and astrophysics at UChicago. "Instead of seeing the normal, faint image of that distant source, you see highly distorted, highly magnified, and in this case, multiple images of the source caused by the intervening gravitational mass."

The cosmic lens gave the UChicago team the unusual opportunity to see what a galaxy looked like 10 billion years ago. The reconstructed image of the galaxy revealed regions of star formation glowing like bright points of light. These are much brighter than any star-formation region in Earth's home galaxy, the Milky Way.

'Looking at the nature of dark matter'

In 2006 the Chicago astronomers used the Very Large Telescope in Chile to measure the arc's distance and calculated that the galaxy appears more than three times brighter than previously discovered lensed galaxies. Then last year, Jane Rigby of NASA's Goddard Space Flight Center in Greenbelt, Md., and the Chicago team imaged the arc with the Hubble Space Telescope's Wide Field Camera 3.

Using this gravitational lens as a telescope offers two



This graphic shows a reconstruction (at lower left) of the brightest galaxy, whose image has been distorted by the gravity of a distant galaxy cluster. The small rectangle in the center shows the location of the background galaxy on the sky if the intervening galaxy cluster were not there. The rounded outlines show distinct, distorted images of the background galaxy resulting from lensing by the mass in the cluster. The image at lower left is a reconstruction of what the lensed galaxy would look like in the absence of the cluster, based on a model of the cluster's mass distribution derived from studying the distorted galaxy images. Courtesy of NASA; ESA; J. Rigby (NASA Goddard Space Flight Center); K. Sharon (Kavli Institute for Cosmological Physics); and M. Gladders and E. Wuyts (University of Chicago).

major scientific opportunities, Gladders said. First, "It gives us a look at that very distant source with a precision and fidelity that we couldn't otherwise achieve," he said.

And second, it provides an opportunity to learn something about the lens-forming mass, which is dominated by dark matter. "It's really a way of looking at the nature of dark matter," Gladders said. Dark matter accounts for nearly 90 percent of all matter in the universe, yet its identity remains one of the biggest mysteries of modern science.

Keren Sharon, a postdoctoral scholar at UChicago's Kavli Institute for Cosmological Physics, led the effort to perform a detailed reconstruction of the lensed galaxy. She and her co-authors, including Gladders, NASA's Rigby and UChicago graduate student Eva Wuyts, published their findings last month in the *Astrophysical Journal*.

(Continued on page 25)

China's second moon orbiter outperforms design

China's second moon orbiter, the Chang'e-2, has performed outstandingly, a Chinese lawmaker close to the lunar exploration project said Tuesday.

Chang'e-2 has more than achieved the goals set for it, said Hu Hao, deputy commander-in-chief of the lunar exploration center under the Commission of Science, Technology and Industry of National Defense and a deputy to the National People's Congress, the country's top legislature.

China last month published a high-resolution full-coverage map of the moon captured by the Chang'e-2, which is "the highest-resolution photo of the entirety of the moon's surface to be published so far in the world," according to Hu.

"China's lunar exploration is providing research materials for global scientists, which has demonstrated that our utilization of the moon is for peaceful purposes," he said.

Chang'e-2, named after a Chinese mythological moon goddess, was



launched on Oct. 1, 2010.

"The excellent performance of Chang'e-2 has laid a solid foundation for the future landing of its successor, Chang'e-3, next year," noted Hu.

China's third lunar probe, Chang'e-3, is expected to be launched in 2013 and conduct a moon landing and lunar explorations. Its launch is part of the second step of China's three-phase lunar probe project of orbiting, landing

and returning.

Chang'e-2 will continue tests on the space environment and engineering technology experiments at the second Lagrange Point.

Staff Writers , Space-Travel.com

(Continued from page 24)

Sharon painstakingly created a computer reconstruction of the gravitational lens, then reverse-engineered the distorted image to determine the distant galaxy's actual appearance. "It's a little bit of an art, but there's a lot of physics in it. That's the beauty of it," Sharon said. "It was a fun puzzle to solve, especially when we had such great data."

Gladders said Sharon is "one of the world experts on exactly how to do

this. Combine that degree of finesse with this quality of data, and you get a very nice result. This object now becomes not only the brightest-lensed source known, but because of this analysis, it is also going to be one of the best-understood sources."

Through spectroscopy, the spreading out of light into its constituent colors, the team plans to analyze the distant galaxy's star-forming regions from the inside out to better understand why they are forming so many

stars.

The team also has obtained data from one of the twin Magellan Telescopes to help them determine why the galaxy, which is 10 billion light years away, looks so irregular.

"It's not like we have something to compare it to," Sharon said. "We don't know what other galaxies at the same distance look like at this level of detail."

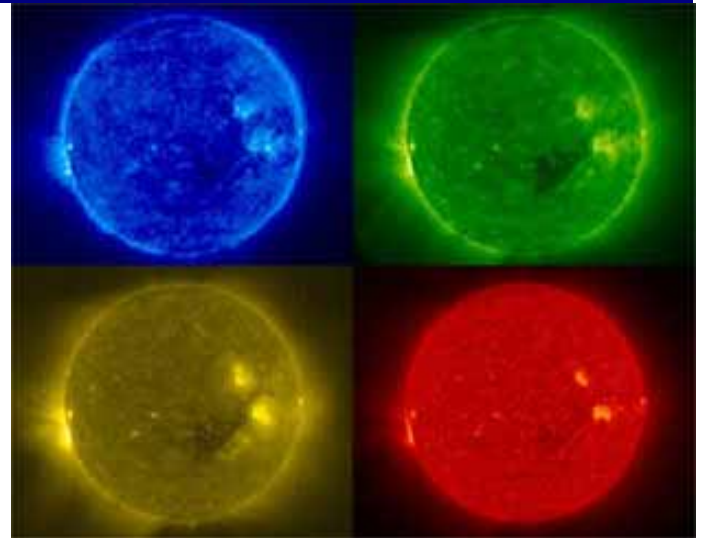
Alien Plants May Thrive on Many Wavelengths of Light

Aaron L. Gronstal, Astrobiology Magazine Contributor

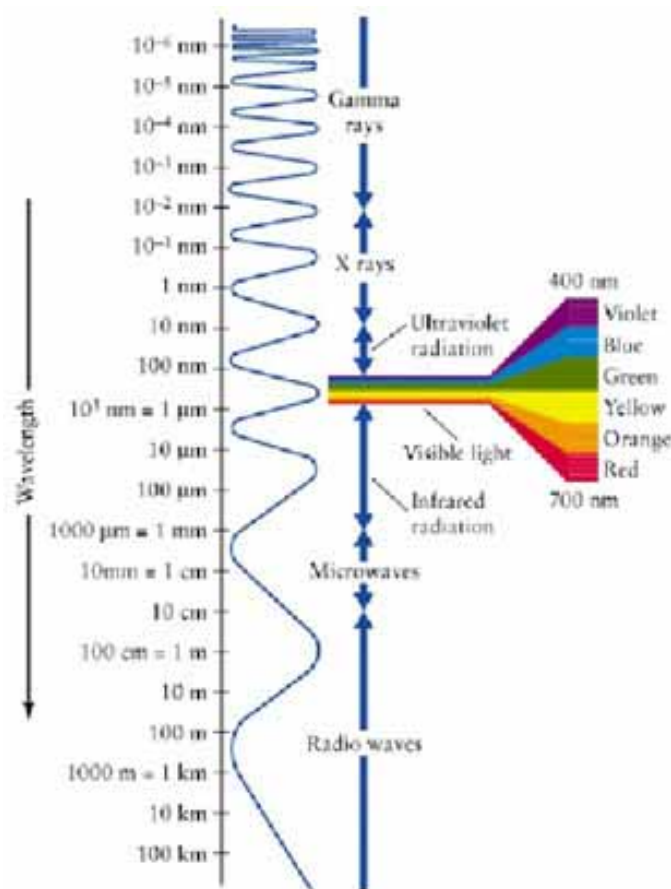
www.space.com

Everyone knows that we as humans literally owe the air we breathe to the greenery around us. As school children we learned that plants (as well as algae and cyanobacteria) perform the all-important biological "magic trick" known as photosynthesis, which helps generate the atmospheric oxygen we take in with every breath.

Plants, algae and cyanobacteria alter our planet in a way that only life can: they use photosynthesis to completely change the composition of the Earth's atmosphere. Since the days when [dust devils on Mars](#) were suspected to be the seasonal variation of vegetation, photosynthesis has been considered a key to identifying the presence of life on other planets.



Different types of stars have different temperatures and lifetimes. Cooler red M-class stars live a long time, while hotter blue A-class stars have relatively brief lives. These four pictures are actually four different views of our own star, the sun. Each false-color view highlights atomic emission in different temperature regimes of the upper solar atmosphere. Yellow is 2 million Kelvin, green is 1.5 million K, blue is 1 million K, and red is 60 to 80 thousand K. CREDIT: Stereo Project/NASA



Our eyes are sensitive to light which lies in a very small region of the electromagnetic spectrum labeled "visible light". This "visible light" corresponds to a wavelength range of 400 - 700 nanometers (nm) and a color range of violet through red.

CREDIT: Wavelength image from Universe by Freedman and Kaufmann

Both atmospheric oxygen (in the presence of liquid water) and the reflectance spectrum of plant leaves produce signs of life — dubbed "biosignatures" — that can be seen from space. Therefore, photosynthetic biosignatures are a priority in the [search for life](#) on planets in distant solar systems. The big question is, will extrasolar photosynthesis use the same pigment as on Earth?

Until recently, scientists thought Chl a was the only photopigment used in oxygenic photosynthesis. Chl a uses photons in visible light at wavelengths of 400-700 nm.

According to NASA postdoc Steve Mielke, lead author of a new study, "It was assumed that, due to the stringent energy requirements for splitting water molecules, longer wavelengths of light (which have lower energy) could not be used for oxygenic photosynthesis."

That assumption changed in 1996 when Hideaki Miyashita and colleagues discovered a [cyanobacterium](#) named *Acaryochloris marina* that uses chlorophyll d (Chl d) instead of Chl a to perform oxygenic photosynthesis with photons from visible light through to wavelengths up to 740 nm in the near-infrared (NIR).

This discovery raised many questions about the [wavelengths of light required](#) for photosynthesis. Scientists wondered how difficult it was for *A. marina* to power biochemical reactions with low energy photons. It

survives in environments where there is little visible light, because it gets the photons left over by Chl a organisms.

However, could *A. marina* be regularly unsuccessful in using the longer-wavelength photons, and could its ability to use NIR be inefficient, at the edge of what the molecular mechanisms of [oxygenic photosynthesis](#) are able to handle? Or could these unique organisms actually thrive on low-energy photons?

New research has shown that *A. marina* doesn't struggle at all when living on low-energy photons. In fact, the cyanobacterium is just as efficient or more so in storing energy as organisms that rely on Chl a for photosynthesis.

Mielke and collaborators used a technique called pulsed time-resolved photoacoustics (PTRPA) to compare the photosynthetic abilities of *A. marina* to a Chl a cyanobacterium named *Synechococcus leopoliensis*. PTRPA involves laser pulses at controlled wavelengths and allowed the team to measure the efficiency of photon energy storage (energy stored vs. energy input) of cyanobacterial cells.

When testing Chl d and Chl a at the wavelengths they each need to split water molecules, the team showed that whole-cell energy storage in *A. marina* was just as — and sometimes more — efficient than the *S. leopoliensis* cells using Chl a. For the first time, the team showed that oxygenic photosynthesis can operate well at longer wavelengths.

Alien photosynthesis?

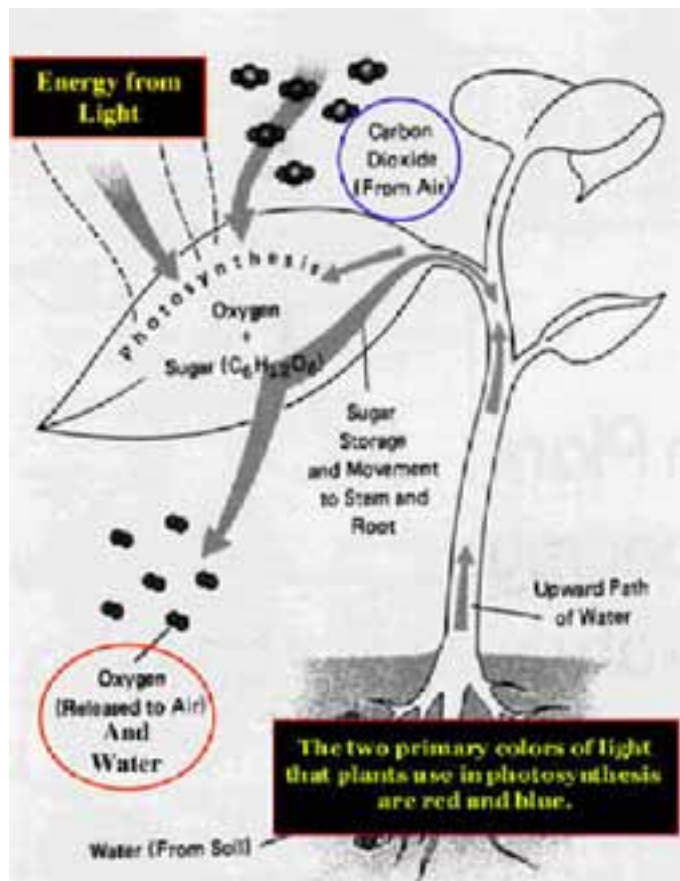
This discovery makes *A. marina* and Chl d very interesting for scientists trying to find life on extrasolar planets that orbit stars beyond our solar system. [[The Strangest Alien Planets](#)]

Nancy Kiang of the NASA Goddard Institute for Space Studies (GISS) explained, "Chl d extends the useful solar radiation for oxygenic photosynthesis by 18% — meaning life can use more wavelengths of light (i.e. more types of light-producing stars) to survive. This implies a lot of cool things."

Kiang emphasized the implications that the findings could have in the search for life on [alien planets](#), and the future of life here on Earth. For instance, Kiang said that *A. marina* appears to have evolved relatively recently, occupying a light niche that is produced by leftover photons from Chl a organisms. Since it can use more solar radiation than Chl a organisms, might our planet evolve to have Chl d out-compete Chl a?

Also, "Planets orbiting red dwarf stars may not get much visible light, but they'll get a lot of NIR light," she said. "So, now we know it would still make sense to look for oxygenic [photosynthesis on such planets](#), and we could look for pigment signatures in the NIR."

Finally, Kiang said the discovery could have implications for the development of renewable energy sources.



In the process of photosynthesis on Earth, plants convert energy from the sun into chemical energy in the form of glucose, or sugar. The chlorophyll in plants absorbs more blue and red light from sunlight, and less green light. Chlorophyll is green, because it reflects green light more than blue and red light.

CREDIT: NASA Ames

"Biomimicry of photosynthesis continues to be a quest in the development of renewable energy, but no one has yet developed an artificial system as good as Nature to split water," she noted. "For renewable energy that depends on sunlight, do the lower energy photons used with Chl d mean that we don't need such strong artificial catalysts for producing hydrogen fuel and biofuels?"

The findings could completely change our understanding of a biological reaction that is essential to the modern biosphere of Earth, researchers say. The results may also open new doors for the future of humankind in areas like renewable energy. But for NASA, the study could also have implications for the future of life on Earth and beyond that are truly far out.

This work was conducted by NASA Postdoctoral Program fellow Steven P. Mielke, under the advisement of Nancy Y. Kiang at GISS, in the laboratory of David Mauzerall at Rockefeller University in New York City, and in collaboration with Robert Blankenship at Washington University in St. Louis, MO, and Marilyn Gunner at City College of New York.

.....and finally

NASA Launches Comet-Hunting iPhone Game

by Mike Wall, SPACE.com Senior Writer



A scene from NASA's Comet Quest iPhone [game](#), which lets players steer the unmanned Rosetta spacecraft toward a rendezvous with a comet.

CREDIT: NASA/JPL

Ever wanted to steer a robotic spacecraft toward a comet rendezvous in deep space? Now there's an app for that.

NASA's new free iPhone game Comet Quest puts players at the controls of the European Space Agency's [Rosetta spacecraft](#), which is slated to arrive at the comet 67P/Churyumov-Gerasimenko in 2014.

The real Rosetta will drop a lander onto the [comet's nucleus](#), then spend roughly two years studying the icy wanderer from orbit. Comet Quest parallels the actual mission. Players must deploy a lander in a scientifically interesting area; receive data from the lander; transmit lander and orbiter data back to Earth; and keep Rosetta safe from dangerous chunks of material blasting off the comet's surface.

Players earn points by accomplishing all of these tasks, then can rack up even more by correctly answering comet quiz questions at the end of the game. [\[Best Close Encounters of the Comet Kind\]](#)