

WHS AGM on 3 March 2018

CHAIRMAN'S REPORT FOR 2017

This is my second annual report as Chairman of the William Herschel Society. I am pleased to say that 2017 has seen some exciting new developments.

Our lecture programme continues to be well received, and wide ranging as the report at Annex A shows. We are broadening our approach to seeking speakers, rather than relying overmuch on linking up with academic visitors to the University of Bath. We have continued to be ready to add in additional lectures of interest that are offered to us – one example this year being the talk about Lexell that came about from an approach by a European cultural organisation to our President. Tony Symes continues to organise all this very efficiently.

Simon Holbeche has taken over the coordination of our observing arm, Bath Astronomers, and has applied himself to this role with great energy and success. He has initiated a wide range of new activities, including a series of practical observers' workshops, outreach visits to schools, a much expanded and more informative website, much more active social media presence, and a stronger link to our Society which has proved a successful recruiting tool. He has also been very active in devising and running children's workshops at BRLSI and elsewhere. More detail on the activities themselves is at Annex B

Dr Matthew Spring has proved a welcome addition to our committee. He has enabled us to be more systematic and informed when addressing musical aspects of the Herschels' lives. It was also helpful in promoting the collaboration between Bath Spa University and the Herschel Museum on the Jubilate Concert Series over the past year.

We have made very good progress on the establishment of the Caroline Herschel Prize Lectureship for promising female astronomers early in their careers. We now have an awarding committee chaired by Professor Carole Mundell; we have agreed criteria for the Lectureship; and we are currently exploring the possibility of collaborating with the RAS on practical aspects of taking it forward. Our new Vice-President, Professor Mike Edmunds, has been extremely helpful on all of this. We have also, thanks to the campaign launched by our member Joseph Heaven before last year's AGM, received a substantial donation from Dr Fran Bagenal of the University of Colorado to support us in this effort. We hope to award the first Prize Lectureship this year, though the timescale is tight.

In April we were approached by an environmental group in Freshford about the possibility of working together in promoting a dark skies initiative in Bath and its surrounds, for human health and wildlife benefits, as well as astronomical ones. This led to quite an intense period of activity for Simon Holbeche and me and our two environmental collaborators, culminating in a "Starlit Skies" conference at BRLSI in September, with quite broad participation, that agreed on a list of useful initiatives that could be pursued. The challenge is how to turn the ideas into practical actions. We are pursuing those ourselves as far as we can, but the real need is to find individuals with the right skills who can devote a reasonable chunk of their time to this cause. One key aspect of this is finding a successor to Michael Tabb as our local Commission for Dark Skies Representative.

Another unexpected initiative last year was a request by a small local dance company to support the development and performance of a dance piece based on the lives of William and Caroline Herschel. We provided some financial support, and introduced some of the performances. It proved an interesting way of telling their story in a new medium to a different audience.

The bi-annual Journal continues to provide well received lecture reports, other articles, and notices of our business under Francis Ring's editorship, with production managed by Fred Schlesinger.

Jim Foreman has managed the website and queries that arise there with great dedication, and continues to sustain our Facebook Group (with 36 members) and Twitter Feed (with 177 followers).

I am grateful to all our Committee Members for their contributions over the year.

We plan several changes in how we organise ourselves, but I will address them orally at the AGM itself under the Election of Office Holders item.

Charles Draper

Chairman

William Herschel Society

26 January 2018

Annex A

WHS Lecture report for 2017

In 2017 we managed our usual programme of lectures apart from December when we were unable to find a speaker, and April when Dr Claire Brock cancelled her talk on Mary Somerville. However we were able to put on an “extra” lecture in September, taking advantage of the visit of Dr Johan Stén from Finland.

Average attendance has been going up over the last four years, and we have outgrown the Duncan room (capacity 50). As a result we now nearly always book Elwin (capacity 100) even if we have to change the day from Friday on occasion. The average figures are:

2014: 40

2015: 41

2016: 56

2017: 57

Details of last year’s programme are as follows:

Understanding Cosmic Explosions: gamma-ray bursts and other violent phenomena in astrophysics

Date: Friday 6th January 2017.

Lecturer: Dr Hendrik van Eerten of the University of Bath.

Attendance: 68.

The brightest events in the universe are also the most violent. Massive stars explode at the end of their lifetime to produce a supernova blast wave, in some cases approaching the speed of light, giving rise to a burst of gamma rays that is detectable from across the universe. Similar blast waves can be triggered by collisions between neutron stars, or by stars venturing too close to the huge black hole at the centre of their galaxy. Stellar-sized black holes can collide and merge as well, causing an invisible shock that reverberates through the universe as a gravitational wave. All these phenomena pose their own fascinating challenges to the theoretical astronomer, and we try to use all means at our disposal, including numerical simulations on massive computer networks, in order to make sense of the underlying physics.

Mercury rising - measuring temperature through time (The Dick Phillips Memorial Lecture)

Friday 3rd February 2017.

Lecturer: Professor Graham Machin of the NPL.

Attendance: 36.

In the 18th Century a number of practical temperature scales emerged, denoted here as de facto temperature scales. At the time there was no real understanding as to the meaning of temperature and so measurements performed with these thermometers had no fundamental significance due to the arbitrary values assigned to the fixed points (e.g. the melting point of ice was assigned 100 °C and 0 °C at different times in the 18th Century).

In the middle of the 19th Century a more fundamental understanding of the meaning of temperature developed through the work of William Thompson (later Lord Kelvin) and others, including the concept of primary thermometry. Temperatures derived from primary thermometers, were unquestionably more fundamental than those derived from the earlier de facto temperature scales. However such temperature measurement was technically very demanding, and the growing needs of users for reliable thermometry (in for example industry) led, in the 20th Century, to the establishment of defined temperature scales. Defined scales are based on simple practical thermometers whose output is calibrated at discrete temperature fixed points whose thermodynamic temperatures had been determined a priori by primary thermometry. The first such scale was the International Temperature Scale of 1927 (ITS-27), and it was succeeded by the ITS-48, the IPTS-68 and the ITS-90, with the PLTS-20001 added in the year 2000 to cover temperatures from 0.9 mK to 1 K. This approach has allowed temperature scales to be established worldwide, which were relatively easy to realise and disseminate, and whose values are close to primary values. A brief outline of the earlier scales will be given, with more detailed attention given to the features of the current temperature scale the ITS-90.

In 2018 the international system of units (the SI) will be redefined in terms of fixed values of fundamental constants; for temperature this will be the Boltzmann constant. The redefinition will give new opportunities for practical primary thermometry. Initially primary thermometry will supplant defined scales at both high temperatures (above 1300 K) and low temperatures (below 10 K), due to lower uncertainties and through direct linkage to the new definition. It is possible that in the long term (2030s+) the kelvin may be completely realised by primary thermometry, potentially leading to the demise of defined temperature scales, with ITS-90 being the last defined scale.

The talk will be illustrated with a number of artefacts including water triple points, metal fixed points, platinum resistance thermometers and the NPL primary acoustic thermometer and demonstrations.

Black-hole Driven Explosions and the Dynamic Universe (Annual Lecture)

Friday 3rd March 2017.

Lecturer: Professor Carole Mundell of Bath University.

Attendance: 86.

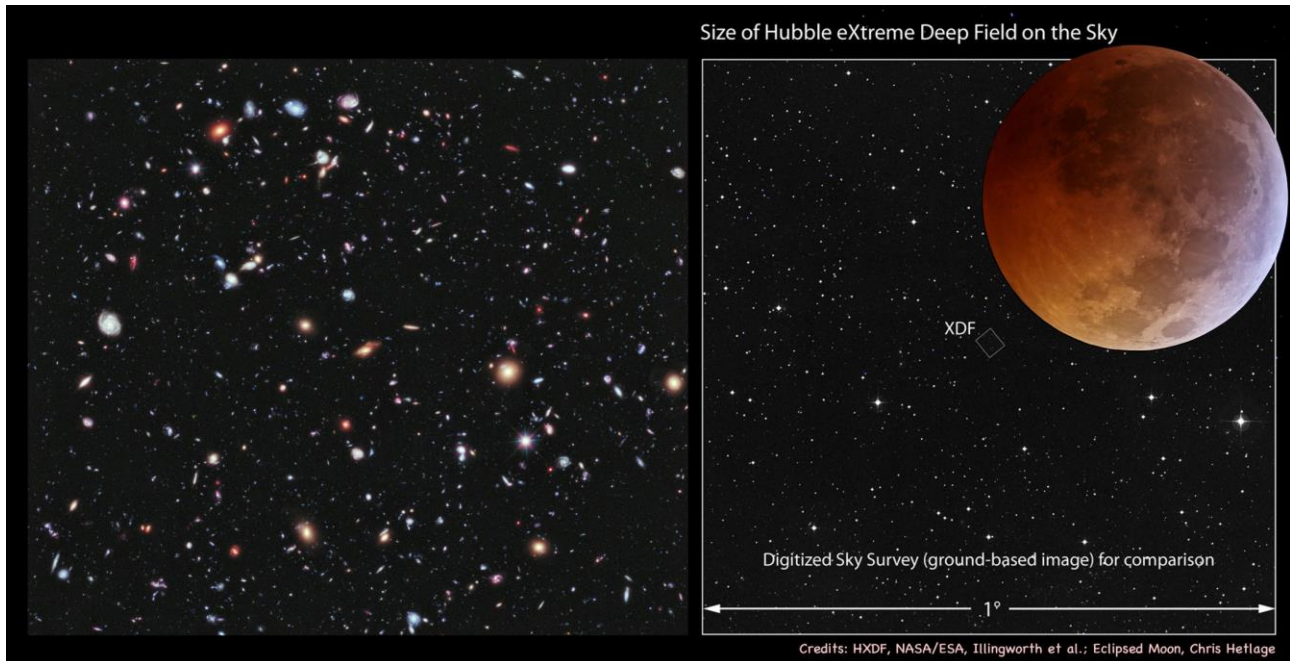
Predicted from Einstein's theory of General Relativity, black holes have been confirmed to exist in nature but questions regarding their origin and influence in the Universe remain at the forefront of modern astronomy. Professor Mundell will give a flavour of the kinds of black holes discovered, the impact they have on their environments and the revolution in our understanding that is expected in the coming decade as new ground- and space-based technology is developed that will open up new windows on energetic, transient phenomena in our dynamic Universe.

From Far to Near: Imaging the History of the Universe

Friday 1st September 2017.

Lecturer: Robert Fosbury of the European Southern Observatory (ESO).

Attendance: 74.



Light from the Moon travels to us in one and a quarter seconds. The image on the left is a composite of over 3000 exposures of a small patch of sky with two of the cameras carried on the NASA/ESA Hubble Space Telescope and obtained over a period of ten years. The total exposure time of over two million seconds results in an image which shows galaxies in the very young universe that emitted the light we detect now more than thirteen billion years ago. Hubble is a ‘time machine’ that allows us to see back to a time when the universe was only about 450 million years old with most of the chemical elements that constitute our Earth yet to be forged in future generations of stars.

In this talk, I will describe some of the tools and procedures we use to obtain the images of these extremely faint and distant objects with cameras on both space- and ground-based telescopes. These have revolutionised our view of the evolution of the universe from the time of the Big Bang nearly fourteen billion years ago. I will conclude with a short summary of how we are using the same telescopes to prepare for the search for life on earth-like planets orbiting other stars in our own galaxy, the Milky Way. The relevance of the lunar eclipse seen at the top right of the image with then become apparent!

Anders Johan Lexell (1740 - 1784). His contribution to the discovery of Uranus.

Friday 15th September 2017.

Lecturer: Dr Johan Stén of the University of Helsinki.

Attendance: 28.

Anders Johan Lexell was the first Finnish mathematical scientist of international renown. He made his name at the St. Petersburg Academy of Sciences in Russia as a close colleague of the great Swiss scientist Leonhard Euler.

In this lecture the speaker will present his life and work and focus on his contribution to the discovery of Uranus. Lexell was on his European Grand Tour passing through London and Oxford in 1781 when the discovery of a new celestial object was announced. Lexell started immediately to calculate its elements and found that the observations fitted a circular orbit better than a parabolic one. It took more than a year of new evidence to convince him that the orbit was really planetary. The development of his thought will be illustrated with citations from his correspondence.

'Skylark' Britain's First Space Rocket (Jointly with the BIS)

Thursday 5th October 2017.

Lecturer: Robin H Brand.

Attendance: 52.

These days, few have heard of the Skylark sounding rocket. Yet, in November 1957, it was the first British rocket to reach space, and became the basis of Britain's earliest space programme. Hundreds were fired, launching into space thousands of scientific instruments. Many of these carried out pioneering astronomical observations in the X-ray and UV spectrum, regions previously unavailable to British scientists.

This talk tells the story of that space rocket, from its origins in the 1950s, until its last launch in 2005. It is based on research for Robin Brand's book of a similar name (the first ever written on the full story of the Skylark), which was published in December 2014. The book includes many photographs from Australian archives never before published. Some of these, and rare video footage of Skylark launches, will be shown during the presentation. (Copies of the book will also be available for purchase on the evening).

The Intimate Universe (Jointly with Bath University)

Thursday 23rd November 2017.

Lecturer: Dr Marek Kukula of the Royal Observatory, Greenwich.

Our familiar surroundings are full of profound astronomical connections. Astronomy has left its mark on our minds from high art to popular culture, and even the smartphone in your pocket owes a debt to astrophysical research!

This lecture included a very stimulating description of some of the large scale processes in the Universe which have produced the materials out of which both we and our smart phones are made.

Annex B

BATH ASTRONOMERS ACTIVITY LOG 2017

WHEN	WHO/WHERE	WHAT
2 Jan	Dave, Peter, Roy, Tony and his daughter, Sandy, Charles, and Simon at Wellow	5 scopes out including 1 new 3" refractor, and 1 unpractised 12" Dob Newtonian. Lots of advice given. Some newish to astronomy so constellation identification kicked off the evening and was revisited throughout. Either the Quadrantids or Geminids were on show with some nice long trails. Uranus was a popular target especially as frost and dew were conspiring to hide fainter nebulae. M42 Orion Nebula was, as expected, jumping out of eyepieces. As too was M31 Andromeda and M45 Pleiades. However escaping the main stream, clusters M36, M37, M38, Beehive, Christmas Tree etc were viewed and Rosette, Crab etc nebulae. Despite best efforts, no sight of the Horsehead again. Early arrivals got to see Venus, crescent moon and Mars all in a line to the west before the trees engulfed them.
14 Jan	Simon at Young BRLSI	6 under twelves arrived for the 3 hour session entitled 'Planets Beyond'. The talk was based on the discovery of exoplanets over the last 20 years and the acceleration of discoveries in the last few years. The talk started with a Solar System refresher and then moved on to use the Faulkes Telescope to look for known exoplanet systems... and of course fail. An ideas session led to using eclipses to find planets and the building of a lego orrery and light flux measuring web cam per group to simulate exoplanet transits. Given this discovery, the Kepler mission was looked at and the groups looked at with www.planethunters.org to start classify exoplanets measured by Kepler. Deriving the properties of exoplanets and what types of new planets we can expect was discussed before looking at the habitable zone around these new systems. To wrap up, the groups presented their findings to the other young scientists.
26 Jan	Simon at Wellow and Jim Foreman	The evening was a bit of a long shot due to weather but both Simon and Sandy were up for making the most of the slot between the banks of clouds. At 8pm only a few glimpses of stars were visible through the cloud and so Jim got an introduction to the constellations of the night sky and how to find your way around. It took quite a bit of imagination as the clouds refused to ease up. The 8" Celestron did get some action on the Orion Nebula, the Pleiades and some double stars but by 9:30pm it looked like the cloud was set in and wouldn't budge so we called it an evening. It did clear later but by then all were having Ovaltine elsewhere.
5 Feb	Wellow planned event	Called off beforehand due to weather
13 Mar	Public Talk "What have the Astronomers ever done for us?" at the Raven on Quiet Street, Bath	A lecture/presentation as part of National Science Week to 40+ attendees in the Raven.
31 Mar	School/Public Stargazing Hugh Sexey Church of England Middle School	Supported public stargazing in playground for several hundred pupils and parents. Unfortunately targets were very limited and spent most of the time looking at the moon's terminator between banks of swirling cloud. Activity was organised by Space Detectives and the school.
1 Apr	Jonathan, Charles, and about 8 visitors at Wellow, from 8.	Dusk was still falling at 8, with a 3-day old moon, transparent skies, but also 50% cloud cover. Great views of the moon, and bright double stars (Castor, Mizar) as dusk descended, plus plenty of chat about telescope options. But the cloud cover increased to about 95%. Most departed by 9.30. Charles stayed on, and the skies got back to about 50% clear. This was good enough for a look at the bright Ursa Major galaxies (M51, M81, M82, even M101), and in Leo (M65, M66; M95, M96), M3, and a quick look at Jupiter. Charles packed up at 10.30, and 30 minutes later, back in Bath, it was 95% clear!

WHEN	WHO/WHERE	WHAT
22 Apr	Simon, Marjorie, Rachel, Steve and Francis at Wellow from 21:30	<p>A hugely successful Saturday evening under the stars with Bath Astronomers at Wellow last night.</p> <p>The sky clouded over soon after meeting up at 21:30 but even the poor weather forecast by metcheck.com suggested the high cloud would clear. To fill the time, we looked at the two new scopes brought to the evening, a 5" Newtonian on an equatorial mount and an 8" Dobsonian. Problems with focusing, mount alignment and navigating the sky were all openly chatted about. Hopefully Marjorie, Rachel, Steve and Francis who attended with Simon found it helpful.</p> <p>After almost an hour, the skies cleared and boy how they cleared. Gin clear. steady and stable. Jupiter leapt out so brightly that it not only wrecked night vision, it hurt your eyes. Strong equatorial banding in all scopes. Easy to find in the south and easy to enjoy with the motion of the four primary satellites as well as the disc itself. Graduating on from planets, using the the goto Celestron as a lead, we looked at planetary nebula M57 (goto only), Globular Cluster M13, Owl Nebula (goto only), double stars (Alcor/Mizar, Albeireo), spiral galaxies (Sombrero M104), Praesepe M44 Open Cluster and all the while the background of the Lyrid Meteor shower. If you snoozed, well you....lost out. The evening closed gone 1am so a small enjoyable marathon.</p>
13 May	Simon at Young BRLSI	<p>Eleven 8 to 10 year olds attended a session entitled Robotic Telescopes. Activities included telescope Top Trumps, measuring focal lengths, build cardboard tube telescopes and constructing a Lego Alt Azi refractor complete with remote control. Presentation at: https://prezi.com/51xdddllkrdr/brlsi-robotic-telescopes/ Five of the participants took part in the presentation to other groups as well.</p>
25 May	Observing at Wellow. 5 attendees	3 hours observing
17 June	Observing at Wellow. 4 attendees	2 hours observing
20 June	Outreach at Callicroft Primary School on Gravity	Years 5 and 6 received a talk on Gravity and its effect in the Universe. Included practical session drawing orbital ellipses.
23 June	Visions of Space 2, supporting Wells and Mendip	Helping Chris Starr out during 2 week exhibition in Wells.
20 July	Charles, Simon, Eliot, Stephen M, Francis K, Margaret, Jenna, Tony and James at Raven	Discussion on changes to Bath Astronomers and seek approval to proceed. All agreed to general principles.
15 Aug	Charles and Simon at White Sheet Hill	<p>Great conditions for an hour or so until the high cloud came in. Here is the observing list:</p> <p>Globulars – M3, M13, M15, M92 and M71, the much more distant cluster in Sagitta that looks more like an open cluster.</p> <p>The usual favourite summer nebulae – Ring, Veil, and, heading further south, the Eagle (M16), Swan (M17), and Lagoon (M8), but the last of these not at its best as Sagittarius never quite escaped the murk.</p> <p>Open clusters – just M11 (Wild Duck) and later on the Double cluster in Perseus</p> <p>Galaxies – M31 and its two main companions. M81, M82.</p> <p>Just one double star – 61 Cygni.</p> <p>And lots of Milky Way sweeping with Charles' new wide angle eyepieces. Typical Dob indulgence.</p>
19 Aug	Simon at New King Street Community Party	<p>Bath Astronomers stand just outside Herschel Museum on New King Street.</p> <p>Activities included Scavenger Hunt, 3D headset looking at the stars, building simple telescopes, making constellations with marshmallows and straws.</p>
8/9 Sept	Simon and Jenna with Wells and Mendip/Space Detectives at National Trust South West Outdoor Festival	<p>Public outreach organised by Space Detectives. Bath Astronomers supplied 50% of telescopes. First night was partially cloudy but 20 or so public attended. Second night was clear and 30 to 40 public attended. Saturn was main target. Also viewed M31, M57, Albeireo and the Moon. Moon was 75% illuminated. Kit:</p> <p>Celestron 8" GT</p> <p>Celestron 9.25" AVX</p> <p>Meade 80mm refractor</p> <p>Binoculars 15x70 on tripod</p>
16 th Sept	Beginner's Workshop: Navigating the Sky at BRLSI	30+ attendees including Charles Draper, Stephen MacGillivray and Simon Holbeche speaking

WHEN	WHO/WHERE	WHAT
21 Sept	Wellow observing night with Margaret, Deepali, Jenna, David, Steve, Stephen, Charles and Simon from 21:00 until 01:30	<p>The high humidity and recently wet ground meant that dewing was a risk for all the optical equipment exposed. The Celestion SCT soldiered on until 23:30 when even the dew shield submitted and the corrector plate fogged over. The Dobsonian was made of tougher stuff and finished the night.</p> <p>This was a first observing evening for several members and so learning constellations and use of binoculars was the primary activity. As there was a little coming and going and we operated over two scopes, not all seen every object but the full list is here for reference:</p> <ul style="list-style-type: none"> • M13 globular cluster in Hercules • M92 globular cluster in Hercules • Almach double star in Andromeda • M31 Andromeda /M32/M110 galaxies in Andromeda • M81/M82 galaxies in Ursa Major • M108 galaxy in Ursa Major • Veil Nebula (supernova remnant) in Cygnus • Albireo double star in Cygnus • 61 Cygni double star • M27 Dumb Bell Nebula • Double Cluster in Perseus • M37 Open Cluster • M1 (Crab Nebula) • Failed to get M97 (due to Sun/Bath glow) • M101 galaxy (faint due to Sun/Bath glow) • Mizar/Alcor double in Ursa Major • M57 Ring Nebula in Lyra • Failed to get C/2017 O1 comet • Pleiades in Taurus • Hyades in Taurus • Epsilon Lyrae double star • Saturn • Uranus • Neptune
10 th Oct	Simon at Callicroft Primary Academy	Two 1 st Year classes taken through Journey to Mars. Included a presentation, using a telescope and VR.
21 st Oct	Simon at Exmoor Dark Skies event near Wheddon Cross	Supplied only scopes at public observing event. Weather poor. Space Detectives kept visitors engaged.
11 th Nov	Simon at Young BRLSI	Sculpted by Gravity. 8 attendees
12 th Nov	Wellow observing night with Deepali, Jenna, Alex and Tony from 19:30 until 01:30	Cold night with Jenna and Alex seeking to master the secondhand 10" Newtonian she acquired. Tony brought his Dob and was seeking most of the objects of the evening. Simon's goto wasn't set up well and so was unreliable. It was reset but frost covered the corrector plate within 2 hours. Added borrowed sightscope to Jenna's Newt and added Canon body on T-adaptor to get Jenna into astrophotography. Targets included M1, M42 and the Moon approaching last quarter.
16 th Nov	Beginner's Workshop: Using telescopes at BRLSI	12 attendees including Tony Symes, Francis King and Simon Holbeche speaking on how telescopes work, different types and how to set them up.
22 nd Nov	Simon at Heywood Prep in Corsham	A talk to 30 of the pupils at Heywood Prop on the skies above and whether our Solar System is an oddball or not.
25 th Nov	White Sheet Hill observing with Jenna, Stephen and Simon	Session with bright moon to introduce people to White Sheet Hill and to practice using new telescopes
14 th Dec	Beginner's Workshop: Using telescopes at BRLSI	Rerun of the original workshop for those that could not attend the first time. 3 attendees.