No. 510 Registered Charity 271313 July 2015

OASI News

The newsletter of the Orwell Astronomical Society

Solar observing at RSPB Minsmere, 21 June during one of many cloudy patches

Chairman's new observatory

Below: The Topping-out Team

Martin Cook
Bill Barton
Mike Norris
Matt Leeks
Martin RH

Contents

Society Contact details

Observatory (meeting nights only) 07967 519249
Email queries: info@oasi.org.uk
facebook.com/pages/orwell-astronomical
Twitter: @OASIpswich
Forum: forum.oasi.org.uk/index.php

Please send material for the OASI web site and newsletter

e.g. observations, notices of events, general interest articles, to

news@oasi.org.uk

Other contact details will be issued to members on a separate printed list or emailed directly to those who only receive the e-version of the News.

Access into the School Grounds and Observatory Tower

Please use the third gate into the school grounds by the gym.

Areas out of Bounds

Access to the Observatory is **only via the black door** at the foot of the Observatory tower, which leads to the staircase and thence to the spiral staircase up to the Observatory. If the black door is locked, please phone the observatory mobile, 07967 519249 during meeting hours.

Please do NOT explore other routes. When in doubt, ask or call the Observatory mobile.

Remember this is a school and straying into the main part of the school where the pupils reside would cause the society big problems and could see us losing the use of the observatory. Any member found to be anywhere other than the approved access route or the observatory area will face serious sanctions up to and including expulsion from OASI.

Please note that access time for all observatory member nights is now after 20:15

The key to the toilets in the school gym is located in the seating area in the Belvedere room.

Articles for OASI News

News, pictures and articles for this newsletter are always welcome. Please send them to

news@oasi.org.uk

The CLOSING date is the 15th day of the month

Please submit your articles in any of the following formats:–

Text: txt, rtf, rtfd, doc, docx, odt, Pages, pdf

Spreadsheets: xls, xlsx, OpenOffice/LibreOffice, Numbers

Images: tiff, png, jpg Please send tables as separate files in one of the above formats.

OASI on BBC Radio Suffolk

Lesley Dolphin has asked David Murton to do a monthly spot on her afternoon show once a month starting in May. Initially it is standing in for Tom Bowles for a few months then possibly having a separate monthly slot.

She has said he is welcome to plug OASI events (& DASH ones!), talk about a couple of upcoming astronomical events plus a general talk about something else each month.

The Newsletter

We use an outside printer. The cost of doing so means that only the cover pages can be printed in colour. **The full colour version is now available from the OASI web site.**

Newsletter archive http://www.oasi.org.uk/NL/NL_form.shtml

Authors, please note that your articles will now be publicly available worldwide!

Reproducing articles from OASI News

If you plan to reproduce an article exactly as per OASI News then please contact the Editor – otherwise, as a matter of courtesy, please seek permission from and credit the original source/ author. You may not reproduce articles for profit or other commercial purpose.

Committee 2015

Chairman	David Murton	Set overall agenda for OASI, Chair committee meetings, Press and publicity, Public appreciation of astronomy, Outreach activities.
Secretary	Roy Gooding	Outreach meetings (jointly with Chairman), observatory decoration.
Treasurer	Paul Whiting FRAS	Finance, Supervision of applications for grants, Visits by outside groups, Observatory tours, Public appreciation of astronomy (jointly with Chairman).
Committee	James Appleton	Committee meeting minutes, Web site
	Martin Cook	Membership, Tomline refractor maintenance & user testing
	Peter Richards	Lecture meetings, Email distribution lists
	Martin Richmond-Hardy	Newsletter
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club.
	Avtar Nagra	Newbourne Observing Group
	Kevin Fulcher	Safety & security, Newbourne Observing Group
Co-opted	Pete Richards	Lecture co-ordinator
	Vacancy	Librarian

Society Notices

Contacts

A printed list of Committee and other activity contacts is available from the Secretary or the Observatory. Email links are available in the A4 pdf version of this newsletter.

For general enquiries please email info@oasi.org.uk and your enquiry will be forwarded for action.

Next Committee Meeting

Tuesday 14 July 2015, starting 8.00pm. at the Shepherd & Dog.

This is an open meeting, any member is welcome to attend.

Welcome to New Members

None this month

2015 Outreach Meetings

Contact: Roy Gooding or David Murton

Nowton Park, Bury St Edmunds

11 July (12th if cloudy)	Solar Day
19 September	Stargazing

Holywells Family Day

Wednesday 5th August

Landguard Fort Solar Event (TBC)

This has now been confirmed

We have been asked NOT to set up anything in front of the the main entrance to the fort

Venue Landguard Fort (the Fort's moat will probably be our location)

Date **15 or 16 August** (depends on which day has the best weather)

Time 11:00 to 16:00 Setup time from 10:00

Bentley Village Family Day

The Bentley Family Fun Day is on **Sunday 6th September** (date confirmed) 11:00 to 15:00

Set up time from 09:30. The playing field is at the bottom of Case Lane. There is parking in the field..Location to be arranged on the day. It will probably be down the left hand side of the field.

Snippets from the Twittersphere @OASIpswich

@OASIpswich currently has 329 followers and follows 274 astronomy-related sites.

- As I put the finishing touches to this edition (23 June), the aurora is at Kp 8+ with Bz -14.4 and has been seen at Selsey by @Avertedvision (Pete Lawrence). For the latest predictions see http://www.aurora-service.eu/aurora-forecast/
- @BeyondMatter @ScienceDaily Astronomers discover 854 ultra-dark galaxies http://www.sciencedaily.com/releases/2015/06/150622162027.htm/… there's something invisible ...or dark #Cosmology
- @esaoperations The ESA-developed Sentinel satellite – Sentinel-2A – was launched today, adding a high-resolution optical imaging capability to the European Union Copernicus environmental monitoring system. http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Sentinel-2/Sentinel-2A_launch_event_at_ESOC
- @universetoday See the Beauty of Earth and Space in Stunning New ISS Timelapse http://www.universetoday.com/120953/see-the-beauty-of-earth-and-space-in-stunning-new-iss-timelapse/
- @starsmaven Researchers have discovered intense radio emission from a tiny binary star, which calls for a review of stellar models. http://www.dnaindia.com/scitech/report-mass-of-tiny-binary-star-discovered-thanks-to-its-intense-radio-emissions-2098075

Society Events Diary

For the latest event details, please see www.oasi.org.uk/Events/Events.shtml

There's a Google Calendar on the OASI web site with the latest dates (and corrections!). If you want to easily add OASI Events to your own computer/phone/tablet calendar application click this button on the website Events page

For other astronomy news and astro pictures try our

Twitter feed https://twitter.com/OASIpswich
Facebook page https://www.facebook.com/pages/Orwell-Astronomical/158256464287623
Facebook Group https://www.facebook.com/groups/1558395534430623/
Discussion Forum http://forum.oasi.org.uk/index.php
Subscribe to the OASI Yahoo group by emailing oasi-subscribe@yahoogroups.com

Date and Time	Location	Contact	Event
Weekly, every Wednesday, 20:15	Orwell Park Observatory	Martin Cook, Roy Gooding	General observation (weather permitting) using a variety of telescopes.
Sunday 11 July or 12th if cloudy	Nowton Park, Bury St Edmunds	David Murton chairman@oasi.org.uk	**Public Solar Event** Observing the sun safely.
Monday 13 July 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Monday 13 July 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Tuesday 14 July 20:00	Shepherd & Dog Felixstowe Road,	Roy Gooding	**Committee meting**
Saturday 18 July	Newbourne Village Hall	Pete Richards lectures@oasi.org.uk	OASI BBQ
Wed 5 August	Holywells Park, Ipswich	Roy Gooding	**Public Solar Event** Observing the sun safely during Holywells Park Families Day. Booking not necessary.
Monday 10 August 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Saturday 15 August 11:00 – 16:00	Landguard Fort	Roy Gooding	**Public Solar Event** (TBC) If cloudy postpone to 16th.
Friday Sept 4 - 19:00 to Sunday Sept 6 - 12:00	Rutherford Appleton Laboratory, near Didcot	http://britastro.org/meetings	BAA Autumn Weekend Meeting "Astronomy in Space"

Date and Time	Location	Contact	Event
Sunday 6 Sept	Bentley	Roy Gooding	**Public Solar Event** Bentley Village Family Day
Friday 11 September	Methodist Church Hall	Pete Richards lectures@oasi.org.uk	Lecture Meeting. Andrew Lound: *Lunatick Astronomy*.
Saturday 19 Sept	Nowton Park, Bury St Edmunds	David Murton chairman@oasi.org.uk	**Public event.** Star party for International Observe the Moon Night". Booking not necessary.
Monday 28 Sept from 00:11			Total Lunar eclipse. See online Diary for timings
Friday 02 October 01:00	Location TBD	James Appleton info@oasi.org.uk	Field trip to observe graze of ZC 618. More info.
Friday 02 October 20:00	Methodist Church Hall	Pete Richards lectures@oasi.org.uk	Lecture Meeting. Professor Michael Rowan-Robinson: title TBC.
Friday 23 October 18:00	Chantry Library	Paul Whiting FRAS treasurer@oasi.org.uk	**Public event.** Talk and telescopes evening. Talk at 18:00, telescopes at 19:00.
Sat 07 Nov, 19:00 Note earlier start time.	Methodist Church Hall	Pete Richards lectures@oasi.org.uk	**Public event.** Lecture Meeting. Damien Peach: *The Giant Planet Jupiter*. Access is free to members of OASI; £2 per head for non-members.
Thu 17 Dec, 18:00	Location TBD	James Appleton info@oasi.org.uk	Field trip to observe graze of Tycho 5248-0249-1. More info.
2016			
9 May 2016	Orwell Park Observatory	Martin Cook membership@oasi.org.uk James Appleton info@oasi.org.uk	Observation of the Transit of Mercury

The Diary includes BAA meetings and other non-local astro events which may be of interest.

DASH Astro Events – July

See http://dash.moonfruit.co.uk/events-calendar/4585090668 for the latest details.

Athenaeum Observatory

You may not be aware that atop a building in central Bury St Edmunds is an astronomical observatory built in 1859. The building is the Athenaeum, built early in the 18th century as Assembly Rooms where people could play cards and attend balls[1]. It became the Athenaeum in 1854 and the inspiration for building the observatory was a visit from Sir George Biddle Airy and the presence in the night sky of Donati's Comet. The Athenaeum Club are hoping to raise funds and awareness of the observatory. I've been in touch with the Athenaeum Club to arrange a visit from OASI. The visit is most likely to be arranged for daytime on a weekend. If you are interested in visiting the Athenaeum observatory email me (Pete Richards) on p.r.richards@btinternet.com or speak to me on a Wednesday evening at the observatory. If you don't have access to email and don't visit the observatory you can phone me on 01473 659806.

Our Late Chairman Ken Goward co-authored, with Martin Mobberly, an article about the history of the Athenaeum observatory published in the Journal of the British Astronomical Association of October 2005. There is a piece about it in the June 2007 OASI Newsletter (OASI Newsletters are available to view on the OASI website).

1. http://www.localhistories.org/burysteds.html

Newbourne Observing Group

Avtar Nagra nog@oasi.org.uk **Kevin Fulcher**

We meet at The Newbourne Village Hall, Mill Lane, Newbourne, IP12 4NP

The Newbourne Observing Group (The NOGs) is a good place to start for beginners. If you are thinking of buying a scope or binoculars, come and try before you buy and talk to owners about the strengths and weaknesses of particular models. If you've already splashed the cash, bring your new scope along to use or for advice on setting-up and adjustment.

All welcome, with or without telescopes.

Please note that Newbourne is also the new location for OASI Astronomy Workshops.

July 13th. & 27th August 10th. & 24th

We open up for all meetings at 7pm. Although we have light evenings this might give opportunities for some evening solar observing and it seems most members enjoy an early cuppa!.

Small Telescope Observing Nights (STONs)

Contact: Paddy O'Sullivan and Dave Robinson

These currently take place at Orwell Park Observatory on the most moonless Tuesday in the month, starting at 20:15. See online Diary

These are organised by Paddy O'Sullivan and Dave Robinson.

If the weather looks unsuitable those wishing to attend may need to check with Paddy or Dave as the evening may possibly be abandoned.

If members cannot gain access due to lack of Fob, etc., please ring the observatory telephone number **07967 519249**.

Astronomy Workshops

Contact Mike Whybray **Location: Newbourne Village Hall IP10 0EU**

Doors open at 7:00pm. **Workshops start at 7:45pm**

We have moved! If you are a new OASI member, or haven't been to one of these informal workshops before, they are a mixture of events of different characters including beginners talks, interactively workshops, films, etc., suitable for all. They are also a chance to chat with other members over a cup of tea and a biscuit, in a venue rather warmer than the observatory dome on a winter's night!

Newbourne Village Hall is our new location for workshops. Given a clear night, we can make use of the field for a workshop or continue after the workshop with some observing.

Do you have a subject you could workshop? Give Mike Whybray a call! workshops@oasi.org.uk

Lecture Meetings

These take place in The Methodist Halls, Upstairs room, Black Horse Lane, Ipswich

There is some parking at the venue but if there is no space at the venue you can drive to the end of Black Horse Lane and turn left to find a pay and display car park which charges (at the time of writing) £2 for parking between 6pm and 6am. There is also the spiral car park by the New Wolsey theatre.

Andrew Lound — "Lunatick Astronomy" (an historic talk).

Saturday 11th September at 8pm

Professor Rowan-Robinson of Imperial College.

Friday 2nd October at 8pm

Damian Peach – "The Giant Planet Jupiter"

Saturday 7th November

7pm start – earlier than usual

Members – free Non-members £2-00

There is some parking at the venue but if there is no space at the venue you can drive to the end of Black Horse Lane and turn left to find a pay and display car park which charges (at the time of writing) £2 for parking between 6pm and 6am. There is also the spiral car park by the New Wolsey theatre.

Read about planetary photographer, Damian Peach, here:

www.damianpeach.com/about.htm

Roger Pickard "Why observe variable stars?"

14th October 2016. Note this is next year.

Roger is director of the variable stars section of the BAA.

The Night Sky in July

Martin RH

Times are **BST** (unless otherwise stated) at Orwell Park Observatory 52.0096°N, 1.2305°E

Moon

Source: http://heavens-above.com/moon.aspx

Full Moon	Last Quarter	New Moon	1st Quarter
02 July 03:20	08 July 21:24	16 July 02:24	24 July 05:04
31 July 11:43 (Blue Moon)			

Sun and planets + Pluto

Source: http://heavens-above.com/PlanetSummary.aspx

Object	Date	Rise	Set	Mag.	Notes
Sun	1	04:39	21:18		
	31	05:15	20:47		
Mercury	1	03:32	19:25	0.0	Perihelion 2015-Jul-16
	31	05:58	21:13	-1.2	Superior conjunction 2015-Jul-23
Venus	1	08:35	23:12	-4.4	
	31	07:46	20:53	-4.2	
Mars	1	04:18	20:57	1.9	
	31	03:59	20:11	1.9	
Jupiter	1	08:34	23:14	-1.6	Venus-Jupiter conjunction 30 June
	31	07:11	21:28	-1.5	
Saturn	1	17:43	02:31	1.0	
	31	15:41	00:30	1.1	
Uranus	1	00:58	14:10	5.9	
	31	22:56	12:14	5.8	
Neptune	1	23:47	10:19	7.9	
	31	21:49	08:18	7.8	
Pluto	1	21:13	05:24	14.1	Opposition 2015-Jul-06.
	31	19:13	03:23	14.1	Close encounter by New Horizons July 14.

From http://www.nasa.gov/mission_pages/newhorizons/overview/index.html

New Horizons launched on Jan. 19, 2006; it swung past Jupiter for a gravity boost and scientific studies in February 2007, and will conduct a five-month-long reconnaissance flyby study of Pluto and its moons in summer 2015. Pluto closest approach is scheduled for July 14, 2015. As part of an extended mission, the spacecraft is expected to head farther into the Kuiper Belt to examine one or two of the ancient, icy mini-worlds in that vast region, at least a billion miles beyond Neptune's orbit.

Meteor Showers

Source: BAA Handbook 2015 p97-99

Shower	Limits	Maximum	ZHR	Notes
α-Cygnids	July - Aug	July 21 Aug 20	5	Weak , apparently stationary radiant producing steady activity throughout northern summer.
Capricornids	July - Aug	Jul 8 Jul 15 & 26	5	Bright yellow-blue meteors. May have three maxima and multiple radiant.
δ-Aquarids	July 15 - Aug 20	Jul 29 Aug 6	20 10	For those on holiday abroad, the Delta Aquarid meteor shower favours the Southern Hemisphere and tropical latitudes in the Northern Hemisphere.

Occultations during July 2015

James Appleton

No lunar occultations occur during the month under favourable circumstances.

Visible ISS passes ≥15º max altitude

Martin RH

Source: http://heavens-above.com/PassSummary.aspx?satid=25544

NB predictions are approximate. Check the day before. Night shift observers only this month.

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
18 Jul	-1.5	03:32:28	12°	S	03:34:26	20°	SE	03:36:53	10°	E
20 Jul	-2.3	03:20:03	19°	SSW	03:21:46	31°	SSE	03:24:42	10°	E
21 Jul	-1.8	02:27:30	21°	SSE	02:27:31	21°	SE	02:30:02	10°	E
21 Jul	-3.3	04:00:15	10°	WSW	04:03:28	64°	SSE	04:06:41	10°	E
22 Jul	-3.0	03:07:24	23°	SW	03:09:03	47°	SSE	03:12:12	10°	E
23 Jul	-2.5	02:14:45	32°	SSE	02:14:45	32°	SSE	02:17:38	10°	E
23 Jul	-3.4	03:47:33	10°	WSW	03:50:47	80°	S	03:54:02	10°	E
24 Jul	-1.1	01:22:03	15°	ESE	01:22:03	15°	ESE	01:22:54	10°	E
24 Jul	-3.4	02:54:32	24°	WSW	02:56:17	66°	SSE	02:59:31	10°	E
25 Jul	-3.2	02:01:49	49°	SSE	02:01:49	49°	SSE	02:04:57	10°	E
25 Jul	-3.4	03:34:46	10°	W	03:38:01	86°	S	03:41:16	10°	E
26 Jul	-1.4	01:09:03	19°	E	01:09:03	19°	E	01:10:18	10°	E
26 Jul	-3.5	02:41:32	23°	WSW	02:43:26	81°	S	02:46:41	10°	E
26 Jul	-3.4	04:16:30	10°	W	04:19:45	70°	S	04:22:58	10°	ESE
27 Jul	-3.5	01:48:45	67°	S	01:48:51	67°	SSE	01:52:05	10°	E

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
27 Jul	-3.5	03:21:54	10°	W	03:25:09	82°	S	03:28:23	10°	E
28 Jul	-1.7	00:55:57	23°	E	00:55:57	23°	E	00:57:25	10°	E
28 Jul	-3.5	02:28:26	21°	W	02:30:30	86°	S	02:33:45	10°	E
28 Jul	-3.2	04:03:34	10°	W	04:06:44	52°	SSW	04:09:53	10°	ESE
29 Jul	-3.5	01:35:40	78°	SW	01:35:49	82°	S	01:39:04	10°	E
29 Jul	-3.5	03:08:53	10°	W	03:12:06	69°	SSW	03:15:20	10°	ESE
30 Jul	-1.6	00:43:03	22°	E	00:43:03	22°	E	00:44:22	10°	E
30 Jul	-3.5	02:15:33	23°	W	02:17:26	82°	S	02:20:40	10°	E
30 Jul	-2.8	03:50:34	10°	W	03:53:33	35°	SSW	03:56:32	10°	SE
31 Jul	-2.8	01:23:31	47°	E	01:23:31	47°	E	01:25:57	10°	E
31 Jul	-3.3	02:56:06	12°	W	02:58:55	50°	SSW	03:02:04	10°	ESE
31 Jul	-2.9	22:48:49	10°	SW	22:51:49	36°	SSE	22:53:16	23°	ESE

There's an app for that: Try ISS Spotter for iPad/iPhone, which alerts you to impending passes of the ISS. For Android-based phones/tablets there's ISS Detector. If you use Twitter @twisst or @ISS_spotter will send you a tweet when the international space station (ISS) will be visible at your location.

Paul's Astronomy Podcast for July

Paul Whiting FRAS

Podcast, July 2015 www.oasi.org.uk/2015_07_pod.mp3

The Generation of VLF Emissions by Meteors

Source: http://amsat-uk.org/2015/06/09/the-generation-of-vlf-emissions-by-meteors/

Radio amateur Dr David Morgan 2W0CXV has published an article about the possibility of the generation of Very Low Frequency (VLF) emissions in the range 1 to 10 kHz by an ionised meteor trail. He used a FUNcube Dongle SDR [Software-Defined Radio] as part of the equipment for his experiments.

The article reviews the interesting, but not widely known, possibility that an ionised meteor trail can generate Very Low Frequency (VLF) emissions in the range 1 to 10 kHz. The work of several academic authors is referenced to describe the phenomenon and explore the physical mechanism that may be involved.

In this article he discusses the possibility of amateur radio astronomers being able to detect meteor radar echoes and simultaneous Very Low Frequency (VLF) signals in an attempt to establish a causal connection.

Download the article from

www.britastro.org/radio/downloads/The_Generation_of_VLF_Emissions_by_Meteors.pdf

Telescopes (and Eyepieces)

Bill Barton FRAS.

We often say the practical maximum limit on telescopic magnification is

$$M = 2\ D$$

Where M is the magnification, and

D is the aperture (in millimetres)

The actual magnification given by any particular eyepiece is $M = F_{obj}/F_{ep}$

Where M is, again, the magnification, and

F_{obj} is the focal length of the objective lens or mirror

F_{ep} is the focal length of the eyepiece (these last two are measured in the same units)

The focal length of the objective is, of course, fixed on construction of the telescope and the focal length of eyepieces usually ranges from 40mm down to around 4mm.

Combining the above two formulae we get $2\ D = F_{obj}/F_{ep}$

Rearranging this formula we arrive at $2\ F_{ep} = F_{obj}/D$

The right hand side of the above formula is known as the **focal ratio** of the telescope.

So the minimum practical focal length eyepiece (measured in millimetres) for any particular telescope is the 'focal ratio' divided by two. $F_{ep} = (D/F_{obj})/2$

Thus for the 'Tomline Refractor', working at f/15, the limit is a 7.5mm focal length eyepiece. For an f/8 instrument the limit is a 4mm eyepiece. But for a, possibly Dobsonian mounted, Newtonian reflector working at f/5 or f/4 the only practical way to get to the maximum magnification is to use the shortest eyepiece available with a Barlow Lens to simulate an eyepiece around 2mm focal length.

Planetary Pole Stars

Bill Barton FRAS

The following table has been compiled to assist members of this society should they find themselves on a planet of our solar system other than the Earth and need to know where North or South is. The altitude of these stars will also give you your latitude of the planet you are visiting.

	North Pole Star			South Pole Star		
Planet		**RA**	**Dec**		**RA**	**Dec**
Mercury	Omicron Draconis	18h44m	$+61.41^0$	Alpha Pictoris	6h44m	-61.41^0
Venus	42 Draconis	18h11m	$+67.16^0$	Eta[1] Doradus	6h11m	-67.16^0
Earth	Polaris (Alpha Ursa Minoris)	-	$+90.00^0$	Sigma Octantis	-	-90.00^0
Mars	Deneb (Alpha Cygni)	21h10m	$+52.89^0$	Kappa Velorum	9h10m	-52.89^0
Jupiter	36 Draconis	17h52m	$+64.50^0$	Beta Doradus	5h52m	-64.50^0
Saturn	No named naked eye star within $5^0$of this point	2h42m	$+83.54^0$	Delta Octantis	14h42m	-83.54^0
Uranus	Eta Ophiuchi	17h09m	-15.18^0	15 Orionis	5h09m	$+15.18^0$
Neptune	Point between Gamma & Delta Cygni	19h57m	$+43.46^0$	Gamma Velorum	7h57m	-43.46^0

Minsmere Solar Day

The array of telescopes

Photo Martin Richmond-Hardy

Caption competition?

Dr Helen Mason gives a solar talk at Minsmere

Photos: David Murton

and here followeth the Sun...

Mike O'Mahony captured **two clusters of sunspots**
using 120 mm F7 skywatcher refractor, Canon 60D, Thousand Oaks White Light Filter

Report by James Appleton

OASI, DASH, LYRA and Breckland astronomy societies, under the leadership of David Gwynn, Chairman of DASH, jointly hosted a public observing event at the RSPB Minsmere visitor centre, 10.00am - 5.00pm on 21 June 2015 to mark International SUNDay. The guest speaker was Dr Helen Mason, OBE, FRAS, St Edmund's College, University of Cambridge.

Members of OASI arrived at the visitor centre at 09.30am in time to set up their equipment. Doors opened to the public at 10.00am with the first and most important event being a quick safety briefing, to ensure that all understood how to observe the Sun safely, and never to look at the Sun directly except through an instrument specifically designed for the purpose. The programme of talks throughout the day covered a variety of topics about the Sun at *beginner* and *intermediate* levels. Speakers were Dr Helen Mason, Dr Paul Whiting, FRAS, from OASI, and a speaker from Brecklands AS.

Throughout the day there were activities for children, and sources of further information were available (covering courses, books, local astronomy societies, etc.)

Weather throughout the day was mixed but it was possible to do some solar observing during periods of clear sky. A variety of telescopes and equipment were in use, in both white light and Hα, and there was a real-time feed of the solar image onto a large projection screen for all to see.

Members of OASI who attended were: Bill Barton, Andy Gibbs, Roy Gooding, David Murton, Mike O'Mahoney, Pete and Nicky Richards, Martin and Jen Richmond-Hardy and Paul Whiting.

At the end of the day, just as all the exhibitors had finished packing up and were preparing to leave, the RSPB education manager commented: *"I've been involved in many events with the*

RSPB over the years and it is sometimes very hard work trying to get the public engaged with the exhibitors. I needn't have worried about this today, as it was very clear that the astronomers were excellent at engaging with the public!" A welcome encomium.

Is it a Bird, is it a Plane…?

James Appleton

On the evening of Wednesday 10 June, Matthew Leeks and I were on the north-west-facing balcony at Orwell Park Observatory, gazing at the dazzling sight of Jupiter and Venus slowly descending towards the horizon in the twilight. Matthew, glancing idly to the south-west, noticed what appeared to be a close-knit formation of birds in the middle-distance. A quick look with his ever-present pair of big binoculars, however, revealed a large aeroplane, shadowed by four smaller craft, traveling due east. Further scrutiny suggested that the smaller craft were a fighter escort for the larger one, which could perhaps be a passenger, cargo or refueling vehicle. None of the aircraft appeared to be showing navigation lights. As we watched, the flight turned sharply due south and rapidly disappeared.

What's this all about? we pondered. The Queen traveling abroad? No, HRH wouldn't have an escort of four fighters. President Obama returning to the US after the G7 meeting in Schloss Elmau, Bavaria, following a quick stop-over in London? But he'd be flying west from London, not south from Ipswich. And a later consultation of the White House schedule showed that the President returned to Andrews Air Force Base on Monday evening (Tuesday morning, UK time). So no obvious explanation at this stage…

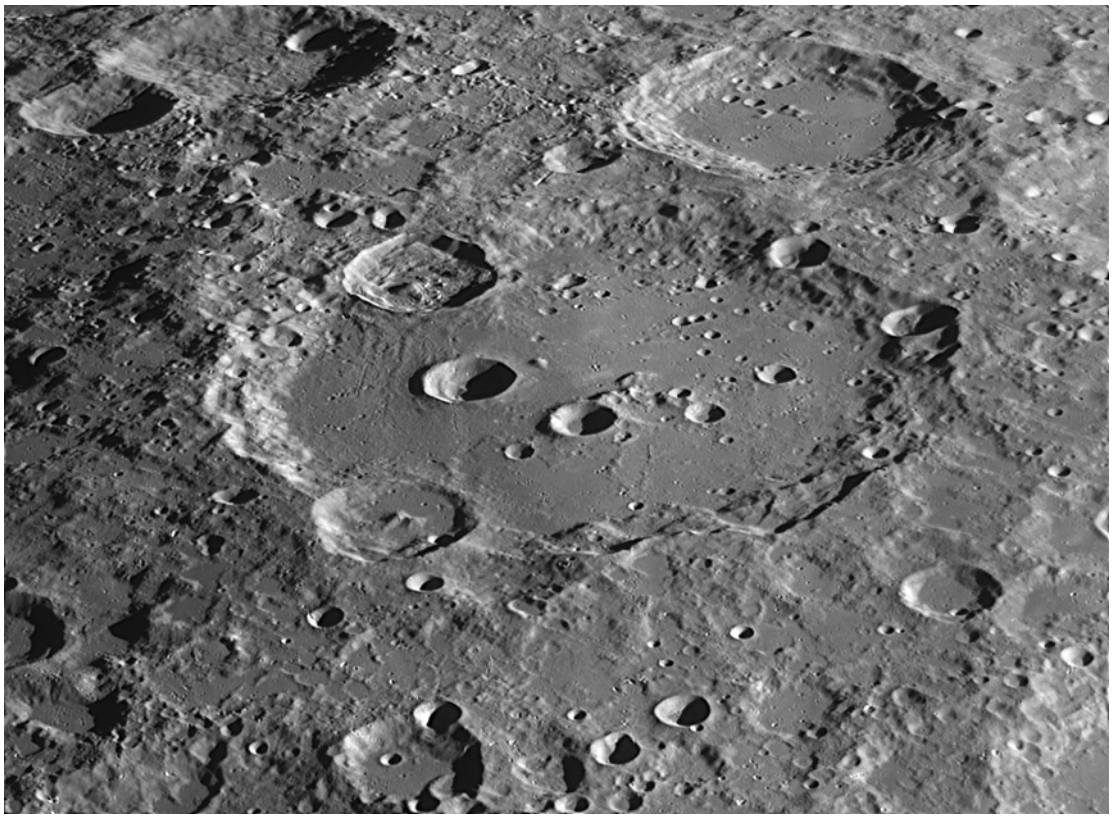
Some days later, I decided to undertake a little research into the mystery flight. Various plane spotters' websites and online forums provided no clues. So, where to turn next? Ask Google, of course! A quick consultation rapidly produced two plausible explanations. Reports in the local Lincolnshire press on Tuesday and Wednesday 09 and 10 June presented the first potential explanation. They described RAF training exercises being held over the county in preparation for the Queen's birthday flypast on Saturday 13 June. By this explanation, the aircraft we saw were probably a C-17 (large cargo carrier) accompanied by Typhoons and/or Tornados, returning to base after the exercise. The current engagement of the British military in a large NATO exercise in the Baltic provided a second plausible explanation, in which case the aircraft we saw were probably a Voyager refueling aircraft accompanied by Typhoons and/or Tornados.

At this stage there is no definitive explanation, but two plausible candidates. Did anyone else see the flight or have any further information about it?

Orwell Park School Observatory and clock tower from the River Orwell

My favourite Lunar Crater – Clavius

Bill Barton FRAS



My favourite Lunar crater is Clavius. It is the third largest crater on the Earth-facing hemisphere. Were it to be easily visible to the naked eye it would be at the "seven o'clock position" around three quarters of the way from the centre of the Moon's disk to the limb in the southern Lunar highlands. Its precise location is 58.40 South latitude by 14.40 West longitude. Its Solar Selenographic Colongitude is therefore approximately 150 (for sunrise) and (15+180) 1950 for sunset, this means that it is illuminated from around one to two days after first quarter until the same period past last quarter or five or so days before the following new moon.

The "Sun's Selenographic Colongitude" value is tabulated daily in the annual British Astronomical Association Handbook. It enables observers to calculate when sunrise (morning terminator) and sunset (evening terminator) occurs over any given Lunar feature providing its longitude is known. The value of the Colongitude is 00 at First Quarter, 900 at Full Moon, 1800 at Last Quarter and 2700 at New Moon. It increases by 0.50 an hour or 12.20 per day.

In terms of relative size, if the Moon was represented by a golf ball Clavius would be the size of one of the dimples. As there is no fixed number of dimples on a golf ball this illustration is only approximate. On this scale the Earth would be six inches (152mm) in diameter and the two globes would be 15ft 6in (4.72m) apart. To illustrate this the dome at Orwell Park is 19ft (5.8m) in diameter, so the two globes would be only just inside the dome walls. In terms of absolute size it is 140 miles (225km) in diameter, so to give you an idea of its scale if London was at the centre Ipswich would be on one rim and with somewhere like Portsmouth on the opposite rim. It is, however, only just over two miles (3.5km) deep. This large diameter and small depth means that it should probably be referred to as a "walled plain" (or depression) rather than a crater, it also means that if you could stand in the centre of the crater you would not be able to see the walls as they would be beyond your horizon. Like many other craters it does have a central peak, but, in this case, it is far from prominent. It is entirely possible that this crater has in the past been partially filled with liquid lava. It is thought to be around four billion years old which puts it only half-a-billion years younger than the Moon itself.

What makes it my favourite? Well, it must be the curving chain of six smaller craters within it with each one smaller than the previous one that appeals to me. This curving decreasing chain often challenges by belief in random evolution. The largest of these is named Rutherfurd which sits atop the southern wall of Clavius. This name is not to be confused with Rutherford, which is on the lunar far-side and named after Ernest, Lord Rutherford (30 August 1871 -19 October 1937) the man who split the atom. Then there is the approximately east-west chain of D, C, N, J and finally JA. The sizes of these craters are given below.

Rutherfurd, 30 x 33 miles, 48 x54km.

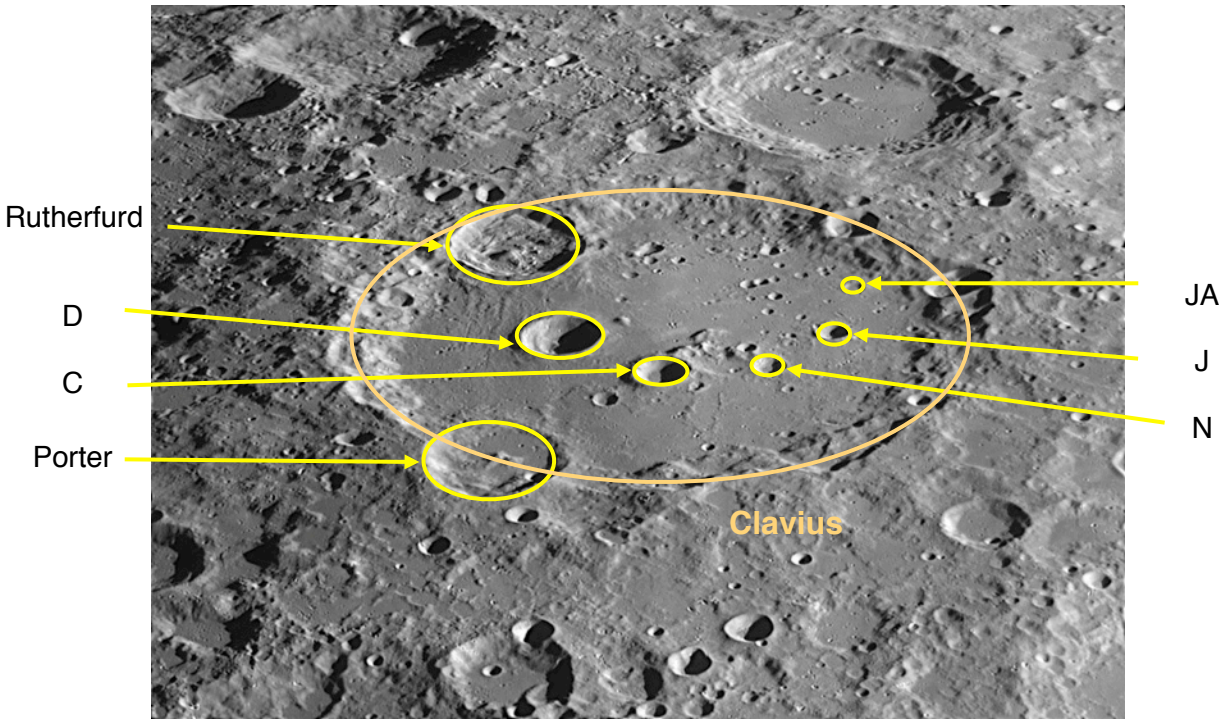
D, 17 miles, 28km.

C, 13 miles, 21km.

N, 8 miles, 13km.

J, 7 ½ miles, 12km.

JA, 5 miles, 8km.



As a chain of objects of decreasing size they can be used to test the resolution of telescopes and observers visual acuity. Clavius itself should be visible in steadily held ten power binoculars and might even be glimpsed by the naked eye if viewed at the right point in the Lunar cycle of phases. Rutherfurd should be seen in a two inch (50mm) aperture telescope, while N, J and JA will need a minimum of four inches or 100mm.

Opposite Rutherfurd sits another crater Porter. Rutherfurd is named after Lewis Morris Rutherfurd (25 November 1816 - 30 May 1892) who was an American lawyer and pioneer astrophotographer. Porter is named after Russell William Porter (13 December 1871 - 22 February 1949) who is regarded as the 'father' of amateur telescope making. Rutherfurd and Porter are virtually identical in size. Rutherfurd was previously known as 'Clavius A' and Porter was previously 'Clavius B'.

Who was Clavius? Well the 'ius' ending to his name suggests a latinised version of a name in another language. In this case he was a German Jesuit mathematician and astronomer and his name is thought to be Christoph Klau (or Clau). He was born in Bavaria on the 25th March 1538 and died on the 2nd February 1612 in Rome. An alternative possibility was that his name was "Schlüssel" (German for "key", which is "clavis" in Latin). As an astronomer Clavius believed in a geocentric solar system, in which all the heavens rotate about the Earth. Though he opposed the Heliocentric system of Copernicus he recognized problems with the (intermediate) Ptolemaic model, which used 'epicycles' and 'deferents'. He was treated with great respect by Galileo, who visited him in 1611 and discussed the new observations being made with the telescope; Clavius had by that time accepted the new discoveries as genuine, though he retained doubts about the reality of the mountains on the Moon. As part of his work on calendar reform Clavius published tables of numerical values and was one of the first to use the decimal point rather than fractional values.

To conclude Clavius was chosen by Arthur C. Clarke as the location for the fictional base for human operations on the Moon in his "2001: A Space Odyssey".

Motion Of the Moon, Venus and Jupiter, 21 May – 10 June 2015

James Appleton

In May-June 2015, the planets Venus and Jupiter, both at the time in the constellation Cancer, appeared in the western sky shortly after sunset. In late May, the pair was joined by the crescent Moon, which passed close by during the three days 21 – 24 May. The conjunction of objects formed a very photogenic grouping.

Throughout the period, Venus and Jupiter appeared in the neighbourhood of α and β Gemini, Castor and Pollux respectively. The stars provided a fixed reference point against which to judge the motions of the planets and the Moon.

On each clear evening during 21 May – 10 June, I photographed the western sky after sunset. (The dates span the period from the genesis of the project to the last date before the planets disappeared in the evening twilight behind a neighbour's house.) I adjusted the images to a common scale and alignment (using the fixed stars Castor and Pollux as markers), highlighted Castor, Pollux, the Moon, Venus and Jupiter as foreground objects and set everything else as a transparent background and overlaid the images. Adding as background the terrestrial landscape looking west produced the composite image below. In the image, the numbers below the Moon and planets represent dates in May and June. The position of Jupiter is shown for the same dates as Venus, and in the same sequence (numbers are not given for Jupiter as they would be too squashed together). Castor and Pollux are marked. Note that the images of the stars and planets have been slightly retouched to enhance visibility: the image covers an area of approximately 600 square degrees and the objects un-retouched would appear as very small dots.

The Moon clearly shows the largest apparent daily movement, followed by Venus, then Jupiter. The motion of Venus appears approximately linear and prograde over the period shown, with daily increments in RA slightly reducing over time; this is in line with theory. The path of Jupiter also appears prograde, but notably less regular; this is due to its increased apparent distance from Castor and Pollux, magnifying the effect of alignment errors in composing the image.

Table 1 lists the apparent daily motions of the planets over the period in question, calculated using the NASA ephemeris DE-430. As expected, the dominant motion of the bodies is in RA.

	Daily Average Motion	
Body	**RA (°)**	**Dec (°)**
Venus	1.06	-0.20
Jupiter	0.14	-0.04

Table 1. Average daily planetary motions, 21 May - 10 June 2015.

To the naked eye, the motion of Venus was apparent each night as it sped towards and then away from Pollux. Greatest eastern elongation occurred on 06 June. The daily motion of Jupiter, however, was not obvious.

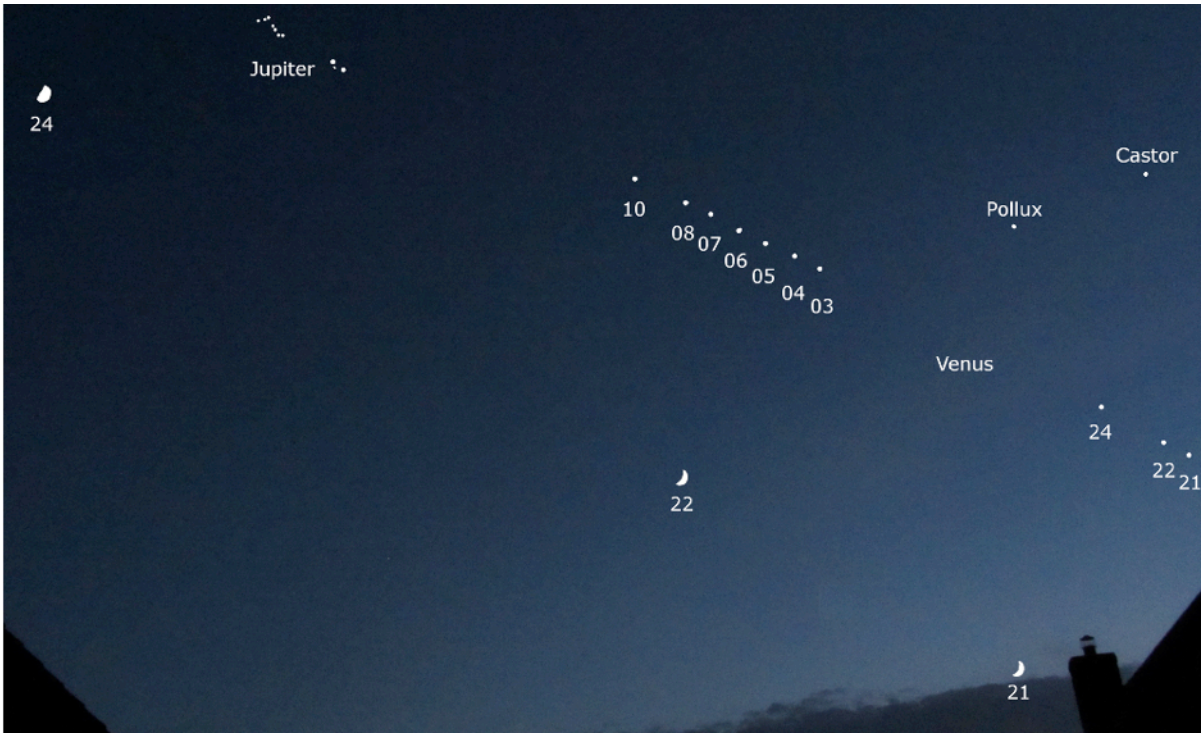


Figure 1. Motion of Moon, Venus and Jupiter 21 May – 10 June 2015.

Sesame Name Resolver

http://cds.u-strasbg.fr/cgi-bin/Sesame

The **Sesame** Service queries several databases from the name of an astronomical object (outside the Solar System bodies), and displays some fundamental parameters (type of object, J2000 position).

http://www.minorplanetcenter.net/db_search

Build your own observatory like our Chairman's

Sky at Night magazine Jan 2015 cover disk supplement

Author: Brian Critchley

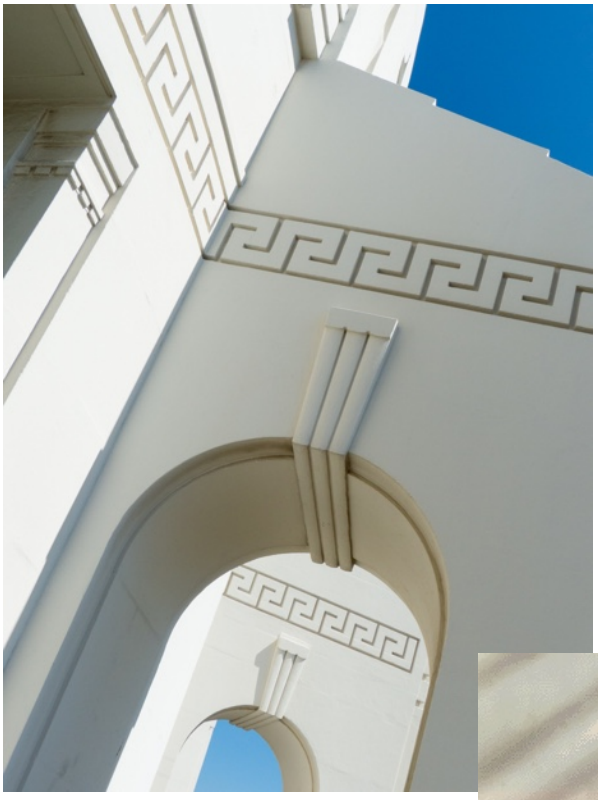
http://www.skyatnightmagazine.com/CAD-plans
Foundations
http://immediatecontent.co.uk/sites/default/files/BBC%20S%40N%20116_CADPLAN1.pdf
Walls
http://immediatecontent.co.uk/sites/default/files/BBC%20S%40N%20116_CADPLAN2.pdf
Dome
http://immediatecontent.co.uk/sites/default/files/BBC%20S%40N%20116_CADPLAN3.pdf
Finishing touches
http://immediatecontent.co.uk/sites/default/files/BBC%20S%40N%20116_CADPLAN4.pdf

Griffith Observatory

Mike Kwasniak http://www.mikekwasniak.co.uk/

The observatory http://www.griffithobservatory.org/ belongs to the state of California, everything apart from seats in the planetarium free, and peeks down the telescope start at 7.00pm, four hours after we left.

The shot of the telescope is a bit rubbish because it's viewed through glass and there's light reflecting off the glass from the doorway. I asked two complete strangers to stand in the doorway and cut out as much as possible, but they weren't quite tall enough.



Did I mention 'The Rocketeer' ? Long-standing favourite art deco movie, which has a lengthy climactic battle outside this building, before the action transfers to an airship. It was so lovely to walk across the forecourt, remembering the movie.

Editor's note: Mike, knowing my interest in astronomy, recently sent me some pictures of his recent visit to California. I am most grateful for his permission of use them.