FAS Newsletter

Federation of Astronomical Societies

http://www.fedastro.org.uk

2013 FAS Convention in Cambridge

The 2013 FAS Convention will be held at Cambridge again. There are some new departures this year, and also the return of some old favourites.

The Telescope Tours have been missing for the last couple of years. We know they're popular and are delighted that we've been able to bring the lunchtime tour back this year. For those who haven't yet been to the IoA, the telescope tour is one not to miss. The tour includes the Northumberland and Thorrowgood telescopes.

The Thorrowgood telescope was built by T. Cooke & Sons of York & London in 1864.

The Northumberland is the only remaining large instrument from the early days of the University Observatory and was presented to the observatory by the Duke of Northumberland in 1833. In fact this scope is often described as an 'almost famous' telescope, because it was used to find the planet which became named as Neptune, but was just pipped at the post by a German observatory.

2013 Convention will be held on Saturday 19th October at the Institute of Astronomy, Madingley Road, Cambridge, commencing at 9.30 am.

The programme is:

Dr Samuel George - University of Birmingham "Magnetic Fields in the Universe"

Break

Andrew Robertson "Building a large (600mm) Dobsonian Telescope"

Lunch - telescope tours

Prof. Andrew Coates - Mullard Space Science Laboratory, UCL "Mars exploration – and the ExoMars mission"

FAS AGM

Break

Early Career Researchers:

Tamela Maciel - Cavendish Laboratory, University of Cambridge "Jets from AGN".

Mark Burke - University of Birmingham "How do we hunt Black Holes"

Break

Dr Robin Catchpole - University of Cambridge "Climbing the Distance Scale ladder to the Edge of the Universe"

5.30 Close

Treasurer



Another feature to return is the raffle. A raffle always adds a sense of fun to events such as our Convention, and we hope attendees will join in and support it. Our traders have generously undertaken to donate some items as prizes, and the Federation too will be contributing a major prize.

The first of the new features is in a way related to the raffle in that there is a prize associated with it. In an effort to control numbers this year the event will be ticketed. We felt this necessary as in recent years the lecture theatre capacity has almost been reached, and we're keen to avoid a situation arising where there's too many attendees for the number of seats available. Tickets will cost £5 for attendees from FAS member societies, £7 to anyone else. There's a booking form available on the FAS website, so please download that and post to the address shown, your ticket(s) will then be guaranteed. Multiple tickets can of course be booked on a single form. Tickets will be numbered and will be entered into a free prize draw, and the winners' society will get a year's free subscription to the FAS, including PLI.

This year there will be three break periods, giving attendees more chance to browse our excellent trade stands. We see the return of Astronomia, Space Rocks, Astronomica, Cambridge University Press and Aurora Books, and we are particularly pleased to welcome Ian King Imaging for the first time.

The BAA will also be present and we expect some local societies to have stands.

The last new feature to mention is about speakers. As per usual we have some excellent speakers from academia and cutting edge research, but this year we wanted to inject some

(Continued on page 4)

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Published by the Federation of Astronomical Societies

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ISSN 1361 - 4126

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President's Spot

I'll start this time with expressing mine and council's thanks to Keith Brackenborough for his service on council. Keith was the SAGAS rep for many years, his replacement is Tony Questa.

Due to several long standing council members stepping down at the next AGM, we will have several vacancies on council for the next year.

The vacancies are:-

- 1. *Membership Secretary* Responsible for processing new membership applications and managing the annual renewals using the FAS membership database. They also provide information from the database to other Council post holders for their duties, as per the data protection document.
- 2. *Webmaster* Maintains the FAS website, updating as required. Moderates the FAS Yahoo Group. Maintains the all FAS societies e-mail listing (from MARS) and acts as data protection officer.
- 3. *Handbook Editor* Updates the contents of the FAS Handbook on an annual basis. Arranges the printing of the Handbook and distributes the copies to member societies.
- 4. *Meetings Organiser* Organises the Annual Convention of the FAS at a venue agreed by FAS Council, including arranging for the speakers and the Traders for the event. With help from other Council Members runs the annual convention on the day.

If anyone would be interested in filling any these posts please get in touch.

Reminder - We do keep getting the occasional request to update the information we hold about societies. The responsibility for updating this information lies with the society and they can update their details using the membership and renewals systems (MARS) on the website. If you are responsible for updating this info & do not have the login details please ask at your next committee meeting as someone there should have these details. If you have the details it may be worth printing them out, putting them in a sealed envelope & storing securely with another committee member.

Also through MARS, societies who have signed up to PLI now have the ability to download the latest PLI schedule/policy – often a crucial document to provide to venues where societies are running an event.

On a lighter note, the UN-declared World Space Week is 4-10 October 2013 is the largest public space event on Earth. societies may want to use these dates to run public events, hopefully the British media will give the week a bit of publicity. Local libraries are always a good place to put up an astronomical display, astrophotography exhibition or hold a public lecture - if you are interested in doing this get in touch with your local library now, as they organise events months in advance. Visit www.worldspaceweek.org for more detail

Now that the winter observing season is over most of us look forward to a nice quiet summer, especially from the point of view of interacting with the public. But if your society has a solar telescope (either white light or Hydrogen alpha) then how about contacting local fetes or country parks & ask if you can bring your telescope & show the public a close up view of our nearest star.

Don't forget to put the Convention Date in your diary for 19th October 2013 at the Institute of Astronomy, Cambridge. We've arranged a great day out including an interesting set of speakers and the telescope tours will be making a welcome return this year during the lunch break. Of course the traders will also be present – trying to separate you from you're your hard earned money! See the Convention page on the FAS website for more details.

That's all for now.

Gary Gawthrope



Hello Frank,

Thank you for getting back, and especially for the offer to include our appeal.

Nottingham Astronomical Society would like to ask other astronomical societies the following questions:

- 1. Do you have an observatory?
- 2. What is the best reading taken on Sky Quality Meter on your observatory site (if known)? What SQM device did you use to take the reading?
- 3. What is the spec (and manufacturer) of your main telescope?
- 4. How many telescopes do you permanently have on site?
- 5. Do you have a designated area for your members to set up their telescopes on site?
- 6. How many times did your observatory open in 2011? And in 2012?
- 7. How many people attended you observatory in the last year?
- 8. Does your site allow access to general public?
- 9. Do you hold outreach events on your observatory site?
- 10. Do you have a donations box on site? Would you consider charging for tea or coffee, or for any other services?
- 11. Do you have running water and toilet facilities on site?
- 12. Do you have permanent electricity supply to the observatory?
- 13. What is the most popular activity in the observatory?
- 14. Do you do radio-astronomy?
- 15. Do you do astro-photography?
- 16. Do you have a planetarium?
- 17. What are the most practically useful features in your observatory (lights, automated dome control, etc)?
- 18. What were the most expensive features of your observatory? How much did it cost?
- 19. Do you have a designated tarmacked car-parking area?
- 20. Do you have a warm room?
- 21. If you could improve anything, what would it be?
- 22. What lessons have you learnt from running an observatory, and what advice could you share?
- 23. What do you think makes your observatory a success with your members?
- 24. What do you think makes your observatory different?
- 25. How many members did you have in 2012?

Many thanks for your help, and clear skies!

If this kind of information could be made available, we would be most grateful! Please feel free to change the order of the questions, or anything else that you feel may improve their presentation.

Responses can be sent to committee@nottinghamastro.org.uk.

We are really looking forward to the Spring issue of the FAS Newsletter. :0)

Victoria

Dear Frank,

I haven't yet read *Nicolas-Louis De La Caille, Astronomer and Geodesist* by Ian Stewart Glass, which you recently reviewed in the FAS Newsletter, but I do know that La Caille is perhaps best remembered for his introduction of 14 new constellations in the southern sky, mainly instruments, which we still use today. Examples are Antlia, Fornax, Microscopium, Telescopium and Fornax. These were obviously drawn up after his observations from South Africa. I don't know if this is dealt with in the book.

The Newsletter is essential reading, and always of interest. Keep up the good work!

Regards, Madeline Cox, FRAS.

Chairman, Society for the History of Astronomy, Bassetlaw AS

Dear Frank John,

We are planing to establish an educational observatory for students. But nothing is available about astronomy in Pakistan. Kindly advise us, how we can take a start. Best Regards Muhammad Raza Khan

If anyone with such experience is prepared to assist our astronomy friends in Pakistan, please let me know and I will put you in touch with Muhammad. (see item on P 7)

Editor

STAR GAZING AND THE LYRA OUTREACH PROGRAMME

This Autumn saw bad weather cancel the FAS sky watch programme in Lowestoft.

We received good press coverage, a half page spread of LYRA members with telescopes in the local paper and our Chairman, Leonard Brundle was interviewed live on two local radio stations. The spin off from this exposure was, however, a new school added to our outreach programme and a sky watch after hours at one school. As reported below the Moon and Jupiter made a great evening for the children.

Our schools programme has grown again this year having risen to 4 schools plus 2 requests from our local library to speak to adult groups. We started on January 11th with a visit to Oulton Broad School for an afternoon display, then on January 25th we were at Poplar School.

April 16th saw us talking to an adult group, "The Best of Lowestoft", at Carlton Marshes Nature Reserve.

In September we were invited by Lowestoft Library to talk to an adult group, Time Out.

October 3rd saw us at Woods Loke School for 2 sessions, (1 morning and 1 afternoon) and again on 14th November when we returned for an after school science club.

We then went on to Elm Tree school for a morning and afternoon talk on November 22nd and after school the following day we were back, with 3 telescopes, for a skywatching evening. About 30 children attended and a clear night allowed us to observe the gibbous Moon and Jupiter which obligingly had all 4 major moons visible in line abreast for our delight.

The format for the classroom talk is a visual demonstration of the Solar System using the excellent orrery built by Leonard Brundle. This always intrigues the staff as well as the students as they acknowledge that a moving model demonstrates the subject so much better than a book or even a video. The Earth and its Seasons module is another subject that a moving model demonstrates so much better than any other method.



Pupils building the orrery

Each Planet is discussed in turn with an accompanying slideshow, class volunteers identify and install Planets onto the orrery and the grand finale is a 10 second countdown when the orrery springs into life and the planets orbit the Sun.

The FAS grant is much appreciated and LYRA will attempt further public skywatches in the New Year as well as offering our services to local schools and societies.

> John Perring Lowestoft & Great Yarmouth A S



School visit. Leonard Brundle with his orrery.

FAST 'slows to a halt!'

In the previous edition of the Newsletter, we reported on progress with the FAST project. Up to that point things had been going well. The initial survey resulted in 50 member societies expressing positive interest and this more than justified pursuing the idea further.

The FAS Council took the view that, from this point on, more active involvement by interested member societies would be needed if the project was to be carried forward successfully. Such representation, it was thought, would be essential to the initial development of the project as well as its eventual management. It would also be crucial in ensuring that the project responded to members' needs and interests and in enabling the project to be sustainable over time.

In the previous edition of the Newsletter, we invited interested parties to come forward to join an initial planning group, but no-one has responded to this invitation. The FAS Council, taking the view that I have outlined above, has therefore decided to time on the FAST project.

The exploration has not been without its value and correspondence around it has often been interesting and informative. On behalf of the Council, I should like to thank all of you who contributed to the dialogue.'

John Evans

(Continued from page 1)

practical amateur astronomy into the proceedings. So we are very pleased that we have Andrew Robertson from Norwich AS to tell us about the build of his amazing 24" dobsonian (one of the authors has observed with this instrument and still breaks out in a green colour when thinking about it!). We also have a radical new spot - fledgling researchers (PhD students) giving short presentations on their cutting edge research.

These will be shorter than the rest of our talks but this will mean a much wider range of topics incorporated into the day. Council too is providing a speaker - Dr Samuel George, our WebMaster.

All in all it's going to be as per usual, an excellent day out, splendid value for money.

We hope to see you there

Dr. Samuel George - FAS Web Master John Axtell FRAS - FAS Membership Secretary Joint Organisers 2013 Convention

WELCOME

The Federation welcomes the following new joining societies

West Kintyre Stargazers westkintyrestargazers@mail.com

Wells & Mendip Astronomers www.wellsastronomers.org.uk

North Lincs Astro Society www.northlincsastro.com/index.html

We hope that each will find membership useful and look forward to hearing further from them by means of contributions to the Newsletter.



Some of you may not be aware that the FAS is run entirely by volunteers, and many of the current FAS officers also hold organising positions within their own society, as well as holding down jobs.

Without volunteers your astro society would not exist and neither would the FAS.

The FAS provides a range of services to its member societies, the principal one being the advantage of group PLI cover. Virtually all astro societies organise star parties and the like, and so public liability insurance is an absolute must. Such cover taken out individually is very expensive and so most societies rely on the Group Scheme, the continuance of which does come back to the volunteers who run the FAS.

Gary Gawthrope, in his President's Spot, listed the current vacancies on the FAS Council and these are repeated below.

It is worth explaining that the FAS is run by a Council of Officers and Members, which meets 3-4 times a year, usually in the RAS premises in Piccadilly, London. All attending members are, of course, reimbursed for their costs to attend these meetings.

Many of the current Council have been undertaking their various duties for quite a few years and several now wish to stand down. It is important, in fact, it is vital that volunteers come forward to fill these posts.

If you are interested in undertaking any of the positions listed please contact the President or Secretary of the FAS.

Do not delay!!

The vacancies are:-

- 1. Membership Secretary
- 2. Webmaster
- 3. Handbook Editor
- 4. Meetings Organiser

Macclesfield AS - Tegg's Nose Public Star Party

On Saturday the 8th of December Macclesfield Astronomical Society were invited by the Cheshire East Ranger Service to host a public star party at Tegg's Nose.

Optimism faded when the day of the event saw the sunny morning turn to cloudy skies by mid-afternoon. Even the drive up to Tegg's Nose was misty and the event seemed to be in jeopardy ... However, seven o'clock came and so did the people! The room filled as friends and families came to the cosy visitor centre. The Society was fully prepared. Andrew Greenwood, Society Chairman for over ten years, opened the event and was enthusiastically followed by Paul Cannon who presented a fascinating lecture on meteorites. What made this presentation so special was that Paul brought his personal collection of rare and valuable meteorites with him. We held pieces of rock formed in space many millions of years before our Earth was even formed ... Wonderful!

Duncan Toms presented a perfect lecture showing all the features of our Milky Way, which was easily accessible to new observers. It was perfect inspiration for the audience.

After a short break of hot chocolate and mince pies, Andrew Greenwood gave a riveting exposé of the universe, including a journey through the Orion Nebula, the Milky Way, out beyond the Andromeda Galaxy and finally towards the realm of the Great Attractor, a massive galactic gravitational force which is pulling the Milky Way and neighbouring galaxies towards it.

Sally Stubbs the Society Public Relations Officer said "I felt incredibly proud of the team who presented a professional and inspirational event. It just shows that astronomy is as much about camaraderie as it is the stars. And during the evening, the true stars were the many members of the public and children who came together to experience the wonders of astronomy".

Ten year old Erin Slattery, the youngest visitor told us she felt really inspired. Her Dad had bought her a telescope for her birthday and she could not wait to go stargazing! We hope she will join us again!

Andrew Greenwood said "Everyone was outstanding - it really was quite amazing, despite the terrible weather. The public were clearly enthralled by what the Society does, and the accessible, passionate and knowledgeable people within it."

Macclesfield Astronomical Society is incredibly grateful to Martin James, Ranger for Cheshire East Council who looks after Tegg's Nose Visitors Centre. Without his support and the friendship of the Ranger Service, our star party would not have been possible.

Having the perfect stargazing site on our doorstep is phenomenal, and we are looking forward to our next Tegg's Nose star party in April 2013!



Duncan Toms delivering his presentation of the basic observing targets easily viewable in the night sky during winter



Erin Slattery, youngest public member who attended the star party. Picture taken by her Dad Patrick and kindly sent to me after the party. Erin went home set up her scope ready to observe. She also is showing all the notes she took at the star party. She is hoping to join our society as a junior member.

BOOK REVIEW

THE FIRST GALAXIES IN THE UNIVERSE

Abraham Loeb and Steven R. Furlanetto Princeton University Press 2013 ISBN-978-0-691-14492-4 (paper)

oeb and Furlanetto's 'The First Galaxies in the Universe' is an advanced text which is directed firmly and uncompromisingly at graduate level astrophysicists who are about to embark on research programmes in the deep space astrophysics of the so-called cosmic dawn. The book is in three main parts. In Part 1 the authors review the theory of the emergence and evolution of structure in the dark matter dominated early universe. With sections on linear perturbation theory and non-linear structure formation written by highly respected theoretical astrophysicists the reader should expect to find the uninhibited use of some challenging mathematics and advanced scientific terminology both in this part and throughout the book. Part 1 concludes with a chapter on the intergalactic medium which prepares the way for later consideration of reionisation processes. In part 2 the authors present an in-depth analysis of the formation processes of the first stars, the first galaxies and the supermassive black holes which now occupy (some) galactic centres. Central to the discussion of early star formation is the importance of feedback. That the radiance and supernova emission products of the early massive stars influenced so strongly the emergence and evolution of second generation stars was new to this reader. In terms of experimental method the book provides a detailed review of studies based on Lyman-a emission, the Lyman-a forest, the so-called Gunn-Peterson effect, the 21 cm line and gravitational lensing. Once again the treatment is at times severely mathematical and reliant on advanced concepts in spectroscopy and atomic physics. In part 3 the emphasis is on the advances which can be anticipated in the coming decades through the use of next generation large telescopes and emergent associated technology. The early Universe in the era of the cosmic dawn is highly red-shifted so much attention is directed at large aperture instrumentation with infrared capability but attention is also given to the search for the oldest stars in the Milky Way and in low luminosity satellite galaxies in the local group.

In reviewing any book directed at a graduate readership but having to keep in mind the amateur astronomer it has to be asked if the content and presentation is accessible to that wider readership. This reviewer, with degrees in physics from the 60's and experience in experimental research until the late 70's found much of the mathematical and technical content of Loeb



and Furlanetto's book seriously challenging at first reading. As with any text on a wide ranging and developing topic, however, we will dip into this book again - and hope! There are of course passages and sections from which all might learn to appreciate at least the direction if not the detail of frontline research. I am always attracted to brutal honesty in the reporting of scientific endeavour and the popular astronomical literature is not, in my view, always as eager to report what we still do not know or understand as it perhaps should be. In that context I would offer one quotation from this book. In Chapter 5, in commenting on the complexity which arises when baryonic matter condenses within dark matter haloes, the authors write "The art of cosmological studies of galaxies involves a delicate dance between what we observe but do not fully understand and what we fully understand but cannot observe." Dealing as it does with an emergent but nevertheless wide ranging field of astrophysics there is little doubt that this book will find an easily accessible place on the bookshelf of many a senior university researcher.

Brian Parsons

Near Earth Objects Donald H. Yeomans Princeton University Press ISBN 978-0-691-14929-5 £16.95

his is a small (153 page) but very useful reference volume for your library. It has been written by Donald Yeomans – a Fellow of the Jet posed of a weak, dusty, silicate Propulsion Laboratory (JPL) - who is manager of NASA's Near Earth Object Programme Office . He has produced an interesting, sometime humorous - but very timely book, as in 2013 we expect to see two comets, a large "near miss " asteroid - not to mention the Chelyabinsk fireball over Russia.

The book starts with an introduction as to why we should concern ourselves with these near earth objects. He cites the case of the destruction of Michelle Knapps Chevrolet car by a 27lb meteorite, the Tunguska fireball devastating two thousand square kilometres of Siberian forest, and of course the probable dinosaur extinction event by the Chicxulub impactor 65 million years ago. It goes on to distinguish the differences / compositions between asteroids (which make up 99 per cent of near earth objects) comets and meteors, their likely origin from either the asteroid belt or possibly the Oort cloud, and as the possible origins of life important of course, should one on Earth.

Chapter 5 describes in some detail how we find, track and determine any possibility of a likely impact of an asteroid with our planet. There are some excellent photographs, taken from telescopes here on Earth and from spacecraft enabling us to determine likely internal composition, size, therefore the energy of a likely impact. If they are close enough to us then radar can also prove useful in determing size and shape and any possibility of landing site to begin possible mining operations on those composed of solid nickel-iron, and other metals such as platinum. Water of course would yield oxygen and hydrogen for rocket fuel. Comets are

not forgotten but, being commatrix composed in, or surrounded by, ices (mostly water ice) they are unlikely to hit the Earth and cause any substantial damage. That is not to say they are not interesting - they just tend to be more difficult to observe in any great detail due to outgassing from the nucleus causing a diffuse appearance. Yeoman calls them the show offs of the near earths objects.

To find and track is most

of them as Yeoman says - have our name and address on it. The size of the object and its impact site will determine the level of devastation that would be caused. So preventing this impact will be the next major priority for the space industry. According to Yeoman's there are numerous deflection techniques that can be considered but he suggests that we KISS the object and wave as it goes past.

If you want to know more about kissing an asteroid then I suggest you purchase this book. I found it to be highly interesting and informative and well worth the money.

Adrian Roach

NEAR-EARTH OBJECTS

Finding Them Before They Find Us

DOWALD H. YEOMANS

INFINITE ASTRONOMICAL SOCIETY OF PAKISTAN - SUN VIEWING PROJECT

Report of sun viewing session at Beacon-

Introduction

Infinite Astronomical Society of Pakistan is a sister concern of Nature Club of Pakistan and working to motivate youth to explore knowledge through study of astronomy.

This year we offered three very successful programmes under the titles;

1. Earth is Round

In this programme students were given task to prove that earth is round. Students proved this theory through hands on experiments. This programme got good admiration from NASA and other astronomical societies in USA & UK. The report of this project may be obtained from office of the society on request.





2. Relationship between Altitude of the Sun and Energy we receive on Earth

In this programme, students established a relationship between altitude of sun and energy received in terms of temperature on earth. The report of this project may be obtained from office of the society on request.



This programme was designed to introduce the sun as most important star in our solar system.

Programme was started with a welcome address from the representative of the Infinite Astronomical Society.

Then students took a tour of solar system in which they observed and viewed the planets moving and rotating on its orbits and axis's. Information regarding their mass, volume, temperature and distance from earth, etc., was delivered to them.

Students very much liked and enjoyed seeing planets moving on their orbits and axis's.

After this, students viewed sun with sun viewing glasses and described it in poetry, drawing etc. They were very happy to see sun spots and expressed that it is the first time that they are viewing sun spots.

88 students from this institution joined this session and registration is continuing and we are hopeful that more students will join this interesting activity.

30th of April-2013





After viewing the Sun, students are recording their feelings

3. Observe and Describe the Sun

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Open Night at Rugby is a resounding success

The March meeting was a public event that saw a round thing full of hot air being used to project the night sky onto the inside of it in the form of an inflatable planetarium and a less round thing full of hot air giving talks to the members and guests.

Despite having a fairly small car Jo had managed to fit the planetarium inside with all it's ancillary equipment the blow-up igloo threatened to burst out of the hall when inflated-the ceiling tiles may never be the same again.

The evening kicked off with the chance to see an Iridium flare, so at 18:37 everyone was looking skywards to see the magnitude -8.2 flare



Looking for an Iridium flare



from one of the satellites antenna, despite the cloud that was threatening to spoil the evening.

Barrie Chessell was door keeper and register taker, a role he has taken on with enthusiasm since his election to the position in February, Dave Riley was freezing his anatomy off outside giving people a look at Jupiter and the Moon with his 'scope while inside Sarah Meek was doing the catering as one of her many jobs for the night and David Morris did what he did best and talked a lot, giving presentations on the size of the universe and Iridium flares.

A second flare at 20:13 was also seen, but this was dimmer at a magnitude of -1.3. For many the event had been the first time that they had seen a flare. With other chances to speak to the members about everything from basic naked-eye observing to modern go-to telescopes, see the scale of the Solar System and even eat bits of the Sun and asteroid belt there was something for everyone.



The Hall filling up.

A BIT OF HISTORY - LIVERPOOL AS

George Higgs 1841 -1914 (Born Daniel Sutton) President of the Liverpool Astronomical Society, Fellow of the Royal Astronomical Society

D aniel Sutton the son of an illiterate farm labourer, was born in Clawton (Devon), and trained as a watchmaker in Launceston (Cornwall) where he married aged 21. He and his family arrived in Liverpool sometime before 1868, after spending a few years in Penrith (then in Cumberland)and on the way adopted his wife's surname to become George Daniel Sutton Higgs, names which he retained for the rest of his life.

He established his first watchmaker's shop in Liverpool on Deacon Street, Everton, but moved several times in the next 9 years before settling on West Derby Road where he had a succession of shops, sometimes two at once, sharing with his second wife, a milliner. They stayed longest at no 320, (now demolished) remaining there from 1899 until his death in 1914.

His first wife died in 1870, leaving him two young sons. He remarried in 1874 and a daughter was born in 1875.

When and where he was educated has not been discovered: it is likely that his knowledge of science in which he reached a relatively high standard in mathematics, physics, chemistry and astronomy, was acquired in maturity. By the late 1880s he started to publish papers in leading scientific journals on his main subject of research which was recording the Sun's spectrum at various solar elevations and under various weather conditions. He prepared himself for this project by first designing and making an induction coil to produce known spectra for comparison, and also by perfecting methods of sensitising photographic plates to reduce the exposure times for his spectral photographs, particularly for the red rays.

In addition to the scientific papers, he privately published two editions of an atlas of photographs (with descriptions) of solar spectra. His spectroscopic work, carried out in a room of his suburban house with mainly home-made apparatus, was praised in a large number of

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papers and several books, by leading British, Continental and American scientists who regarded it as comparable with, or better than results produced by leading astronomers and physicists who used well-equipped Observatories or University laboratories. Recognition came during his lifetime: he gained four Government Grants (administered by the Royal Society) for help with research and publication expenses, he was elected a Fellow of the Royal Astronomical Society (of Great Britain) and after some years on the council, became Vice-president and later President of the Liverpool Astronomical Society.

George Higgs died suddenly of a heart attack in December 1914 and was buried in Smithdown Road Cemetery – the numbered plot can be identified even though there is no monument. His widow, daughter and one son survived him, but no present day descendants have been traced, and none of his private papers or apparatus has been found, with the exception of his Rowland diffraction grating – recently donated to the Liverpool Museum by the University of Liverpool Physics Department and now on public display.

Gerard Gilligan



Klaus Hentschel



FIG. 10. Higgs's mounting of the concave grating. The light enters from the right into the slit, is guided towards the grating in the back (not visible), and from there onto the photographic plate in the box at the far left; moving the slit along the big semicircle by means of an intricate system of pulleys causes different orders of the spectrum to fall onto the photographic plate; the path of the light, fully enclosed in card boxes, shields the plate from stray light. From G. Higgs, A photographic atlas of the normal solar spectrum (ref. 124), Plate 90.

Liverpool AS Youngsters Club is a huge success

The format has remained the same, from October 2012 through to March 2013 we held a monthly Astronomy Club on a suitable Thursday evening, chosen so we can observe the Moon in 1st or 2nd quarter.



Each evening had a theme. We've had Missions to Mars, Life of a Star, Habitable Exo-planets and Observing the Messier Objects. All attended by very enthusiastic young astronomers. Ages ranged from 8 up to 15 with a good mixture of girls and boys. Parents or responsible adult must always accompany the youngster's, they also enjoy themselves and find they're learning a lot too! There is always an opportunity to visit and use our observatory telescope plus we have telescopes outside for observing. It's not just the youngsters that enjoy the club, the adult society members that help out also have a great time. We've had interesting talks, experiments, examples of imaging, observing through a variety of telescopes plus working with our Supernova searches – so plenty packed into our events each month.



We now have a long list of over 60 youngsters that attend the Astronomy Club. The regular attendance is between 20 and 25 each





month. We just about squeeze into Pex Hill. Most of the regular attendees have joined the society to be young or junior members and we are all delighted about that.

We're very pleased to say that we have also participated in Stargazing Live for the second time this year during January 2013. This time the



society with several Young Astronomers from our club were invited along to the Jodrell Bank BBC events on both evenings Tuesday (8th Jan 2013) and Wednesday evening (9th Jan 2013). Everyone had an unforgettable time. Whilst the Tuesday evening was too wet and cloudy for observing, the Wednesday evening proved to be clear. Once again the youngsters did us proud and are all now big celebrities in their schools! Well done to them all again.

(Continued on page 11)



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(Continued from page 10)

The LAS Young Astronomers Club is now very much part of the society activities and has proved to be very popular and very enjoyable. It is providing exactly what we wanted namely introducing youngsters to our wonderful hobby of astronomy and rejuvenating the society membership. Long may it continue and we'll be back in October for another set of monthly astronomy evenings just for youngsters. Thanks to those members who have contributed their own time and helped out at the youngsters club each month. And many thanks to the parents and young astronomers that so enthusiastically come along to the monthly club. Well done to them all.

Each year we also try to organize something in addition to the monthly evenings. For the last 2 years we have arranged visits to the Liverpool World Museum Planetarium. This year we arranged a Science & Astronomy afternoon at Edge Hill University in Ormskirk with a visit from Galileo himself!



For further information please contact Steve Southern or Brendan Martin at Liverpool AS.





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Spectacular Stellar Nursery ESO's Very Large Telescope Celebrates 15 Years of Success

With this new view of a spectacular stellar nursery ESO is celebrating 15 years of the Very Large Telescope -the world's most advanced optical instrument. This picture reveals thick clumps of dust silhouetted against the pink glowing gas cloud known to astronomers as IC 2944. These opaque blobs resemble drops of ink floating in a strawberry cocktail, their whimsical shapes sculpted by powerful radiation coming from the nearby brilliant young stars.

This new picture celebrates an important anniversary for the Very Large Telescope -- it is fifteen years since the first light on the first of its four Unit Telescopes, on 25 May 1998. Since then the four original giant telescopes have been joined by the four small Auxiliary Telescopes that form part of the VLT Interferometer (VLTI). The VLT is one of the most powerful and productive ground-based astronomical facilities in existence. In 2012 more than 600 refereed scientific papers based on data from the VLT and VLTI were published ([ann13009].

Interstellar clouds of dust and gas are the nurseries where new stars are born and grow. The new picture shows one of them, IC 2944, which appears as the softly glowing pink background [1]. This image is the sharpest view of the object ever taken from the ground [2]. The cloud lies about 6500 lightyears away in the southern constellation of Centaurus (The Centaur). This part of the sky is home to many other similar nebulae that are scrutinised by astronomers to study the mechanisms of star formation.

Emission nebulae like IC 2944 are composed mostly of hydrogen gas that glows in a distinctive shade of red, due to the intense radiation from the many brilliant newborn stars. Clearly revealed against this bright backdrop are mysterious dark clots of opaque dust, cold clouds known as Bok globules. They are named after the Dutch-American astronomer Bart Bok, who first drew attention to them in the 1940s as possible sites of star formation. This particular set is nicknamed the Thackeray Globules [3].



The Very Large Telescope Snaps a Stellar Nursery and Celebrates Fifteen Years of Operations: This intriguing new view of a spectacular stellar nursery IC 2944 is being released to celebrate a milestone: 15 years of ESO's Very Large Telescope. This image also shows a group of thick clouds of dust known as the Thackeray globules silhouetted against the pale pink glowing gas of the nebula. These globules are under fierce bombardment from the ultraviolet radiation from nearby hot young stars. They are both being eroded away and also fragmenting, rather like lumps of butter dropped onto a hot frying pan. It is likely that Thackeray's globules will be destroyed before they can collapse and form new stars. (Credit: ESO)

Larger Bok globules in quieter locations often collapse to form new stars but the ones in this picture are under fierce bombardment from the ultraviolet radiation from nearby hot young stars. They are both being eroded away and also fragmenting, rather like lumps of butter dropped into a hot frying pan. It is likely that Thackeray's Globules will be destroyed before they can collapse and form stars.

Bok globules are not easy to study. As they are opaque to visible light it is difficult for astronomers to observe their inner workings, and so other tools are needed to unveil their secrets -- observations in the infrared or in the submillimetre parts of the spectrum, for example, where the dust clouds, only a few degrees over absolute zero, appear bright. Such studies of the Thackeray globules have confirmed that there is no current star formation within them.

Notes

[1] The nebula IC 2944 is associated with the bright star cluster IC 2948 and both of these names are also sometimes associated with the whole region. Many of the bright cluster stars appear in this picture.

[2] The seeing of the blue image in this colour combination was better than 0.5 arcseconds, exceptionally good for a ground-based telescope.

[3] They were discovered from South Africa by the English astronomer A. David Thackeray in 1950.

Courtesy: Science Daily

Accurate distance measurement resolves major astronomical mystery

Astronomers have resolved a major problem in their understanding of a class of stars that undergo regular outbursts, called dwarf novae, by accurately measuring the distance to SS Cygni. By NRAO, Socorro, New Mexico — Published: May 23, 2013

S ometimes astronomy is like real estate – what's important is location, location, location. Astronomers have resolved a major problem in their understanding of a class of stars that undergo regular outbursts by accurately measuring the distance to a famous example of the type.

The researchers used the National Science Foundation's Very Long Baseline Array (VLBA) and the European VLBI Network (EVN) to precisely locate one of the most observed variable-star systems in the sky – a double-star system called SS Cygni – at 370 light-years from Earth. This new distance measurement meant that an explanation for the system's regular outbursts that applies to similar pairs also applies to SS Cygni.

"This is one of the best-studied systems of its type, but according to our understanding of how these things work, it should not have been having outbursts. The new distance measurement brings it into line with the standard explanation," said James Miller-Jones of the Curtin University node of the International Centre for Radio Astronomy Research in Perth, Australia.

SS Cygni, in the constellation Cygnus the Swan, is a dense white dwarf star in a close orbit with a less massive red dwarf. The strong gravity of the white dwarf pulls material from its companion into a swirling disk surrounding the white dwarf. The two stars orbit each other in only about 6.6 hours. On an average of once every 49 days, a powerful outburst greatly brightens the system.

This type of system is called a dwarf nova, and, based on other examples, scientists proposed that the outbursts result from changes in the rate at which matter moves through the disk onto the white dwarf. At high rates of mass transfer from the red dwarf, the rotating disk remains stable, but when the rate is lower, the disk can become unstable and undergo an outburst. radio telescopes that work together as a single, extremely precise telescope. These systems are capable of the most accurate measurements of positions in the sky available in astronomy.

By observing SS Cygni when Earth is on opposite sides of its orbit around the Sun, astronomers can measure the subtle shift in the object's apparent position in the sky compared to the background of more-distant objects. This effect, called parallax, allows scientists to directly measure an object's distance by applying simple high school trigonometry.

The astronomers knew that SS Cygni emits radio waves during its outbursts, so they made their radio telescope observations after receiving reports from amateur astronomers that an outburst was underway. They observed the object during outbursts from 2010 to 2012.

The difference in the distance measurements between the Hubble visible light and the radio observations may have several causes, the scientists said. The radio observations were made against a background of objects far beyond our Milky Way Galaxy, while the Hubble observations used stars within our galaxy as reference points. The more distant objects provide a better, more stable reference, the astronomers pointed out. The radio observations, they added, are immune to other possible sources of error as well.

Discovered in 1896, SS Cygni is a popular object for amateur astronomers. According to the American Association of Variable Star Observers, not a single outburst of SS Cygni has been missed since its discovery. It has been observed nearly half a million times, and its brightness variations have been carefully tracked, making it one of the most intensely studied astronomical objects of the past century.

Courtesy: Astronomy .com

This mechanism seemed to work for all known dwarf novae except SS Cygni, based on previous distance estimates. Hubble Space Telescope measurements in 1999 and 2004 put SS Cygni at a distance of about 520 light-years.

"That was a problem. At that distance, SS Cygni would have been the brightest dwarf nova in the sky and should have had enough mass moving through its disk to remain stable without any outbursts," Miller-Jones said.

The closer distance measured with the radio telescopes means that the system is intrinsically less bright and now fits the characteristics outlined in the standard explanation for dwarf nova outbursts, the scientists said.

The astronomers made the new distance measurement using the VLBA and EVN, both of which use widely separated



Artist's conception of SS Cygni double-star system. "Normal" red-dwarf star, left, has material pulled from it onto swirling disk surrounding compact white-dwarf star, right. Outbursts occur when the disk becomes unstable. // Bill Saxton, NRAO/AUI/NSF

Forecast for Saturn's Moon Titan: Wild Weather Could Be Ahead

S aturn's moon Titan might be in for some wild weather as it heads into its spring and summer, if two new models are correct. Scientists think that as the seasons change in Titan's northern hemisphere, waves could ripple across the moon's hydrocarbon seas, and hurricanes could begin to swirl over these areas, too. The model predicting waves tries to explain data from the moon obtained so far by NASA's Cassini spacecraft. Both models help mission team members plan when and where to look for unusual atmospheric disturbances as Titan summer approaches.

"If you think being a weather forecaster on Earth is difficult, it can be even more challenging at Titan," said Scott Edgington, Cassini's deputy project scientist at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "We know there are weather processes similar to Earth's at work on this strange world, but differences arise due to the presence of unfamiliar liquids like methane. We can't wait for Cassini to tell us whether our forecasts are right as it continues its tour through Titan spring into the start of northern summer."



Ligeia Mare, shown in here in data obtained by NASA's Cassini spacecraft, is the second largest known body of liquid on Saturn's moon Titan. It is filled with liquid hydrocarbons, such as ethane and methane, and is one of the many seas and lakes that bejewel Titan's north polar region. Cassini has yet to observe waves on Ligeia Mare and will look again during its next encounter on May 23, 2013. (Credit: NASA/JPL-Caltech/ASI/Cornell)

Titan's north polar region, which is bejeweled with sprawling hydrocarbon seas and lakes, was dark when Cassini first arrived at the Saturn system in 2004. But sunlight has been creeping up Titan's northern hemisphere since August 2009, when the sun's light crossed the equatorial plane at equinox. Titan's seasons take about seven Earth years to change. By 2017, the end of Cassini's mission, Titan will be approaching northern solstice, the height of summer.

Given the wind-sculpted dunes Cassini has seen on Titan, scientists were baffled about why they hadn't yet seen winddriven waves on the lakes and seas. A team led by Alex Hayes, a member of Cassini's radar team who is based at Cornell University, Ithaca, N.Y., set out to look for how much wind would be required to generate waves. Their new model, just published in the journal *Icarus*, improves upon previous ones by simultaneously accounting for Titan's gravity; the viscosity and surface tension of the hydrocarbon liquid in the lakes; and the air-to-liquid density ratio.

"We now know that the wind speeds predicted during the times Cassini has observed Titan have been below the threshold necessary to generate waves," Hayes said. "What is exciting, however, is that the wind speeds predicted during northern spring and summer approach those necessary to generate wind waves in liquid ethane and/or methane. It may soon be possible to catch a wave in one of the solar system's most exotic locations."

The new model found that winds of 1 to 2 mph (2 to 3 kilometers per hour) are needed to generate waves on Titan lakes, a speed that has not yet been reached during Titan's currently calm period. But as Titan's northern hemisphere approaches spring and summer, other models predict the winds may increase to 2 mph (3 kilometers per hour) or faster. Depending on the composition of the lakes, winds of that speed could be enough to produce waves 0.5 foot (0.15 meter) high.

The other model about hurricanes, recently published in *Icarus*, predicts that the warming of the northern hemisphere could also bring hurricanes, also known as tropical cyclones. Tropical cyclones on Earth gain their energy from the build-up of heat from seawater evaporation and miniature versions have been seen over big lakes such as Lake Huron. The new modeling work, led by Tetsuya Tokano of the University of Cologne, Germany, shows that the same processes could be at work on Titan as well, except that it is methane rather than water that evaporates from the seas. The most likely season for these hurricanes would be Titan's northern summer solstice, when the sea surface gets warmer and the flow of the air near the surface becomes more turbulent. The humid air would swirl in a counterclockwise direction over the surface of one of the northern seas and increase the surface wind over the seas to possibly 45 mph (about 70 kilometers per hour).

"For these hurricanes to develop at Titan, there needs to be the right mix of hydrocarbons in these seas, and we still don't know their exact composition," Tokano said. "If we see hurricanes, that would be one good indicator that there is enough methane in these lakes to support this kind of activity. So far, scientists haven't yet been able to detect methane directly."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency, and the Italian Space Agency. The mission is managed by JPL for NASA's Science Mission Directorate, Washington. JPL is a division of the California Institute of Technology in Pasadena, Calif.

For more information about Cassini and its mission, visit: <u>http://www.nasa.gov/cassini</u> and <u>http://saturn.jpl.nasa.gov</u> .

Courtesy: ScienceDaily.com

Mars Rover Curiosity drills second rock target

The science team expects to use analysis of material from the rock called "Cumberland" to check findings from the first rock target. By Jet Propulsion Laboratory, Pasadena, California

NASA's Mars rover Curiosity has used the drill on its robotic arm to collect a powdered sample from the interior of a rock called "Cumberland."

Plans call for delivering portions of the sample in coming days to laboratory instruments inside the rover. This is only the second time that a sample has been collected from inside a rock on Mars. The first was Curiosity's drilling at a target called "John Klein" three months ago. Cumberland resembles John Klein and lies about 9 feet (2.75 meters) farther west. Both are within a shallow depression called "Yellowknife Bay."

The hole that Curiosity drilled into Cumberland on May 19 is about 0.6 inch (1.6 centimetres) in diameter and about 2.6 inches (6.6 centimetres) deep.

The science team expects to use analysis of material from Cumberland to check findings from John Klein. Preliminary findings from analysis of John Klein rock powder by Curiosity's on-board laboratory instruments indicate that the location long ago had environmental conditions favourable for microbial life. The favourable conditions included the key elemental ingredients for life, an energy gradient that could be exploited by microbes, and water that was not harshly acidic or briny.

NASA's Mars Science Laboratory Project is using Curiosity to assess the history of habitable environmental conditions inside Gale Crater. After a few more high-priority observations by the rover within and near Yellowknife Bay, the rover team plans to start Curiosity on a months-long trek to the base of a layered mound, called Mount Sharp, at the middle of the crater.



NASA's Mars rover Curiosity drilled into this rock target, "Cumberland," during the 279th Martian day, or sol, of the rover's work on Mars (May 19, 2013) and collected a powdered sample of material from the rock's interior. Analysis of the Cumberland sample using laboratory instruments inside Curiosity will check results from "John Klein," the first rock on Mars from which a sample was ever collected and analysed. The two rocks have similar appearance and lie about nine feet (2.75 meters) apart. // NASA/JPL-

Meade Instruments Corp. to be acquired by Jinghua Optics & Electronics

The telescope manufacturer will join Meade Europe and Explore Scientific as subsidiaries of the Chinese company. By Meade Instruments Corp. — Published: May 21, 2013

Meade Instruments Corp. (est. 1972), one of the world's largest designers and manufacturers of telescopes and accessories for amateur astronomers, and Jinghua Optics & Electronics Co., Ltd. (JOC) announced May 17 that Meade and JOC's wholly owned subsidiary, JOC North America LLC (JOCNA), and JOCNA's wholly owned merger subsidiary have signed a definitive merger agreement for JOCNA to acquire all of the outstanding shares of Meade for approximately \$4.5 million, or \$3.45 per share. The acquisition will be paid with cash and is expected to be completed by the end of July 2013, subject to shareholder approval.

JOC (est. 1997), with manufacturing facilities in Guangzhou and Kunming, China, is also the parent company of Explore Scientific, LLC (USA) and

Meade Instruments Europe GmbH & Co. KG (Germany). As a leader in Asia's optoelectronic field, JOC manufactures a full range of precision astronomical telescopes, binoculars, spotting scopes, digital microscopes, lens modules for digital cameras and mobile phones, digital night vision, laser rangefinders, and optical engines for micro projectors.

Meade Europe, which is also supporting the acquisition financially, was established in 1957. Meade Europe was a subsidiary of Meade Instruments Corp. from 1999 until 2009, when it was acquired by JOC, former owner Rolf Bresser, and its general manager, Helmut Ebbert. Meade Europe continued, and will continue, to be a distributor for Meade and Coronado products in much of Europe.

Founded in 2008, Explore Scientific began designing new telescopes and high-end eyepieces, including the world's widest apparent field eyepiece in its 120° Series Waterproof Eyepiece. In 2009, Explore Scientific became the exclusive distributor of

BRESSER products throughout the Americas.

Steve Murdock, CEO of Meade, remarked: "We believe that this transaction is in the best interests of our stockholders and that Meade's legacy will be in good hands going forward. We have a long relationship with both JOC and Meade Europe — Meade's former subsidiary and longstanding European distributor which Meade sold to JOC in January 2009 — as well as with Scott Roberts, currently president of Explore Scientific LLC [and] previously one of Meade's vice presidents until 2007. This is a very exciting time for Meade as we believe that the combined compa-

nies will be better equipped to deal with today's competitive consumer optics environment and will continue to provide customers with innovative products, cutting-edge technology, and outstanding

optical quality."

EAD

He Jian, JOC's CEO, remarked: "As a long-time supplier to Meade, we are honored that the board of directors has accepted our proposal. We believe this acquisition will give our family of companies even stronger capabilities and will allow us to expand our offering of research-quality astronomical optical products and the service required for a demanding clientele."

Helmut Ebbert, managing partner of Meade Europe, said: "We are very pleased with this engagement, and we believe this synergy will provide continuity and a promising future for the Meade brand worldwide."

"I am especially pleased with this global reunion with Meade. I believe it will give us a rare opportunity in our industry to combine the best of what all of our companies have to offer," stated Scott Roberts, president of Explore Scientific, which will manage operations of Meade after the acquisition.