# Federation of Astronomical Societies

**Editor: Michael Bryce**
*Member of Carolian Astronomy Society (Kidderminster)*
*Member of Bromsgrove Astronomical Society*

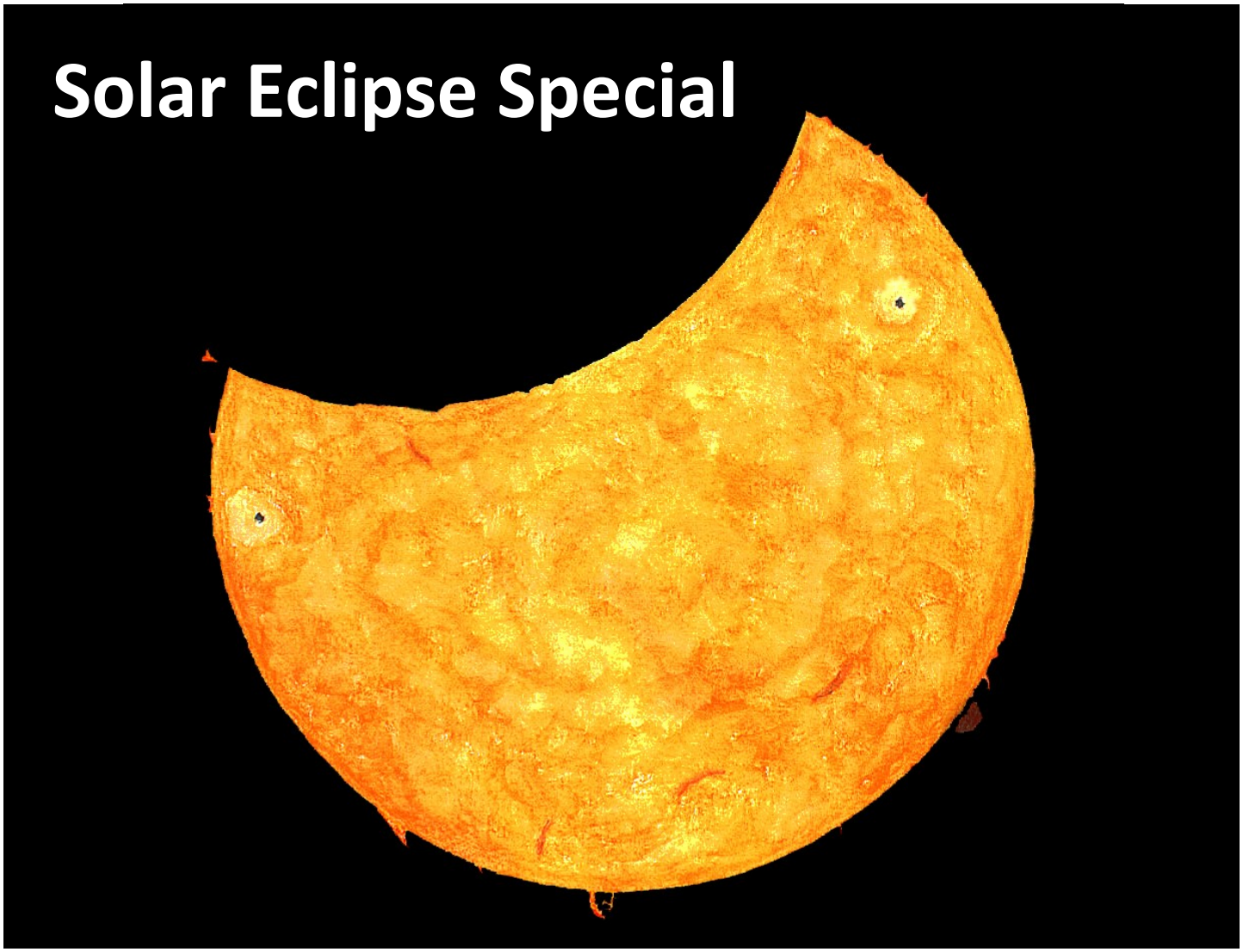
# Newsletter

www.fedastro.org.uk

**No 129: December 2022**

***Note**: The FAS Council Reserves the Right to publish articles, events and reports submitted to the FAS Newsletter*

## Solar Eclipse Special



Sketch rendered in Derwent Inktense pencils from notes and diagrams jotted at the eyepiece (60mm Solarscope manufactured on the Isle of Man). Plage areas around the sunspots are indicative only and features around the lunar limb have been slightly enhanced in scale (sketch is reversed from eyepiece view).

**Steve Warbis, Macclesfield Astronomical Society**

***President***
**Dr Paul A Daniels**
***Rose Hill***
**High Green, Bradenham**
**Thetford, Norfolk**
**IP25 7RD**
*president@fedastro.org.uk*
*07802 324 697*

***Treasurer***
**Pat McEvoy**
**17 Severn Close**
**Paulsgrove**
**Portsmouth**
**PO6 4BB**
*treasurer@fedastro.org.uk*

***Secretary***
**Richard Stebbing**
**01372 750 644**
*secretary@fedastro.org.uk*

***Newsletter Editor***
**Michael Bryce**
***49 Cortland Way***
***Stourport-on-Severn***
***Worcestershire***
***DY13 8NZ***
*newsletter@fedastro.org.uk*
*07821 896 304*

# President's Spot: Dr Paul A. Daniels FRAS

There's quite a bit to report this time so I'll have to leave whimsical astronomical musings for another time…

As you may recall we had the FAS AGM on 23 October 2022 and I'm pleased to say that this year we had no problems over quoracy. After the usual run-through on what the FAS has done over the past year, the state of our accounts and voting to accept the auditors recommended by Council, there were two main items of business: the proposed new FAS constitution and the proposed Graham Bryant Memorial Prize. Following this we had the 2022/23 Council elections and a very useful general discussion.

The proposed constitution and memorial prize details had been circulated to members a few days prior to 25 September to give members an opportunity to provide comments or suggestions on the proposals before the AGM and allow us to 'fix' anything we'd overlooked beforehand. A couple of suggestions were adopted and incorporated into the final documents that were sent out in the 'AGM document pack' on 25 September.

On the day of the AGM the proposed new constitution was put to a vote and accepted without any further changes and the principle of organising a memorial prize in honour of our late Vice -President, Graham Bryant, along the general lines of that proposed was also accepted.

Thanks were given to the 2021/22 Council members for their service over the previous year and the election of the Council members for 2022/23 took place with all those standing being elected unopposed. The Membership Secretary and PLI Officer posts (both previously held by William Bottaci) were merged into a single post again held by William Bottaci and the Publicity and Meetings Organiser posts (both previously held by Jerry Stone) were merged into a single post again held by Jerry Stone; the only Council post left vacant was for the post of International Liaison.

We welcome Clare Lauwerys as the new FAS Vice-President and I'm sure her experience will be invaluable to the Council.

At the 2021 AGM the International Liaison position was filled by Prof Robert Walsh (UCLAN and the UK's IAU National Outreach Coordinator) but Robert unfortunately had to step back from his IAU and FAS positions shortly after the AGM due to ill-health. It was hoped that the new IAU NOC for the UK, Prof Paul Roche (Cardiff University), would stand for election to the post but Paul wasn't able to confirm that he'd be willing to take on the role until *after* the AGM at which time Council agreed by email to appoint Paul to the post to fill the vacancy (5.8(g) in the constitution). This decision was formally ratified at the start of the Council meeting held on 6 November. Paul has some great experience and will be a valuable addition to the Council not only because of his International Liaison role but also his extensive Outreach experience.

There was agreement and good support for the Graham Bryant Memorial Prize and this will proceed under the guidance of our new Vice President, Clare Lauwerys. At the 6 November Council meeting both Clare and Paul spotted some problems with the details of the arrangements for the Junior part of the competition – we'll report back to you on any changes made before we get it going later this year.

In the discussion after the main business of the meeting it became clear that many of you would like some help from the FAS in evolving ways to encourage young people to become involved in astronomy. This has been taken on as a clear 'steer' from our members and will be a major area of Council discussions and action in the year ahead.

Some of you may have attended the FAS *Women in Astronomy* convention in Oxford on 12 November. It was well attended with four great speakers.

The day was opened by our keynote speaker, Prof Dame Jocelyn Bell Burnell, who gave a great talk on her struggles against

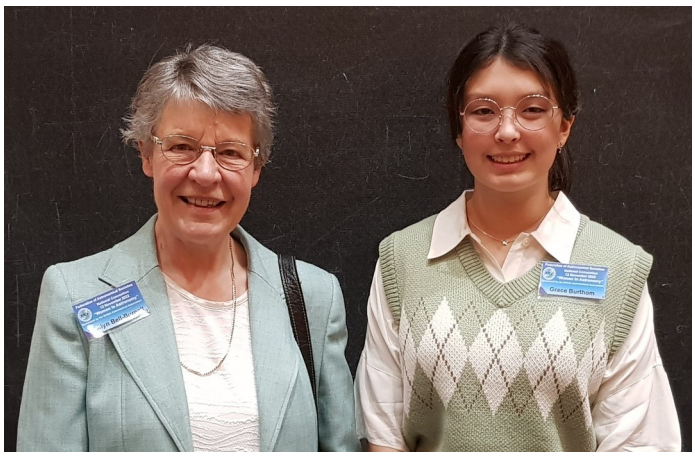


***Image Above**: Grace Burthom with Prof Dame Jocelyn Bell Burnell at the FAS Convention.*

establishment prejudice against women in science and, despite that, her discovery of pulsars. Dame Jocelyn was followed by fifteen year-old Grace Burthom who gave a confident and an inspiring talk on how she became interested in astronomy and what she hoped to be doing in the future.

Opening the afternoon's talks was Mary McIntyre who took us through a catalogue of history's women astronomers and highlighted some of the problems that they'd faced. Mary was followed by Vanessa Okafor, who gave us a reprise of her life in Africa, her struggles to gain a foothold as a young, black woman and her current research at the University of Warwick. Vanessa is one of the early recipients of funding from the 'Bell Burnell Graduate Scholarship Fund' set up by Dame Jocelyn with the aim of supporting those from a disadvantaged background.

It was a very worthwhile and interesting day and some highlights of the talks will be made available on YouTube. Many thanks go to the speakers for their talks, to the BAA for their sponsorship, to Prof Ian Shipsey, Head of the Department of Physics in Oxford, for letting us use their lecture theatre, to Helen Smith and Pam Trigg for their help on the day and also, of course, to Jerry Stone for organising the day so well.

Stay safe and clear skies!

**Paul**

**PS: Mr Darcy woofs 'Hi'!**

# Hertford Astronomy Group

## Meetings Programme

### Wed 14 Dec at 8pm: Live and on Zoom

***"The Last Men on the Moon - For Now" by Jerry Stone FBIS FRAS***

December will see the 50th anniversary of Apollo 17 - the final Moon landing in the Apollo program.

Apollo was kicked off as a response to the space achievements of the Russians, and triumphed with the landing of Neil Armstrong and Edwin Aldrin on Apollo 11 in July 1969. Six other missions followed, though Apollo 13 had a dramatic return to Earth following an on-board failure.

Later missions included an electric rover which allowed the astronauts to cover huge distances in their exploration, which would have taken robotic explorers many, many months to cover. Their achievements are still being examined today ...

Jerry is a Freelance Space Presenter and a recognised expert on the Apollo program. He wrote a book, called "One Small Step" to mark the 40th anniversary of the first flights to the Moon, and since October 2018 he has been giving a series of presentations at the British Interplanetary Society to mark the 50th anniversary of each one of the missions.

This highly visual presentation which includes contemporary images and video completes the series with a look back at the last men to walk on the Moon - so far.

**Visitors can attend HAG meetings for just £2 - Under-18s and full-time students are FREE!**

Visit the society website at **http://www.hertsastro.org.uk** to book your place, either it's in-person or online.

The Lindop Building, University of Hertfordshire, College Lane, Hatfield AL10 9AA. Doors open 7:30pm.

### Wed 11 Jan at 8pm: Live and on Zoom

***Astronomy Students from the University of Hertfordshire***

Emphasising our link with the University, each year we invite some of their astronomy students to talk about their studies and research.

We also hope to have someone talk about the university's observatory at Bayfordbury, near Hertford.

The university holds open evenings at Bayfordbury at which the society has a display and gives advice to visitors.

The next is on Friday, 2 December, from 17:30. Register at **https://www.herts.ac.uk/bayfordbury/bayfordbury-observatory/visit-bayfordbury-observatory/public-open-evenings**

### Wed 8 Feb at 8pm: Live and on Zoom

***"Paradise Planet Earth: a Human Responsibility" by Francisco Diego***

"'and the Universe begins to ring and resound - it is no longer human voices. It is planets and suns revolving in their orbits" Gustav Mahler on his 8th Symphony

Dr Francisco Diego worked for several years at the Instituto de Astronomia, UNAM and then came to University College London where he earned a PhD in Astronomy. Currently, he is a Senior Teaching Fellow at the Department of Physics and Astronomy, UCL, vice president of the UK Association for Astronomy Education and a fellow of the Royal Astronomical Society. He is a keen populariser of natural sciences and extensive experience as a planetarium producer/presenter, lecturer, author and broadcaster.

### Wed 8 Mar at 8pm: Live and on Zoom

***"The study of protoplanetary discs in the 2020s" by Cathie Clark***

Cathie Clarke was the first to demonstrate how protoplanetary disc formation around low-mass young stars is determined by their radiation field. This removes material from the disc and is basic for various models of planet formation.

Cathie Clarke is a Professor of Astronomy at the University of Cambridge and a fellow of Clare College, Cambridge. In 2017 she became the first woman to be awarded the Eddington Medal by the Royal Astronomical Society. In 2022 she became the first female director of the Institute of Astronomy, Cambridge.

**hertsastro.org.uk**

# Mid-Kent Astronomical Society

## Meetings Programme

**Meetings at Bredhurst Village Hall. Hurstwood Rd, Bredhurst, Gillingham ME7 3JZ. From 8:00 pm.**

### 13 January

**Peter Bassett (MKAS) The use of Image Intensifiers in Astrophotography**

### 27 January

**Prof. Jonathan Tennyson FRS (former Head of Physics and Astronomy, UCL) Water in the Universe**

**midkentastro.org.uk**

# The FAS 2022 Convention

## "Women in Astronomy", held at the University of Oxford

### Arranged by the FAS Meetings Organiser & Publicity Officer, Jerry Stone

Following our on-line convention in April 2021 we held an in-person convention last November at the National Space Centre in Leicester. Our 2022 convention was held on Saturday, 12 November and was another opportunity for members of FAS societies as well as members of the public interested in astronomy to gather together.

This time the event theme was "Women in Astronomy" and so the first person approached to be our keynote speaker was Dame Jocelyn Bell Burnell, who discovered the first pulsars as a student back in 1967. We were delighted that she accepted our invitation, and as she is based at the University of Oxford, that's where the event was held.

In this respect we must acknowledge the generous offer by Professor Ian Shipsey, Head of the Department of Physics, who offered us the use of the Martin Wood Lecture Theatre at no charge. In addition, Helen Smith, who is Prof Shipsey's Executive Assistant, gave her time for free. This involved meeting me for a site visit in July, as well as a number of on-line meetings to arrange to details of the event, helping transport the shopping for the event lunch from the supermarket, and then, with her colleague Pam Trigg, preparing the lunch for the day. As things turned out, Paul was the only other member of Council able to be at the event, so their assistance was absolutely vital, and we expressed our thanks at the end of the event, with "Thank you" cards and flowers".

We were very pleased to have the British Astronomical Association act as a sponsor, as they did last year. They also had a sales table, as did Dave Eagle, of www.star-gazing.co.uk. Such support is vital to the success of our events. For future events, local societies should note that they can have displays at no charge to attract potential new members.

A major aim of the conventions is not to hold them at the same venue each time, but to use various locations around the UK so that there will be members of local societies who can attend without having to travel across half the country.

In addition, to encourage attendance, the in-person conventions are not live-streamed. Jerry took some video which it is hoped will be made available in due course, but for the best experience, you needed to be at the event.

A new item at the convention was the pop-up banner designed by Jerry, which we will be able to use at other events in the future.

Jocelyn's presentation was entitled "The discovery of pulsars - A graduate student's tale" and began with her background, mentioning that she failed her 11-plus exam, though next term she came top in science, ahead of those who had passed the exam.

It turned out that this was typical of how she was initially treated as a female student in science, which we learned later was something that many women encountered over the years.

She applied to Cambridge University where she studied radio-astronomy, in particular the aim was to gain more knowledge of quasars, which had been recently discovered. This involved spending 3 years helping to construct the main large-scale radio-telescope at the Mullard Radio-Telescope Observatory outside Cambridge which covered 4 acres! Her work then involved checking the printed chart recordings produced by the instrument. On November 28, 1967, she finally got round to checking some output from August and noticed "a bit of scruff" in the pen recording. Further recordings made with the paper running at higher speed showed that it was a rapidly repeating signal, and it was Anthony Michaelis, the science correspondent of the Daily telegraph, who suggested the name "pulsar".

Jocelyn then explained how pulsars were nearly discovered by others, particular by women whose eyesight was such that they can naturally see pulses at the typical rate of these objects.

The rest of Jocelyn's talk, and the Q&A that followed, was equally fascinating, and we decided that we were very fortunate to have had her presenting to us.

FAS President Paul Daniels recommended Grace Burthom as one of our other speakers. She is a Year 11 secondary school student who loves space. She is a space ambassador for the remote telescope company "Slooh" and has given presentations for the Institute of Physics.

As someone at the relatively early stage of her astronomy experience, her presentation was an interesting contrast to that of Jocelyn's lifetime of astronomy.

Despite her young age, she gave a confident and inspiring presentation.

Lunch was served in the cafe area, with a range of sandwiches, snacks, fruit and drinks. We had arranged for the break to give enough time for groups to visit either the Natural history Museum, which was next door, or the Museum of the History of Science, a short walk away.

We were very grateful that both venues had agreed for groups of up to 30 people to visit on a Saturday, and at no charge.

The Natural History Museum had very recently completed a major upgrade which had been taking place since the summer, so this was an excellent opportunity for a visit, especially as they also offered a guide to give an introduction at the start of the visit.

The afternoon's programme began with Mary McIntyre, who is an Oxfordshire-based amateur astronomer and astrophotographer with a life-long interest in astronomy.

Her presentation looked at women in astronomy in the past. The subject is extremely male-oriented, and many people may be surprised at how many women have actually been involved in astronomy in the past. Mary's presentation gave us a lot of information, much of which would have been unexpected by many of the audience.

Originally, our final speaker was going to carry on the history of women in astronomy from Caroline Herschel onwards. Unfortunately I was informed just 2 weeks before the event that

she would not be able to take part, so I had to find an alternative speaker at very short notice.

In 2018, Jocelyn was awarded the Special Breakthrough Prize in Fundamental Physics, and decided to use the £2.3 million fund to establish the Bell Burnell Graduate Scholarship Fund, to help female, minority and refugee students become physics researchers. I was delighted to be able to book one of the 2021 group of awardees, Vanessa Emaka-Okafor, based quite locally at Warwick University.

Vanessa explores exoplanets, analysing their atmospheric composition and characteristics. Finding exoplanets is one thing, but to be able to learn about their atmospheres is quite a remarkable advance. Vanessa believes that the possibility of finding the signatures of life on an Earth-like world would be one of the biggest breakthroughs of our lifetime.

She described her work and how this has been possible as a result of being a Bell Burnell scholar.

Each of the speakers was given a "Thank You" card, and Jerry also designed and printed a certificate of appreciation for them.

All in all, the programme was very well received, with a number of people saying how much they enjoyed the day.

As a finale, Jerry looked forward to potential future conventions. In particular, 2024 will mark the 50th anniversary of the FAS, and he plans to hold two events; one at the institute of Astronomy and the other at the Royal Greenwich Observatory. One of these would take place on Saturday, 11 May, which will be the exact anniversary of our first meeting; the other will be in the Autumn. More information will be announced regarding these events in due course.

He also showed a map of the UK, with several other potential locations for other conventions to take place between now and 2030 … Details for the 2023 convention will be announced in the Spring.

**Jerry Stone**

***Image Above**: The convention speakers: Vanessa, Mary, Jocelyn and Grace. Photo by Jerry Stone*

***Image Above**: Grace being introduced by Paul Daniels. Photo by Jerry Stone*

***Image Left**: Grace and Jerry during her Q&A session. Photo by Paul Daniels.*

***Image Right**: Vanessa, Grace and Mary taking part in the Q&A panel. Photo by Jerry Stone*

# Solar Eclipse Special

**Welcome to our Solar Eclipse Special. On the following pages you will see reports from various societies and individuals of the Partial Solar Eclipse of 25 October 2022. We have had reports from societies in England, Wales, Scotland, and the Isle of Man.**

**The image on the front cover page was submitted by Steve Warbis of the Macclesfield Astronomical Society. Roger Hyman from Sparkford in Somerset sent the image below.**

**Roger Hyman**: This image was captured using the following equipment:

Mount: iOptron SkyGuider Pro tracker on a Manfrotto 055 carbon fibre tripod

**Telescope**: William Optics GT71 - 420 mm focal length.

**Covering filter**: Baader Solar Film

**Camera**: Player One Saturn – C SQR (Sony IMX533 chip)

**Solar Filter**: Altair Solar Contrast Filter 8mn (Continuum)

The skies proved to be a challenge with cloud coming across the Sun continuously and exposures adjusted to get the progression of the partial eclipse.

I took a photo every 20 seconds from 9:09 am – 10:46 am UT. I did manage to get the passage almost completely but got the crucial maximum of the partial eclipse. Some sunspots were visible during this time.

**Roger is a member of Bath Astronomers and Havering Astronomical Society.**

**bathastronomers.org.uk**

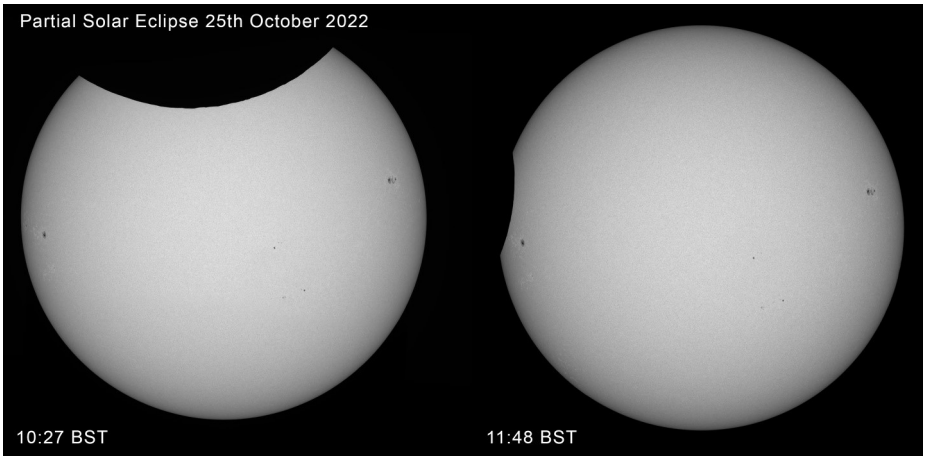
**havastro.co.uk**

# Aberdeen Astronomical Society

Members of the Aberdeen Astronomical Society observed the eclipse from my backyard observatory near Stonehaven. The sky was clear for the first. 25 minutes before thick cloud obscured the view. The cloud eventually cleared 90 minutes later to see the last few minutes.

Observations were made in white light with a Skywatcher Esprit 120 mm refractor and a Baader ceramic Herschel wedge. Images were taken with a ZWO ASI174MM camera.

We also had a Coronado PST Ha scope and the solar disk showed excellent contrast and a number of large prominences. Unfortunately we were unable to get any pictures with this equipment.




**Neal Weston - Secretary,**
**Aberdeen Astronomical Society**

**aberdeenastro.org.uk**

# Hertford Astronomy Group

## Public Eclipse Watch

On the morning of Tuesday, 25 October there was a partial solar eclipse. As with similar events, the Hertford Astronomy Group held a Public Eclipse Watch as part of our outreach programme. We arranged with the local Council to be able to set up near the centre of Welwyn Garden City, where we could invite members of the public to come along to watch the event for free, using a range of specialist equipment.

We had a SolarScope projector, in which the Sun shone down the front tube and the image is reflected off a convex mirror to the inside of the unit and displayed against a white screen. An advantage of this is that a number of people can view the image at the same time.

As an extra, with the image aligned against a line on the screen, within just 2 minutes, the image will have moved from one side of the line to the other, due to the Earth rotating.

As the Sun's apparent diameter is ½º, it would take 4 minutes for the Earth to rotate 1º. That means 15º would take 60 minutes - 1 hour - and 360º would take 24 hours.

That means you have timed the rotation of the Earth by just watching this image for 2 minutes!

We also had a Meade ETX-90 with a white-light solar filter, and 3 hydrogen-alpha telescopes, including a Coronado PST and a couple of Lunt refractors.

At the other end of the scale, Publicity Officer Jerry Stone, who arranged the event, had made a pinhole camera the previous day, and the small image it produced was clear enough to see that the Sun di not show a full disk.

We also set up our gazebo, and our set of display boards which feature information about the society and its activities.

Despite the amount of cloud, we were able to see the eclipse on and off throughout the two-hour duration, and our visitors said how they appreciated the opportunity we offered for them to view this rare astronomical event.


***Image Above**: HAG Gazebo and display boards. Photo by Jerry Stone*

***Image Above**: SolarScope. Photo by Jerry Stone*

***Above**: Projecting multiple eclipse images using a colander. Photo by Jerry Stone*

***Image Right**: Steve Heliczer and Lunt H-Alpha scope*

***Image Below**: High-resolution H-Alpha image of the eclipse. Photo by Steve Heliczer*

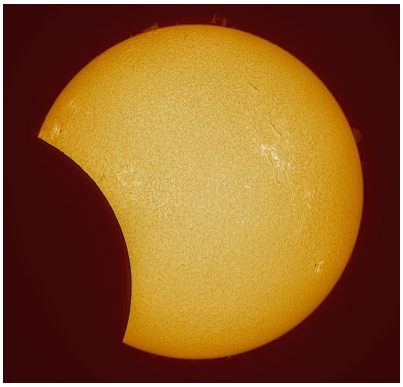


***Image Below**: Richard and visitors with Lunt H-alpha scope. Photo by Jerry Stone*

## Wolverhampton Astronomical Society

# Partial Solar Eclipse Event – 25 October 2022

### By Doug Bickley, Society Treasurer

Whilst astronomers aren't afraid of the dark it's lovely sometimes to get together during the day for an event and a chinwag with other members. This partial eclipse, even though the obscuration was only about 15%, seemed a good opportunity, so we arranged a meeting at our observatory. This was combined with induction training and reminders for the observatory pod plus a bit of ground clearance.

First contact would be at 10:07, maximum eclipse at 10:57 and the Moon would leave the edge of the Sun at 11:48, so we met between just after 9am to get everyone in and set up. The last partial eclipse event in June 2021 attracted 14 members and so did this one, not all the same people however! Cloud cover was forecast to spoil our observations, but it was a dry morning. When we got there we had clear skies and Steve Wootton proudly said "there we are, I've arranged the weather for you". Tempting fate – by 10am there were heavyish clouds lasting on and off until just before midday, the end of the eclipse, and then we had blue skies again. Typical.

However despite the poor seeing conditions it wasn't 100% cloudy all the time and there were plenty of gaps at which point someone might shout "eclipse alert" and we'd stop our chats to see the latest views. For the imagers among us most had Baader solar filters, but when the cloud was fairly thick the sun was still visible and we could use these as a natural filter – ok if you know what you are doing folks.

There was quite a variety of equipment in use and we could move around and see how everyone was doing. This is one of the great things about a group event, there's no "best way" to do things and we all learn from each other.

*Neil Willis wasn't imaging but had a large dob with a Baader film filter fitted. We all agreed that the views through this were excellent, the sun filling the field of view and sunspots very apparent. He also had a very comfortable chair, a good thing while you are waiting patiently for something to happen.*

More images on next page.

**wolvas.org.uk**


*Duncan Willis got this fantastic clear shot with sunspots very evident using his Canon 70D on a tripod with a 600mm zoom and a 1.4 teleconverter, what a beast. (the camera not Duncan!)*

*Linda Manas brought her SunSpotter solar viewer which projected the image of the Sun onto a white surface, and managed to get this excellent shot with her iPad when the sun broke through cloud cover.*

*Steve Wootton was taking stills and also had the Society solar telescope a Coronado PST set up near the pod and this was giving excellent views of some large prominences. Some members had not seen these live before. Steve also took a couple of short videos using his DSLR only showing the clouds moving across the Sun.*

*The author was using a Canon 800D with 300mm lens handheld without a tripod but 1/2000 sec shutter speed to minimise camera shake and got this image at maximum obscuration with sunspots again visible.*

*All in all despite the adverse weather conditions a successful event, the scenery was as usual wonderful, close to our setup was a fantastic fairy ring about 15ft across and nearby the squirrels had been busy with fallen conkers. Good to see people in the flesh again.*

# Loughton Astronomical Society

The Loughton Astronomical Society is the home of all things astronomical in West Essex. Guests are always welcome, just drop in to one of our Thursday meetings. Our programme and contact details are available at https://las-astro.org.uk/

Our activities over the summer included several very successful outreach sessions at local fetes and events. Safe solar observing was very successful with white light, projection and Hα telescopes, allowing viewers to see the increasing activity of this solar cycle.

With the start of the Autumn school term we have completed a couple of evenings at a local school, exploring the solar system, gravity and giving 110 children with their parents views of Saturn, Jupiter and the Moon.

More recently we were able to show the partial solar eclipse to passers-by in our "home" village, Theydon Bois. We were lucky to be blessed with a clear sky from before 1st contact to well after maximum. Since it was half term, many of our "AstroKyds" (junior section) turned up to view the eclipse.

**Brian Morton Secretary, Loughton Astronomical Society**


# Leeds AS and Cleethorpes and District AS

As seen from outside my kitchen door at c. 1100 hrs on Oct 25th. Brinkhill, Lincolnshire. 70-300mm zoom lens @ c. 250mm zoom.

The clouds did the filtering - the camera lens was fully stopped down @ f32; shutter speed 1/4000th; ISO 100; and -5 stops on exposure adjustment !

**Raymond Emery, Leeds A.S. & Cleethorpes & District A.S.**

I like the inclusion of the TV Aerial in the image. (Ed).

# Redditch Astronomical Society

Redditch Worcestershire, Lat 52° 19' 12" N, long 1° 54' 18" W

Time: 0943 UTC, so pretty close to the maximum eclipse.

Equipment: Mount: Sky-Watcher HEQ5-Pro

Telescope: Lunt LS50 H-alpha Solar Telescope

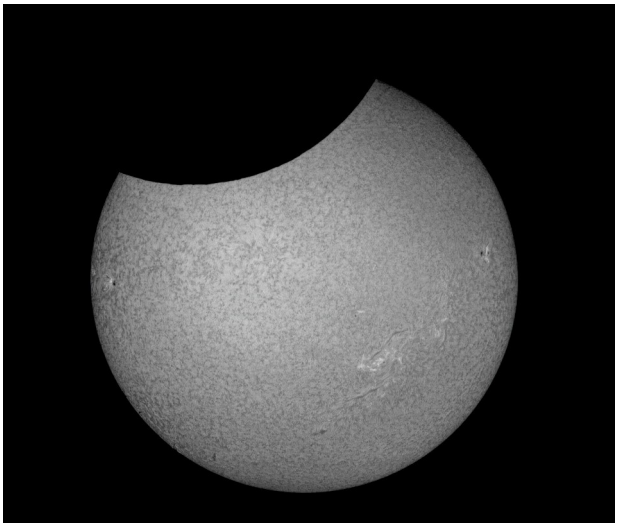
Camera: ZWO ASI178mm-cool (i.e. monochrome)

Image capture: Software: SharpCap

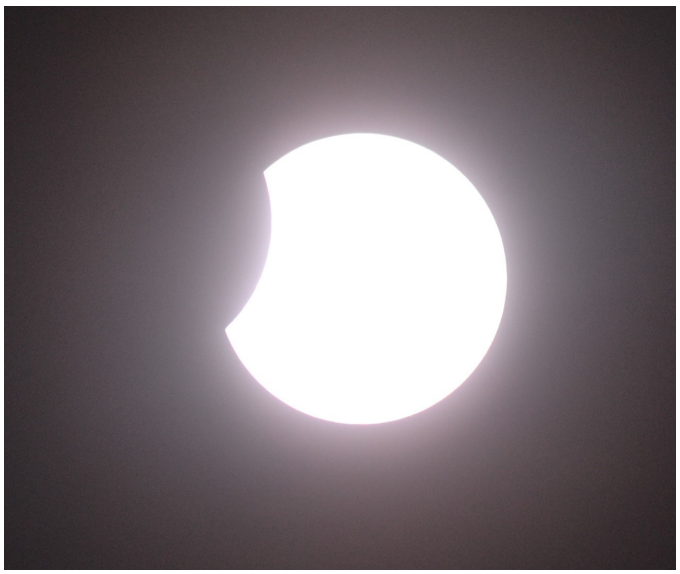
Capture: The duration was set for 15 seconds, quite short, but I wanted to make sure I could get it completed before the clouds came across again!

Processing: Image then stacked using AutoStakkert with a little sharpening and contrast adjustment done in Affinity Photo.

**Michael Toon**



# Cardiff Astronomical Society



**Partial solar eclipse 25th October 2022 at the National Trust's Dyffryn Gardens, Vale of Glamorgan.**

We didn't see the start but sky did clear, and the crowds gathered!

Equipment used: 80mm Celestron refractor with a Baader filter on a Skywatcher az gti mount in alt/az mode - or projecting onto a piece of A0 card clipped to a clothes horse :-)

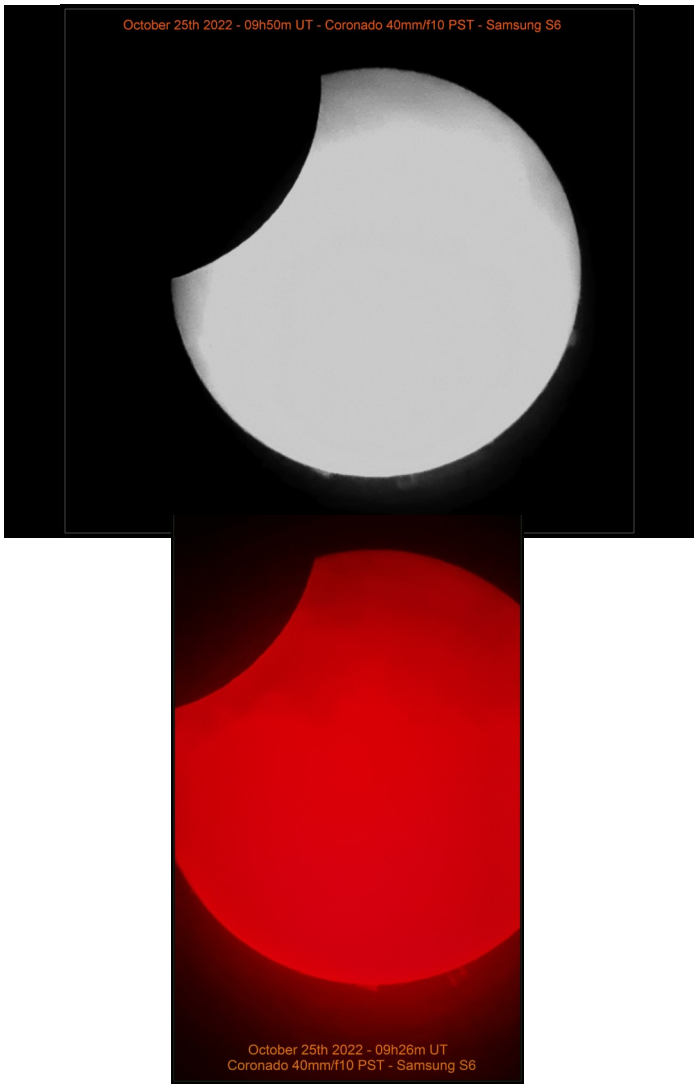
Lunt 40mm Hydrogen alpha solar scope with a B600 solar blocking filter using a star adventurer tracking mount

Coronado Solar Scope

This single image was taken at 11:18 BST with a Nikon D3100 F/5.6, 1/125 SEC, ISO 360, 300mm lens

**Theresa Cooper**
**Public Events Coordinator for Cardiff Astronomical Society**

# Preseli Astronomical Group




Daybreak this morning the weather looked cold and eclipse miserable, it looked as if I might miss out on today's Sun and Moon waltz.

My village and the surrounding area is renowned for more than its fair share of cloud cover and rain.

Its a pretty good bet that, if its raining in our back garden it will be dry and blue sky nine miles down the road in Cardigan.

So with telescope in suitcase we headed northwards to Cardigan town.

I had packed the telescope, two eyepieces and tripod. The Samsung S6 was to be my imaging device.

Spode's Law was in action, and as we arrived in Cardigan, the clouds rolled in to greet us.

No matter, soon we parked, and set up the telescope.

We were in luck, within five minutes the clouds parted and the eclipse was upon us.

One thing I hadn't accounted for was the frequent rain showers.

I could see the Sun above, but had to wait for the showers to stop before I could properly take out the telescope.

Eventually patience paid off and several photos were taken of the eclipse.

Initially I was going to image with a mylar filter on my refractor, but the little Ha telescope did a great job, and it managed to capture a couple of prominences.

**From Mark Lee's Blog "Pembrokeshire Astronomer". Used with permission from the author. Mark is a member of the Preseli Astronomical Group**

# Swindon Stargazers

I arrived at the National Trust staff car park at Avebury around 9:30 and saw Rob and Viv Slack and Robin and Hilary Wilkey (all from Swindon Stargazers) unloading their cars with the equipment they would be using for the event.

After doing several trips moving my equipment from the car to a bench seat, we had a look at where to set up for the eclipse. A large tree to the south of the museum would block part of the eclipse, so it was suggested we set up on the grass well back from the buildings and trees. After a few minutes we decided it would be too wet under foot staying on the grass and the public might miss us? I decided I would move all of my equipment to an area just outside the lavatories, this would be out of the way of the offending tree! I was the only one to move, the others decided to stay put near the benches. I had everything set up and ready by 10:00 with the eclipse due to start around 10:09?

To take photo's I would be using my Canon 70D camera attached to a Tamron 150-600 mm zoom lens (set at 600 mm using manual focus and auto settings with flash off) on a Manfrotto tripod with a Seymour solar filter (white light) on the front of the lens. To do visual, I would be using a 60 mm Solarscope (658 nm wavelength) giving an orange view of the Sun (excellent views for sunspots, prominences and filaments on the surface of the Sun) on a Porta Mount I and a 80 mm William's Optic refractor telescope with an Altair Herschel Wedge and Baader solar Continuum filter (540 nm wavelength) giving a green view of the Sun (excellent for sunspots) on a Porta Mount II. Trouble was, a lot of cloud had built up over the last 30 minutes and viewing could be a problem? I would be using an Orion Explorer II zoom eye piece for both of these telescopes. There were a few groups of sunspots on the surface of which AR 3126 and 3131 were bigger than the Earth!

First view I noticed of the eclipse (probably about a minute after actual first contact due to the thick cloud?) with the WO telescope and moved to the camera to start taking pictures of the event, while being near the toilets, a few people started taking an interest and had a few questions for me to answer plus moving the telescopes slightly to keep them on track with the Sun movement across the sky (none of my gear had power, all hand moved). After about 20 minutes I decided to re-join the group down at the benches, by now, the Sun had cleared the tall tree but the cloud was still a factor to deal with, to the north of us I could see blue sky in places! Any cloud and the Solarscope would be useless as it is the most filtered telescope I have, can only be used for viewing the Sun and nothing else! The WO with the wedge could see thru some cloud, so I had to use that quite a lot of the time and take photos with the Canon when the Sun popped out of the clouds.

Over the course of the eclipse which lasted nearly two hours we had a lot of interest from the general public, showing children the actual eclipse was the hardest part for me as I had to adjust the prism to such a position they look thru the eye piece and then readjust the prism for adults! Viv was busy handing out the flyers for the club as there was an interest in the club (hopefully the odd new member might come forward after this outing?). At times I could do with a few extra arms as I had to keep adjusting all of the equipment to keep the Sun in view of the eye pieces and camera, time went by very quickly for me.

By midday, the eclipse was over, so we packed up all of our equipment and went to the Red Lion for a drink afterwards, thanks to Rob for my lager.

Next partial eclipse in this country if you might be interested will not happen until March 2025 with the next total solar eclipse happening in 2090, might miss that one!

**Peter Chappell**

**swindonstargazers.com**

# Isle of Man Astronomical Society

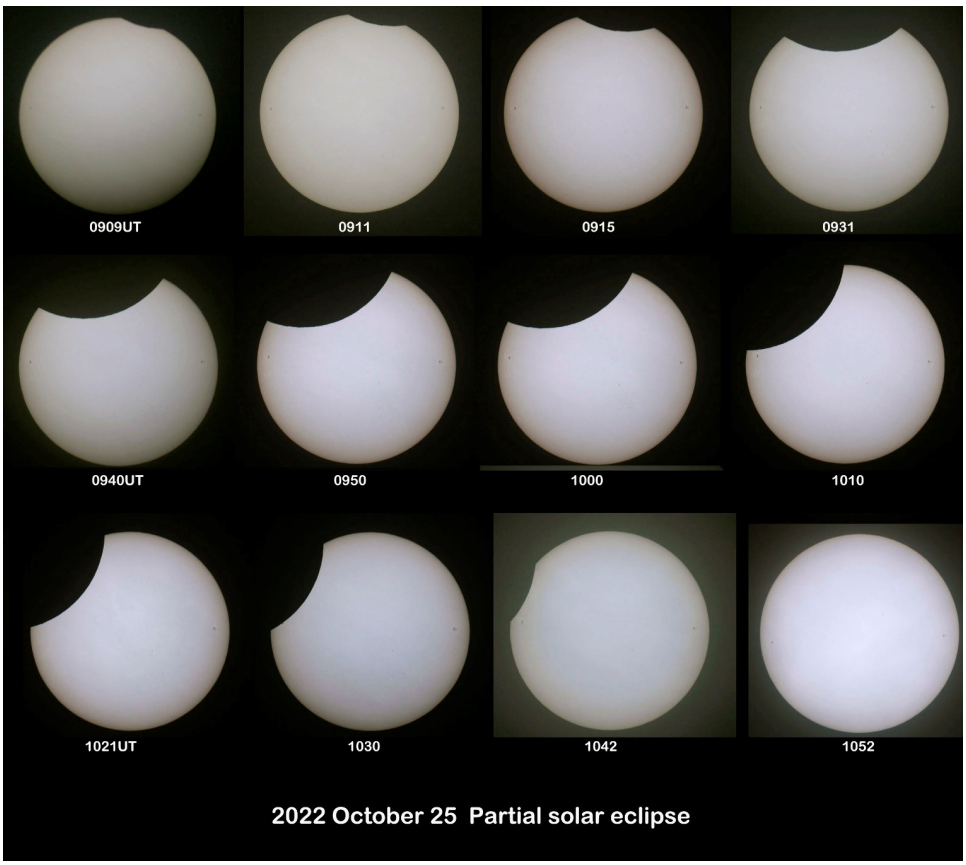
I was in Edinburgh for the partial eclipse and was lucky enough to see most of the event through gaps between the clouds, although thicker cloud arrived and covered the Sun at around 10:25UTC which prevented me from seeing fourth contact.

To capture the eclipse I used my Canon EOS 1200D, a 300mm lens and a Baader AstroSolar safety film ND 5.0. ISO was set at 100 and f5.6 was used. Exposure times depended on the amount of cloud covering the Sun.

**Graham Gordon, Isle of Man Astronomical Society**


[iomastronomy.org](iomastronomy.org)

# Manchester Astronomical Society




Sky conditions in Manchester could have been better but many of us in Manchester Astronomical Society got some results. I live 30 miles south in north east Staffordshire and was fortunate enough to have fairly clear skies throughout the eclipse. I also saw a sundog but it had largely faded by the time I grabbed my other camera.

**Kevin Kilburn**
**Manchester Astronomical Society**

[manastro.org](manastro.org)

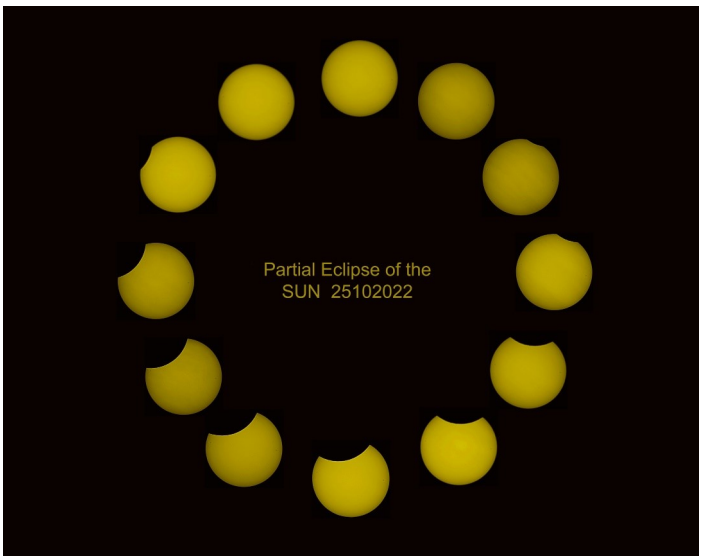
# Macclesfield Astronomical Society

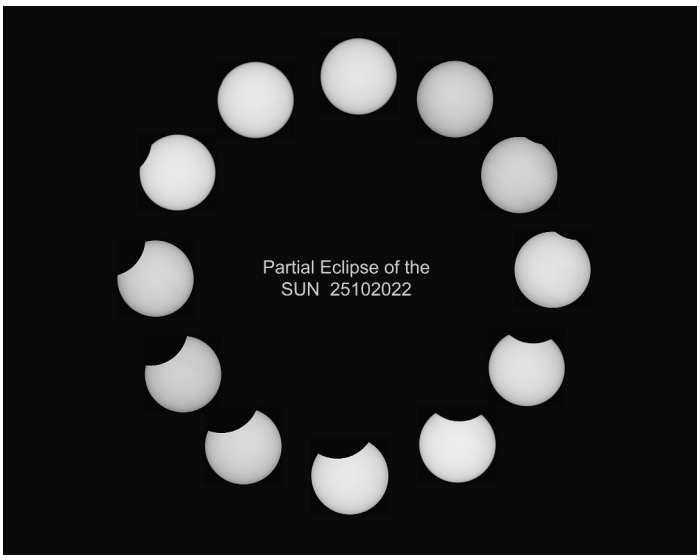
I was able to image the partial solar eclipse from beginning to end on the 25 of October. I used a Baader white light filter on a 105 achromatic F5 telescope with a 2inch x1.5 multiplier making a F7.5 scope, see image below. I used a Canon DSLR camera with exposures varying from 1/100 - 1/500s depending on cloud interference. I connected it to a tablet computer with software called DSLR Controller for Canon cameras only. It mimicked the controls of the camera on screen producing a large live image of the Sun with image magnification to x10 to help with focussing, see image below.

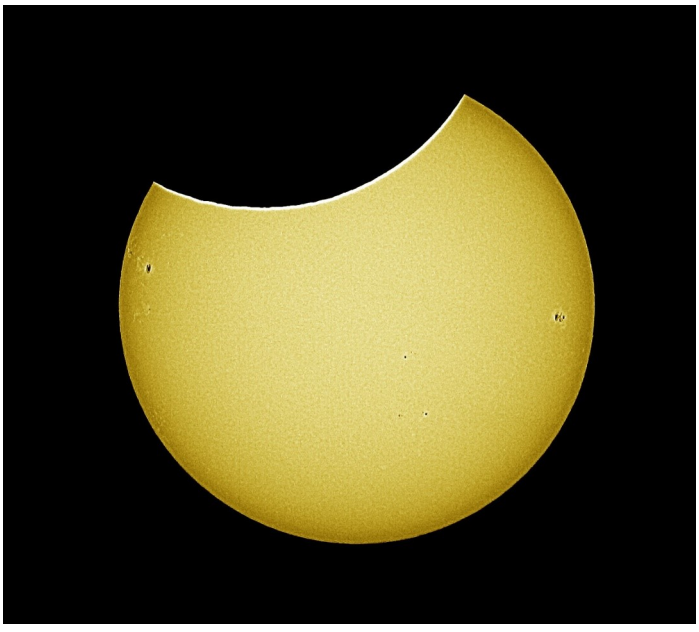
I took numerous images and selected 12 to represent the clock image display of the eclipse see image below. I also produced the yellow colourised version using Photoshop.

A peak image is included in yellow which also shows the sunspots visible on the day. I counted some 10 spots. You will also notice detail of mountains on the edge of the eclipsing Moon if you zoom in.

**Paul Cannon,**
**Macclesfield Astronomical Society**



Above image taken with a Canon DSLR (EOS 80D) and 400mm lens with a filter made from a sheet of Baader AstroSolar Safety Film. I used a simple tripod and a flexible shutter release cable. Camera settings were ISO 100, f/5.6, 1/1000 sec.

**Alan Wootton**
**Macclesfield Astronomical Society**

**Editors Note:**

See also the hand drawn image on the front cover by Steve Warbis, also a Member of Macclesfield Astronomical Society.

**maccastrosoc.com**

# Coventry and Warwickshire Astronomical Society

## Partial Eclipse Viewing and Outreach

Despite the forecast looking it was going to be overcast the day started off bright and sunny with just the occasional cloud, a few of us from the Coventry and Warwickshire Astronomical Society decided to view and do some outreach and decided to set up a small telescope to project the Sun. We set up in Coventry City centre at a place called "Broadgate" right next to the statue of Lady Godiva, this is near the main shopping area so promised quite a lot of potential interest from the public.

Several of us also bought along Solar Eclipse Glasses for the Public to use. The weather remained good for the whole of the eclipse with only a few minutes briefly clouded out. We had a lot of interest especially once people could see the eclipse glasses being used and also hearing oooh's and ahh's and general excitement from viewers. Our members also approached people who were looking intested but were to shy to ask what was going on.

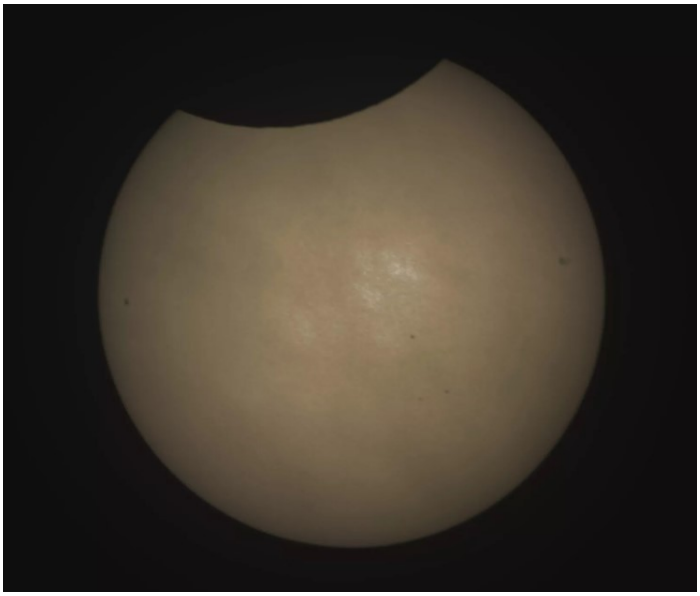
Many of the public were amazed at what they saw and there was a lot of interest in the projected view especially when we pointed out the two small sunspots that were visible and also the rough edge of the moon (Mountains) quite a few people were fascinated to find out that the moon is still there in the daytime and that it sometimes passes across the sun, one saying "You would think that would be better advertised"

All in all we had a great time and it was immensely rewarding to teach people about what was happening.

**John Davies (Chairman)**

[covastro.org.uk](covastro.org.uk)


# Bristol Astronomical Society



**David Bennett**, Observatory Director of the Bristol Astronomical Society, made a last-minute decision to run a live view of the Solar Partial eclipse from the society's observatory. The weather forecast suggested light cloud with a few breaks, so equipment was set up the day before in hopeful anticipation. The weather forecast was accurate allowing members of BAS to watch the entire partial eclipse on Zoom from the comfort of their home or workplace through varying amounts of cloud which contributed to the drama of the event.

Equipment used was a 12" Meade LX600 telescope with a solar filter firmly attached to the front of the corrector plate. A focal reducer allowed the solar disc to fit the sensor of a ZWO ASI2600MM Pro camera with a Luminance filter selected. The camera was connected to a laptop running the ASICap module of ASI Studio and the image window shared via Zoom. The laptop was connected to the internet from the observatory using a SIM router on the EE cell phone network.

During the observation we had a surprise visit from a reporter for the local ITV news team and then featured on the weather report for that evening.

Images can be found on the BAS web site here: https://bristolastrosoc.org.uk/partial-solar-eclipse/

A video of the final stages of the eclipse can be found here: https://www.youtube.com/watch?v=u8hoCenmUYM

**David Bennett**


**John Huntley**: I have been an amateur astronomer for around 40 years now and mostly observe from my garden in Portishead, North Somerset.

Despite some quite extensive cloud cover during the early and later parts of the eclipse I was able to observe some of the event including the period around maximum eclipse. My observational equipment was a 102mm Vixen ED refractor, a Lunt Herschel Wedge and a single polarising filter fitted to the barrel of a 7.2mm - 21.5mm zoom eyepiece. I enclose 2 photos should you wish to use them in the newsletter. The first is an image of the eclipsed solar disk in white light which I captured using a mobile phone held over the eyepiece. I have annotated the main sunspot groups with their active region references for interest. There was some thin cloud cover at that time but that seems to add a little to the atmosphere perhaps ?

**Image left**: my daughter attempting a similar image capture with her mobile phone. This shows the telescope setup we used on the day.

**John Huntley**

## Bristol Astronomical Society:

## bristolastrosoc.org.uk

# North Essex Astronomical Society

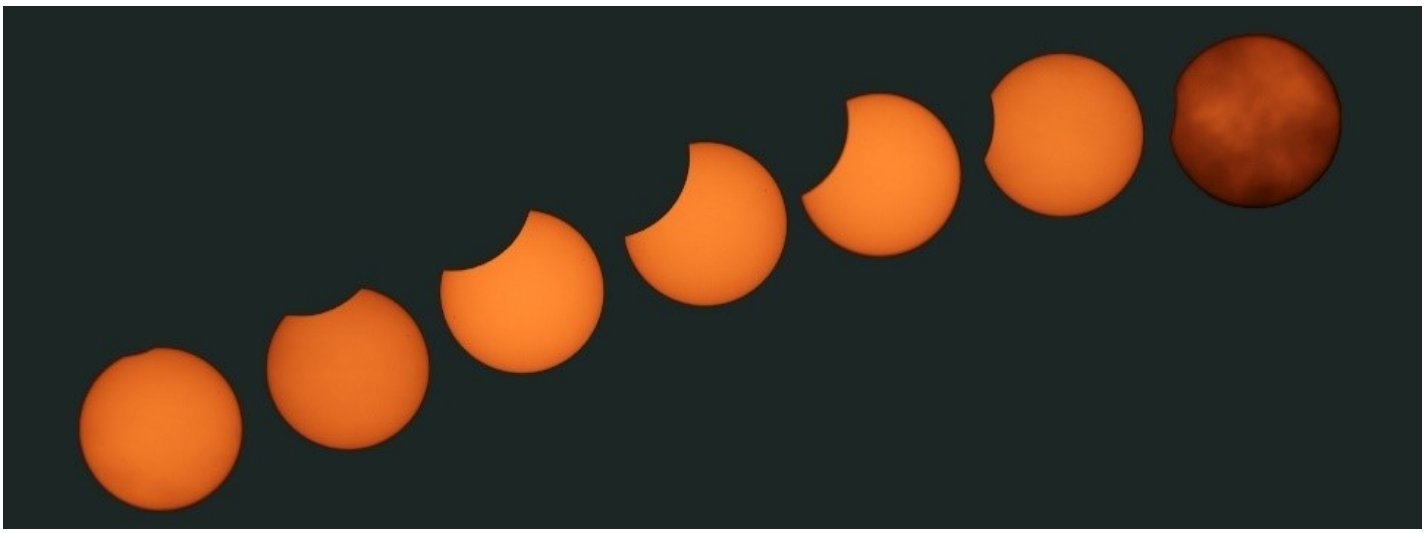


***Image Above**: Camera settings info: Camera 100D with 18-400mm lens, set at 400mm, f/6.3, 1/100sec exposure at ISO400.*

Every Tuesday, when possible, I look to indulge in my "other" passion: archaeology. At present I am part of the archaeology team at Fordham near Colchester where we are excavating a roman site. On this Tuesday morning however, my wishes turned to the sky and not the ground in the hope of a clear day to observe the latest partial eclipse of the sun. With thanks to an appropriate deity, I was rewarded with a lovely blue-sky morning but with warnings of increasing cloud cover later.

Having gained "permission" to go somewhat AWOL from the archaeology I set up my camera and just had time to catch the start of the eclipse (just before 10:00a.m.). Surprisingly none of the other team members present were even aware of the event but on a regular occasion throughout the eclipse cycle were delighted to look through a viewing filter I had brought with me.

As the maximum eclipse came and went my concern re cloud cover began to increase significantly. Dark clouds approached and arrived from the west just as I was to complete the photo-cycle (as the last image in my montage below shows). Seconds after the image capture the filtered camera image went black. On using my phone camera, I caught a last shot of a full sun-disc as the dark cloud rolled in.

Well, I just about made it this time. Roll on the next partial (visible in Chelmsford at least), 10:00 AM on the 29 March 2025.

**Neil Short**
**North Essex Astronomical Society**

**northessexastro.co.uk**

# NASA Artemis I Project

I am sure you will have seen the reports that NASA launched it's giant Space Launch System rocket with the Orion Crew Module on 16 November 2022. This is NASA's first mission in a bid to return Astronauts to the Moon by 2025

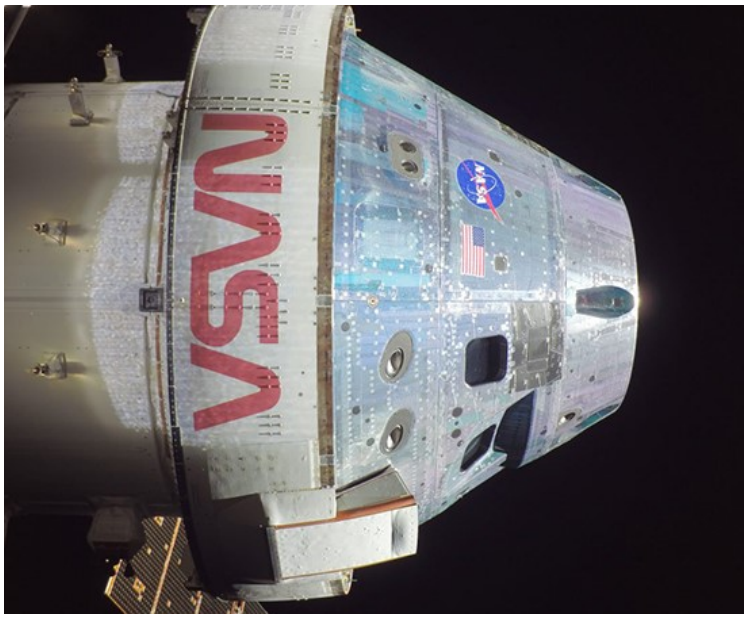
As I write this the Orion spacecraft is entering its planned highly distant retrograde orbit around the Moon. This orbit is to test the feasibility of the Orbit planned for the NASA Gateway Space Station which future Astronauts will use as an orbital staging post prior to lunar landings.

A few days earlier Orion snapped this high-resolution selfie in space with a camera mounted on its solar array wing during a routine external inspection of the spacecraft on the third day into the Artemis I mission.

Follow the mission at NASA va the website at:

**nasa.gov**

**Michael Bryce**



# Guildford Astronomical Society

**Image 1: The Group at Newlands Corner**
*Photo by Nick Tanton. Apple iPhone SE*

**Image 2: John Ridge with his Pinhole Box Viewer**
*Photo by Nick Tanton. Apple iPhone SE*

## Eclipse Viewing in the Surrey Hills

On the morning of 25th October a group of society members and friends gathered at Newlands Corner, just outside Guildford, in the hope of getting a view of the partial eclipse.

We were rewarded by rather better conditions than had been expected. The Sun was on view most of the time, with just a few passing clouds. There was just one properly cloudy spell, which occurred at roughly mid-eclipse. A range of telescopes and cameras were in use, plus several pairs of trusty cardboard "Eclipse Glasses". One member - John Ridge - had been creative and had made a viewer out of a cardboard box. Newlands Corner being a popular spot in the local countryside, quite a few passers-by stopped for a chat and a look at what was going on.

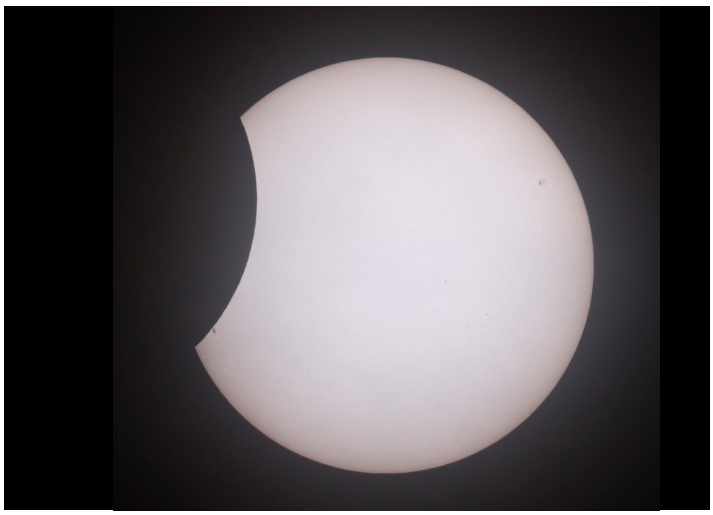
The morning's activities were rounded off by lunch in the nearby village of Shere.

**Nick Tanton, Tony Questa, Tim Ellison**
**(Guildford Astronomical Society)**

**guildfordas.org**

**Image 3: Eclipse in a Cloudy Sky**
*Photo by Tony Questa. Panasonic DMC-TZ60 camera, iso100, f5.6, 1/640th sec, 47.5mm focal length. (photo taken using the camera without a protective filter, during a spell when the clouds were dense enough for this to be safe to do!)*

**Image 4: Partially Eclipsed Sun with Sunspots**
*Photo by Tim Ellison. Canon EOS 77D camera, Sigma 150-600mm C Series lens, iso400, f8, 1/1000th sec, 600mm focal length, protective filter made from Baader Solar Film*



# A Replica of the Revd. William Pearson Orrery of 1805

## by Peter Rigby - Society for History of Astronomy

I have been designing and building orreries on an amateur basis for a number of years, trying to keep alive a now dying art in the history of astronomy. One of my recently completed machines is a replica of the Tellurian by William Pearson.

Of the many important English planetary machines of the 18th century there is unfortunately one missing example. It was designed by William Pearson, a founding member of the Royal Astronomical Society of London, and Fellow of the Royal Society. He designed a number of orreries which represented the state of the art at that time. In the early 1800's, having completed a machine for the Royal Institution he started work on his masterpiece "Orrery for Equated Motions" which represented the pinnacle of orrery design, surpassing many others in terms of accuracy and simulation of planetary motion. The orrery appears in a large portrait by Thomas Phillips in the possession of The Royal Astronomical Society, London. The portrait, painted around 1806, is of William Pearson, his wife and daughter seated around the orrery.

We are fortunate in that the orrery is described in *"The Cyclopaedia or Universal Dictionary of Arts, Sciences and Literature, by Abraham Rees with assistance of Eminent Professional Gentlemen."*, first published in 1805. Pearson having written several sections including those on Planetariums, Planetary Machines and Orreries. Pearson's design was for, in effect, 3 separate machines, the first of which is the tellurian. It is a most sophisticated yet delicate machine, and it is no surprise that it did not survive. The drawing of the original machine by William Pearson is illustrated in the Cyclopaedia, and together with the descriptive text I have been able to build a replica.

The original machine was very large, built into a table some 800mm diameter. To some extent this was determined by the large range in size of several wheels (gears), varying from very high tooth counts to very low tooth counts. The low tooth count pinions being particularly susceptible to teeth being snapped off if placed under heavy or shock loads. Pearson was evidently aware of this potential problem since he specified a very coarse tooth size for the 269 tooth central contrate wheel and matching 10 tooth pinion. Damage to these wheels could easily be caused by a moderate level of pressure being applied to rotate the main Earth arm. This may indeed be the reason for the machine not surviving.

It was decided to build a half scale replica using modern involute gear profiles (module 0.5) rather than cycloidal profiles. The advantage of the involute profile is that the teeth are stronger than the cycloidal profile originally used and require a much smaller range of cutters. One problem of reduced size was that it would be difficult to fit in the 269 tooth central contrate wheel. This was solved by re-calculating the required wheels for the Earth and Moon orbits to limit the number of teeth required on the contrate wheel. This was achieved with minimal change in performance, the Earth orbital period and Moon synodic period being to all intents as accurate as Pearson. All other wheels are as calculated by Pearson, other than the minor wheels for the 7 day dial work for the handle where the tooth count was increased to avoid the low count 8 tooth pinion. The following table summarises the changes in the wheels and the net change in performance.

**Alternative Wheels in Replica**

Pearson recommended that the 269 tooth central contrate wheel have 5.75 more teeth in the summer half than in the winter half to allow for the elliptical orbit of the Earth, a very difficult job for the wheel cutter to achieve. A better approach is to offset the axis of this wheel to give the required ratio of teeth, summer to winter. The replica machine uses this approach with the 269 tooth wheel replaced with an offset axis wheel of 141 teeth as shown in the table below.

| | Earth | Gear Ratios | Lunation | Gear Ratios |
|---|---|---|---|---|
| | Pearson | Replica | Pearson | Replica |
| | 269:10 | 141:11 | 269:10 | 141:11 |
| | 26:10 | 81:11 | 13:43 | 65:68 |
| | 94:18 | 89:23 | 73:48 | 107:106 |
| Net gear ratios | 365.24222 | 365.24218 | 12.3682655 | 12.3682651 |

The only other significant change in the structure is that the 179 tooth wheel driving the Nodes is mounted horizontally rather than vertically as in the original. The reason again is that in the half scale replica there is not sufficient space to mount this very large wheel vertically without destroying the overall proportions of the orrery. In all other respects the replica follows Pearson's description as given in the Cyclopaedia, volume 26.

Pearson allowed for two modes of operation. In the first mode to simulate the full range of motions the 11 tooth pinion needs to be engaged with the 141 tooth central contrate wheel. This is achieved by turning the thumb screw to lower the 11 tooth wheel to engage with the central gear. One turn of the handle represents one day so it takes some considerable time for the Earth to complete an orbit.

The second mode of operation disengages the pinion with the contrate wheel, removing the slow drive of the Earth around the Sun. This allows the Earth arm to be pushed freely around the Sun to quickly illustrate other phenomena such as the change in the seasons. All the motions of the Moon still operate when the handle is turned, illustrating the elliptical orbit and precessions of the nodes and apses.

The machine is comprehensively equipped with dials for the day and date over the 4 year cycle, the declination of the Sun, the apparent horizontal diameter of the Moon, the age of the Moon, the heliocentric latitude of the Moon, the time of the Moon's meridian passage, solar time and sidereal time. Figures 2 and 3 show the replica machine. As far as I am aware, this is the only replica of this important English orrery.

The full description of the machine can be read in the Rees Cyclopaedia, Vol 26 "Orrery" and Vol 27 "Planetary Machines" which can be found in several on-line libraries.

**Peter Rigby**

*See overleaf for Orrery photos:*

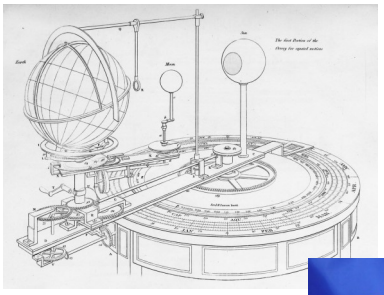


***Image left:*** *Pearson's Original Drawing.*

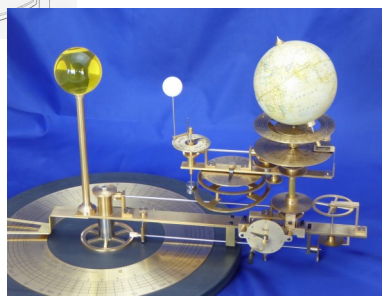


***Image Right:*** *The Replica Machine.*

**societyforthehistoryofastronomy.com**

# University of Derby Research Study

I'm Dr Chris Barnes, a researcher from the University of Derby, UK and would like to ask for your help. I am advertising a study about how people feel towards the night sky & whether they feel a connection to it.

The study involves completing a brief survey and takes 10-12 minutes to complete once you have provided consent. Some people may want to take slightly longer. Anyone can take part no matter where you are in the world or how often you look at the night sky. Taking part is voluntary and there is of course no pressure if you'd prefer not to.

If this sounds like something of interest to you then the survey link is here – https://derby.qualtrics.com/jfe/form/SV_4UQuldSgKsiZElU or you can also find the link on my Twitter profile (@DrChrisBarnes).

Many thanks,

**Chris**

# Astronomical Society Outreach Support

ASTROBOOST

AstroBoost is launching a new website where you can find free information and resources to support your outreach.

AstroBoost is a project run by Jenny Shipway. It was initially conceived as a thank you for the support societies provided to Winchester Science Centre's free stargazing nights. An initial survey of 30 societies in the south showed that nearly all did outreach, and most would like to do more.

The project has already worked with the Royal Astronomical Society and UK Webb Campaign to provide free Webb-related outreach training and resources to twelve UK amateur astronomical societies. Each society was given a box of resources including infrared cameras and giant Webb-mirror jigsaw, which have since been used with over 4,000 members of the public. Training included sessions on the science of learning, talks from Webb scientists, and covered a variety of topics from using children as volunteers to practical risk assessment.

There are two new AstroBoost projects being planned; one on Webb themes, and one focused on Engineering. See the website for full details and how to express interest in participating.

The AstroBoost website contains all the downloadable AstroBoost reports and resources. There is also a list of links to additional high-quality, free astronomy outreach resources that suit astronomical society contexts. Other organisations that can help with funding, marketing, or with contacting schools are also highlighted.

Find the website at http://astroboost.org, or via the new outreach page on the British Astronomical Association website. There is also an AstroBoost mailing list you can join to be the first to hear about new projects or significant website updates.

**Dr Jenny Shipway**
Science Communication | Planetaria
www.jennyshipway.com
@jennyshipway

**astroboost.org**

# FAS Newsletter Copy Deadline:

Deadline for items for inclusion in the next FAS Newsletter, **No 130 February 2023** is

**15 January 2023**