



OASI News

The newsletter of the Orwell Astronomical Society



Trustees: Mr Roy Adams Mr David Brown Mr David Payne
Honorary President: Dr Allan Chapman D.Phil MA FRAS

Lunar eclipse pictures



Moon just before eclipse, Martin Richmond-Hardy
Skywatcher 200 + Canon 500D 1/320s ISO100



Total Lunar eclipse with stars. Photo by David Murton
Mid-eclipse with a Skywatcher 200 PDS and Canon 1100D camera

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Society Contact details

Observatory (meeting nights only)

07967 519249

Email queries: info@oasi.org.uk

Facebook: <https://www.facebook.com/groups/445056098989371/>

Twitter: @OASlpswich

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, rtf, 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.

The Newsletter

The full colour version is available from the OASI web site.

[Newsletter archive](http://www.oasi.org.uk/NL/NL_form.shtml) 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.
Co-opted	Avtar Nagra	Newbourne Observing Group
	Kevin Fulcher	Safety & security, Newbourne Observing Group
	Pete Richards	Lecture co-ordinator
	Andy Willshire	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 17 November 2015, *Shepherd and Dog*, starting 8.00pm. This is an open meeting.

New Members

Ms Karen Lord	Ms Suzanne Parrott	Mr Martyn Andrews
Mr Lee Robinson	Dr Richard Young	Ms Joy Dearing

Short articles for OASI News

If you don't feel up to writing a major article, perhaps you might write a short note for OASI News along the lines of *"This month I have mostly been observing/constructing/mending/reading/etc."*? Articles win points! See page 6.

OASI Member of the Year Competition

- Open to any non committee member (at time points earned)
- Runs from 1st September to 31st August each year
- Winner gets a free membership for the following year
- The points table will be posted in the newsletter
- It is the members responsibility to check that they have been credited the points for a particular event

Activity	Points	Activity	Points
Helping at an OASI outreach event	10	Writing a newsletter article (per page)	3
Giving a workshop	20	Introducing a new member	5

2015 Outreach Meetings

Contact: Roy Gooding

Bentley Star Party 21st November

Saturday 21st November 19:00 to 21:00. Set-up from 18:00

The playing field is at the bottom of Case Lane. There is parking in the field. Location to be arranged on the day.

<https://www.google.co.uk/maps/@51.9916497,1.0696197,17z>

The star parties will be open any villagers who wish to come along.

If you have any questions about outreach meetings, please contact Roy Gooding.

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>

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.
Wednesday 28 Oct, 17:30	Burlington House. London	https://britastro.org	BAA AGM + Ordinary Meeting
Sat 31 Oct	Northampton Natural History Society	Paul Hyde RAGg4csd@yahoo.co.uk	BAARAG one-day workshop on Meteor Scatter. Joint meeting with the BAA Meteor Section. Open to non-BAA members.

Date and Time	Location	Contact	Event
Sat 07 Nov, 19:00 Note earlier start time.	Methodist Church Hall	Pete Richards lectures@oasi.org.uk	Public event. Lecture Meeting. Damien Peach: <i>The Giant Planet Jupiter.</i> Access is free to members of OASI; £2 per head for non-members.
Monday 9 November 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Tuesday 10 Nov. 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Tuesday 17 Nov 20:00	Shepherd & Dog	Roy Gooding	OASI Committee meeting
Saturday 21 Nov from 19:00	Bentley playing field	Roy Gooding	Public access event. Star Party.
Monday 23 Nov. 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
27–29 Nov	Madingley Hall, Cambridge	www.ice.cam.ac.uk/Galaxies-Weekend	Exploring Galaxies. See page 13
Tuesday 08 Dec 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Wednesday 09 Dec	The Fox Inn , Newbourne	Roy Gooding secretary@oasi.org.uk	Christmas meal. (Open to members of OASI and their guests. Places must be booked.)
Saturday 12 Dec, 14:30	UCL, Christopher Ingold Building, 20 Gordon St, LONDON WC1H 0AJ	https://britastro.org	BAA Christmas Lecture
Monday 14 Dec. 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Thu 17 Dec, 18:00	Location Clopton area See p24	James Appleton info@oasi.org.uk	Field trip to observe graze of Tycho 5248-0249-1. More info.
2016			
Monday 11 January 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group and Workshop. At 20:00, Astronomy Workshop, Paul Whiting, New Horizons of Pluto. Paul will present the problems and highlights of the amazing views of Pluto that were sent back by the New Horizons probe.

Date and Time	Location	Contact	Event
Tuesday 12 January 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Saturday 23 January, 14:30 - 18:30	Burlington House, LONDON W1J 0DU	https://britastro.org	BAA Ordinary Meeting James Appleton - Rømer Revisited: A modern estimation of the speed of light from observations of Jupiter's Galilean satellites. Tom Kellestein - The search for near-Earth asteroids. Dominic Ford - MeteorPi: A DIT kit for video meteor triangulation. Callum Potter - Sky notes
Monday 25 January 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Tuesday 16 February 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Saturday 27 February	Rugby	https://britastro.org	BAA Deep Sky Section meeting
Saturday 05 March	Cheltenham	https://britastro.org	BAA Back to Basics Workshop
Tuesday 15 March 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Saturday 19 March, 10:00 - 17:30	Northampton	https://britastro.org	BAA Variable Star Section Meeting
Wednesday 30 March, 17:30 - 20:00	Burlington House, LONDON W1J 0DU	https://britastro.org	BAA Ordinary Meeting & Special General Meeting
Friday - Sunday 1-3 April	Sparsholt College, Winchester SO21 2NF	https://britastro.org	BAA Winchester Weekend
Tuesday 05 April 20:15	Orwell Park Observatory	Paul Whiting FRAS treasurer@oasi.org.uk	Public access event. Observatory tour. Places must be booked. Further info and book a place.
Saturday 30 April, 10:00 - 17:30	Broomfield, Nr Chelmsford	https://britastro.org	BAA One Day Spring Meeting
Monday 9 May 2016, 11:00	Orwell Park Observatory	Martin Cook membership@oasi.org.uk James Appleton info@oasi.org.uk	Observation of the Transit of Mercury
Saturday 21 May	Quaker Meeting House, Liverpool	https://britastro.org	BAA Historical Section Meeting
Wednesday 25 May	Burlington House, LONDON W1J 0DU	https://britastro.org	BAA Ordinary Meeting & George Alcock Memorial Lecture

Date and Time	Location	Contact	Event
Saturday 18 June, 10:00 - 17:30	Institute of Astronomy, Cambridge	https:// britastro.org	BAA Webb Deep Sky Society AGM
Saturday 02 July 11:00	York	https:// britastro.org	BAA Summer Meeting
Friday-Sunday 9 -11 September	Dundee	https:// britastro.org	BAA Autumn Weekend Meeting <i>Stars: Theory, Physics and Effects.</i>
Friday - Sunday 9 -11 September	Horncastle, Lincolnshire	https:// britastro.org	Horncastle Astronomy Weekend
Saturday 24 September, 10:00 - 17:30	Burlington House, LONDON W1J 0DU	https:// britastro.org	BAA Observers' Workshop Asteroids & Remote Planets
Saturday 15 October	Chichester	https:// britastro.org	BAA Back to Basics Workshop
Wednesday 26 October, 17:30 - 20:00	Burlington House, LONDON W1J 0DU	https:// britastro.org	BAA Annual General Meeting

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

OASI Christmas Meal at the Newbourne Fox

URL: <http://www.debeninns.co.uk/fox/christmas-menu/>

Date: Wednesday 9th December 20:00

Deposit: £5 Balance: £13.95 Contact Roy Gooding for details

DASH Astro Events – November

See <http://dash.moonfruit.co.uk> for the latest details.

Saturday 7th November 2015 - at Westleton Common – Setup 6:30pm

As the dark nights start to deepen come along and observe all the Autumn sky has to offer – if you're lucky you might even spot a meteor or two! If this event is cancelled due to poor weather notice will be given on the day via email and on the website www.dash.moonfruit.com be sure to check. Where possible we will still meet up albeit in The Crown at Westleton for an Astro Social evening.

Saturday 21st November 2015 - at Westleton Village Hall 7:30pm.

Professor Michael Rowan-Robinson - *'My nights at the telescope'*

Honorary President of DASH, Professor Michael Rowan-Robinson will be talking to us about his experiences in Astronomy and about the various telescopes he has used around the world.

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**.

Newbourne Observing Group

Avtar Nagra nog@oasi.org.uk Kevin Fulcher

We meet at Newbourne Village Hall, Mill Lane, 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.

Newbourne is also the new location for OASI Workshops.

Nov. 9th & 23rd
Jan. 11th & 25th

Dec. 14th

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



Astronomy Workshops

Contact Mike Whybray

Location: Newbourne Village Hall IP12 4NP

Doors open at 7:00pm.

Workshops start at 8:00pm

!!! Note that the day, start time and the location of workshops have all changed !!!

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, interactive 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 occasional workshops, which will be held on dates booked for normal NOG (Newbourne Observing Group) meetings. If you aren't interested in the workshop you can still just use the hall facilities and the field for observing – but please be quiet so as not to disturb the workshop!

Given a clear night, we can make use of the field for a workshop or continue afterwards with some observing – something not possible at the previous venue, Nacton village hall.

Do you have a subject you could workshop? You could do a short one, or share the effort with a partner. Drop Mike Whybray a line! workshops@oasi.org.uk

Monday 26 October – CERN: Accelerating Science – Charlie Green

At 20:00, Astronomy Workshop, Charlie Green will talk about his recent working visit to the Large Hadron Collider at CERN, Switzerland.

His talk will cover three main areas:

1. The LHC and the detectors; the underlying physics and engineering of how they work, and their purposes
2. The physics that has been done, is being done, and will be done at CERN, from the big unanswered questions to small-scale research interests
3. An overview and explanation of his work this summer with the ATLAS Collaboration

Monday 11 January: New Horizons of Pluto – Paul Whiting

Paul will present the problems and highlights of the amazing views of Pluto that were sent back by the New Horizons spacecraft in July.

Lecture Meetings

These take place in Museum Street 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.



Audience and Professor Rowan-Robinson of Imperial College - "Infra-red images".

Damian Peach – "The Giant Planet Jupiter"

Saturday 07 November

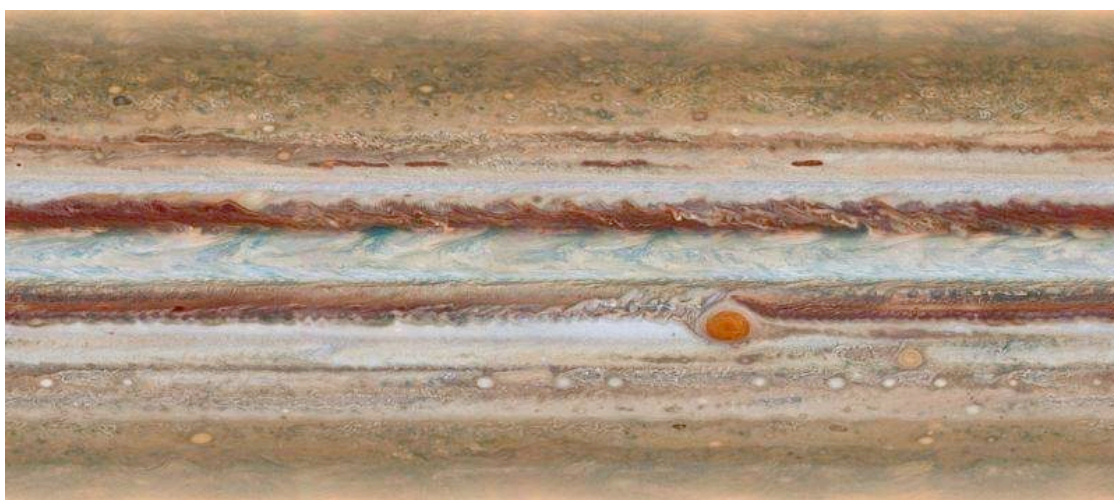
7pm start – earlier than usual

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



Hubble's planetary portrait captures changes in Jupiter's Great Red Spot buff.ly/1GcFxQP

The Night Sky in November

Martin RH

ICYMI Change to GMT was on 25 October.

All event times given are GMT (UTC) for the location of 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
27 October 12:05	03 November 12:24	11 November 17:47	19 November 06:27
25 November 22:44			

Sun, Moon and planets

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

Object	Date	Rise	Set	Mag.	Notes
Sun	1	06:49	16:27		
	30	07:39	15:48		
Moon	1	21:03	11:51		Apogee 07 Nov 21:50
	30	20:53	11:06		Perigee 23 Nov 20:08
Mercury	1	05:49	16:11	-0.9	Superior conjunction-17 Nov
	30	08:32	15:53	-0.4	Aphelion 25 Nov
Venus	1	02:26	15:04	-4.2	Maximum western elongation 26 Oct
	30	03:30	14:14	-4.1	Perihelion 29 Nov
Mars	1	02:28	15:10	1.7	Aphelion 20 Nov
	30	02:13	13:45	1.5	
Jupiter	1	01:55	14:57	-1.7	
	30	00:24	13:11	-1.8	
Saturn	1	09:09	17:35	1.4	Superior conjunction 30 Nov
	30	07:33	15:51	1.4	
Uranus	1	15:46	04:52	5.7	
	30	13:50	02:53	5.8	
Neptune	1	14:39	01:00	7.9	
	30	12:45	23:02	7.9	

Meteor Showers

Source: BAA Handbook 2015 p97-99

Shower	Limits	Maximum	ZHR	Notes
Taurids	Oct 20 - Nov 30	Nov 5 Nov 12	10	Slow meteors. Double radiant. Broad peak $\lambda_{\odot} = 220^{\circ}$ - 230° . Sometimes more bright events, as in 2005. Favourable.
Leonids	Nov 15 - 20	Nov 18 07h	20?	Very fast meteors, many with persistent trains. Enhanced activity unlikely until the late 2020s. Quite favourable

Occultations during October 2015

James Appleton

The table lists lunar occultations which occur during the month under favourable circumstances. The data relates to Orwell Park Observatory, but will be similar at nearby locations.

Date	Time (UT)	D/R	Lunar Phase	Sun Alt (d)	Star Alt (d)	Mag	Star
29 Oct 2015	19:27:23	R	0.92-	-27	9	3.4	Theta 2 Tau
29 Oct 2015	19:32:13	R	0.92-	-28	9	3.8	Theta 1 Tau
29 Oct 2015	21:49:49	D	0.91-	-46	30	0.9	Aldebaran
	22:48:24	R		-50	38		
17 Nov 2015	18:16:08	D	0.33+	-20	19	6.4	ZC 2986
18 Nov 2015	18:44:59	D	0.44+	-25	23	5.5	18 Aqr
	19:19:29	R		-30	21		
19 Nov 2015	17:30:37	D	0.55+	-14	28	5.8	ZC 3270
19 Nov 2015	19:46:24	D	0.56+	-35	27	7.2	ZC 3280
20 Nov 2015	22:31:54	D	0.68+	-55	21	6.6	ZC 3431
21 Nov 2015	23:47:24	D	0.79+	-58	22	7.3	Tyc 2-0709-1
22 Nov 2015	18:56:32	D	0.86+	-27	36	7.3	Hip 5133

Visible ISS passes $\geq 15^\circ$ max altitude

Martin RH

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

Visible passes only for early birds this month.

NB predictions are approximate. Check the day before.

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
06 Nov	-0.4	06:02:10	10°	S	06:04:15	16°	SE	06:06:24	10°	ESE
08 Nov	-1.3	05:52:15	10°	SSW	05:55:04	27°	SSE	05:57:54	10°	E
09 Nov	-0.8	05:00:20	11°	S	05:02:31	18°	SE	05:04:54	10°	E
10 Nov	-2.3	05:42:56	11°	SW	05:45:54	43°	SSE	05:49:02	10°	E
11 Nov	-1.9	04:52:41	28°	S	04:53:17	30°	SSE	04:56:13	10°	E
11 Nov	-3.2	06:26:14	10°	WSW	06:29:29	78°	S	06:32:46	10°	E
12 Nov	-0.3	04:02:20	15°	ESE	04:02:20	15°	ESE	04:03:15	10°	E
12 Nov	-3.1	05:34:58	24°	WSW	05:36:46	64°	SSE	05:40:01	10°	E
13 Nov	-2.3	04:44:30	44°	SE	04:44:30	44°	SE	04:47:14	10°	E
13 Nov	-3.3	06:17:09	10°	W	06:20:24	86°	S	06:23:41	10°	E
14 Nov	-3.4	05:26:36	40°	WSW	05:27:38	81°	S	05:30:54	10°	E

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
15 Nov	-1.8	04:36:00	36°	E	04:36:00	36°	E	04:38:07	10°	E
15 Nov	-3.3	06:08:37	15°	W	06:11:16	82°	S	06:14:32	10°	E
16 Nov	-3.4	05:17:59	62°	W	05:18:28	86°	S	05:21:44	10°	E
17 Nov	-1.1	04:27:19	27°	E	04:27:19	27°	E	04:28:55	10°	E
17 Nov	-3.2	05:59:56	20°	W	06:02:03	66°	SSW	06:05:18	10°	ESE
18 Nov	-3.4	05:09:15	79°	S	05:09:15	79°	S	05:12:31	10°	ESE
19 Nov	-0.6	04:18:34	20°	E	04:18:34	20°	E	04:19:41	10°	E
19 Nov	-2.7	05:51:11	25°	W	05:52:44	46°	SSW	05:55:52	10°	SE
20 Nov	-2.7	05:00:31	50°	SSE	05:00:31	50°	SSE	05:03:10	10°	ESE
20 Nov	-1.4	06:33:31	10°	W	06:35:59	20°	SW	06:38:24	10°	SSE
21 Nov	-2.1	05:42:29	25°	WSW	05:43:17	29°	SSW	05:46:09	10°	SSE
22 Nov	-1.5	04:51:51	26°	SSE	04:51:51	26°	SSE	04:53:37	10°	SE
23 Nov	-1.4	05:33:54	17°	SSW	05:33:54	17°	SSW	05:35:55	10°	S

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 November

Paul Whiting FRAS

Podcast, August 2015 www.oasi.org.uk/2015_011_pod.mp3

Institute of Astronomy, Cambridge

www.ast.cam.ac.uk/public

For the Public: Open Evenings. We host weekly public open evenings every Wednesday during the Winter season (October - March).

We are gearing up to the 2015/16 season which will kick off on 7 October 2015.

[Find out what's involved](#); and a list of [what talks were on during the last season](#).

Exploring Galaxies

Joshua Hatley, Communications and Marketing Assistant
Institute of Continuing Education, University of Cambridge

I'm writing from the Cambridge University Institute of Continuing Education regarding a forthcoming weekend course, **Exploring Galaxies**, that I hope will be of interest to you and members of Orwell Astronomical Society. It would be great if you could forward this information on to members of your society to see if anyone would like to attend. We're also so so close to 1000 twitter followers, so if you would like to follow us @cambridge_ICE and RT this tweet to help us promote the weekend course, that would be fantastic

<https://twitter.com/JudeCroston/status/649510159929221120>

Exploring Galaxies

What's special about our corner of the Universe? How did our galaxy come to be and how might it change in future? In this course we will explore the variety of galaxies, from near to far, 'ordinary' to exotic, and we will investigate how modern space missions and observatories are changing our understanding of their habits and histories. The course is taught by **Dr Judith Croston**, ICE academic director in astronomy and physical sciences. As well as regularly teaching with us, she currently leads several international research projects investigating jets from supermassive black holes using ground and space-based astronomical observatories. This weekend course **starts on the 27 November and runs until Sunday 29 November**.

For more information about this course and to sign up, please visit www.ice.cam.ac.uk/Galaxies-Weekend

Further information

This weekend course costs £260, which includes lunch & dinner over the weekend, refreshments, and tuition. It is also possible to stay at the Institute's home, Madingley Hall, over the weekend at an extra cost starting at £50 per night, subject to availability.

We also run a number of other short courses in a variety of academic subjects including astronomy and physical sciences throughout the year that might be of interest to members. You can find out more information about these courses at www.ice.cam.ac.uk/short-courses

Kind regards

Joshua Hatley

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It's getting colder and Christmas is coming...

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Beanie Hats, Base Ball Caps & Sweat Shirts usually in society stock.

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See Mike Norris for details.

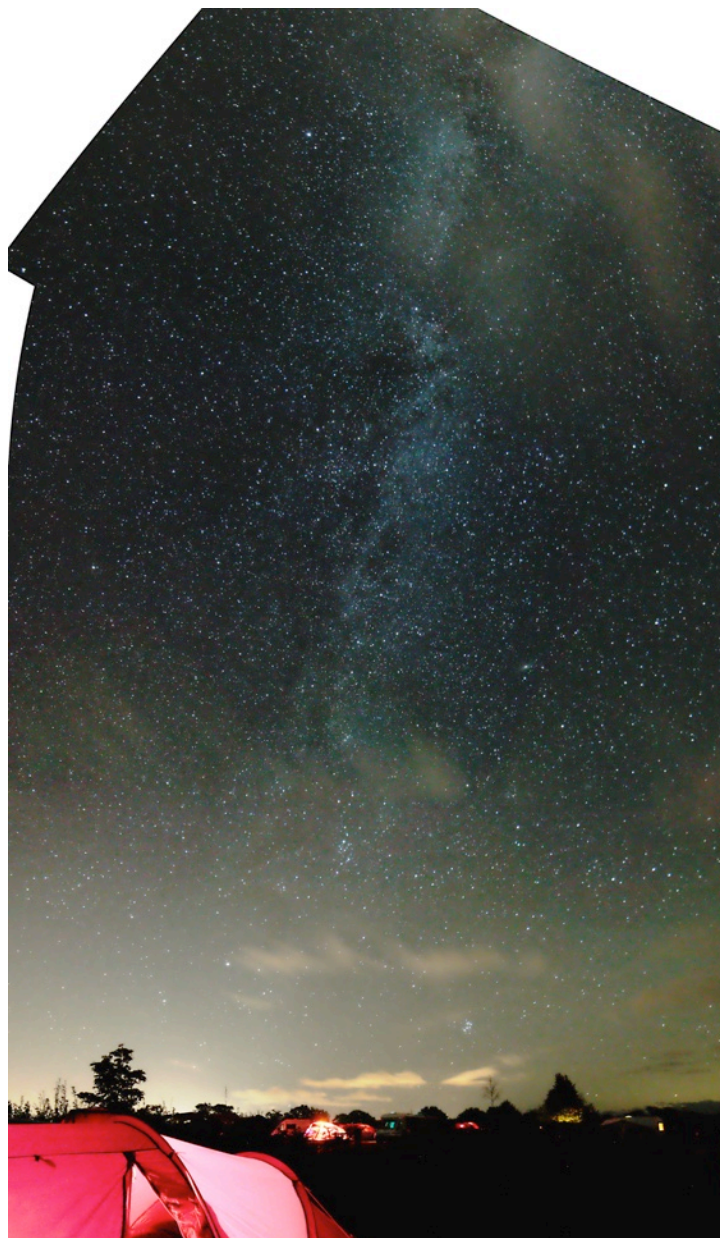
Haw Wood Farm Star Party report

David Murton

The weekend of 9th to 11th October saw the latest Autumn Star party at Haw Wood Farm campsite just 25 miles up the A12 at Darsham. Organised by the Breckland Astronomical Society this is one of two events held each year at the site the other being in the spring.

This year's attendance was swelled by a group of 20 members of the Castle Point Club from Rayleigh in Essex on their annual weekend away, who came with a varied selection of scopes. A big increase in the number of people doing astrophotography was evident this year with people taking advantage of the really dark conditions at this location where the zodiacal light has been seen and the Milky Way really stands out.

Arriving on the Friday afternoon, those who had been there for a couple of days confirmed that the Thursday night had been clear and with a good forecast for the Friday night things were looking good. Having set up my tent and scopes, I had a look at some of the other scopes scattered around. There were several huge Dobbs culminating in Andrew Robinson's 24" go-to motorised version which requires a step ladder to use the eyepiece when it pointing near the zenith!. Andrew is a deep sky object hunter and was to give a guided tour of the sky on the Saturday evening for the public on the site.



The evening started promisingly but heavy dew and some light high level cloud, while ok for visual observing, hindered attempts at taking photographs. The Milky Way was glorious however and the early hours saw the Pleiades and the Orion nebula standing out.

The camp site go to great lengths to make everyone welcome, including putting black outs on the windows of the excellent shower/toilet blocks, turning off the site lighting and laying on a get together and sky tour including hot soup. Saturday was spent talking astronomy, drooling over huge telescopes and complicated CCD imaging rigs. The forecast for Saturday evening wasn't so good and sure, enough as Andrew gave his talk, the sky was pretty cloudy with patches of stars showing through the high level cloud. Suddenly a bright fireball streaked across the sky overhead leaving a huge tail behind which caused a few gasps from those present and prompted him to suggest that he had arranged it beforehand, good try Andrew!

After the get together it was time to get back to the scopes and do what we could. The high level cloud again prevented meaningful photography and most of the big dobbs were unused as faint galaxies were hard to make out with the cloud and reflected light.

All in all an excellent weekend. The skies may not have been the best but it didn't rain and who can complain about a weekend talking and doing astronomy with like minded people.



The next star party here will be in the Spring. It's an excellent location, the facilities are first class and it's only £10 a night for a serviced pitch, so how about a few more OASI members giving it a go? It's definitely a case of the more the merrier. Perhaps we can take a lead from the Castle Point members who had a great time.

Home-made 20" go-to motorised Dobsonian



Gone shopping at the International Astronomy Show

Words by David Murton, Pictures by John Wainwright



The 2nd and 3rd October saw the third Internal Astronomy Show with a change of venue this year to the National Agricultural Exhibition Centre at Stoneleigh, near Coventry. This is a fantastic venue with ample indoor parking, plenty of space and easy access to major routes.

John Wainwright, Mike O'Mahoney and I decided to drive up on the Friday which is usually the quieter day in search of bargains! There were loads of stands covering all aspects of astronomy and none of the crush associated with some other shows, while catering was very reasonable with hot food available.



We decided against attending any of the lectures as we had to be back for the OASI lecture in the evening, but there was so much to see and talk about it would have been difficult anyway. As far as the bargains are concerned, see the photo of my car boot!!

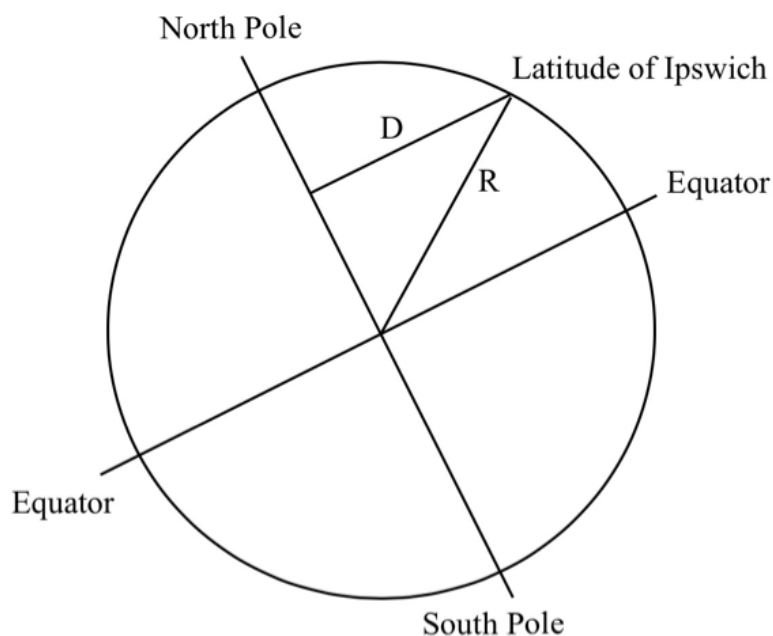
This is an excellent show and I would recommend it to everyone just to drool over some of the gear on display.

David Murton

The Earth's Axis and Your Equatorial Mounting

Bill Barton, FRAS

When setting up an equatorial telescope mounting we strive to get the polar axis of the mounting parallel to the Earth's axis, but how far away is this axis?



Taking the Earth's radius as 6371km (3958 miles, referred to as R below) and knowing that this value will only apply at the equator as the Earth's radius diminishes as we approach a pole.

The Earth's latitude is measured in degrees North and South from the equator, but in this case the angle we need is the co-latitude (90° minus latitude) in order to solve a triangle where the Earth's radius is the hypotenuse and we are trying to find the adjacent side (D). For reference, Ipswich is 52° North, hence our co-latitude is 38° .

$$\cos(\text{co-lat}) = D/R$$

Rearranging the formula to make D the subject we get

$$R \cdot \cos(\text{co-lat}) = D$$

$$R \cdot \cos 38^\circ = D$$

$$6371 \cdot 0.788 = D$$

$$D = 5020\text{km (or } \sim 3120\text{miles)}$$

And, of course, this measurement is at right angles to the polar axis and not vertical which would be back to the full Earth's radius again. Even though the two axes are five thousand kilometers apart this figure is zero when compared to the distance of the things we see in the night sky, thus the polar axis of the telescope mounting and the Earth's axis can be considered co-incident.

This distance, when laid out on the surface of the Earth would take you from London to Cape Cod in New England.

From the interweb

Very good animation video by **Sylvain Weiller** of the lunar eclipse at <http://sweiller.free.fr/>

Total Lunar Eclipse 2015 September 28

Paul Whiting FRAS

The following is an extract from Fred Espenak's eclipse pages on the NASA website [eclipse.gsfc.nasa.gov/OH/OHres/Danjon.html].

Danjon Scale of Lunar Eclipse Brightness

The Moon's appearance during a total lunar eclipse can vary enormously from one eclipse to the next. Obviously, the geometry of the Moon's path through the umbra plays an important role. Not as apparent is the effect that Earth's atmosphere has on eclipses. Although the physical mass of Earth blocks off all direct sunlight from the umbra, the planet's atmosphere refracts some of the Sun's rays into the shadow. Earth's atmosphere contains varying amounts of water (clouds, mist, precipitation) and solid particles (dust, organic debris, volcanic ash). This material filters and attenuates the sunlight before it's refracted into the umbra. For instance, large or frequent volcanic eruptions dumping huge quantities of ash into the atmosphere are often followed by very dark, red eclipses for several years. Extensive cloud cover along Earth's limb also tends to darken the eclipse by blocking sunlight. The French astronomer A. Danjon proposed a useful five point scale for evaluating the visual appearance and brightness of the Moon during total lunar eclipses. 'L' values for various luminosities are defined as follows:



- L = 0 Very dark eclipse. Moon almost invisible, especially at mid-totality.
- L = 1 Dark Eclipse, gray or brownish in coloration. Details distinguishable only with difficulty.
- L = 2 Deep red or rust-coloured eclipse. Very dark central shadow, while outer edge of umbra is relatively bright.
- L = 3 Brick-red eclipse. Umbral shadow usually has a bright or yellow rim.
- L = 4 Very bright copper-red or orange eclipse. Umbral shadow has a bluish, very bright rim.

The assignment of an 'L' value to lunar eclipses is best done with the naked eye, binoculars or a small telescope near the time of mid-totality. It's also useful to examine the Moon's appearance just after the beginning and before the end of totality. The Moon is then near the edge of the shadow and provides an opportunity to assign an 'L' value to the outer umbra. In making any evaluations, you should record both the instrumentation and the time. Also note any variations in colour and brightness in different parts of the umbra, as well as the apparent sharpness of the shadow's edge. Pay attention to the visibility of lunar features within the umbra. Notes and sketches made during the eclipse are invaluable in recalling details, events and impressions.

Members were asked to use the above scale to categorise their observations of the eclipse, the following responses were received:

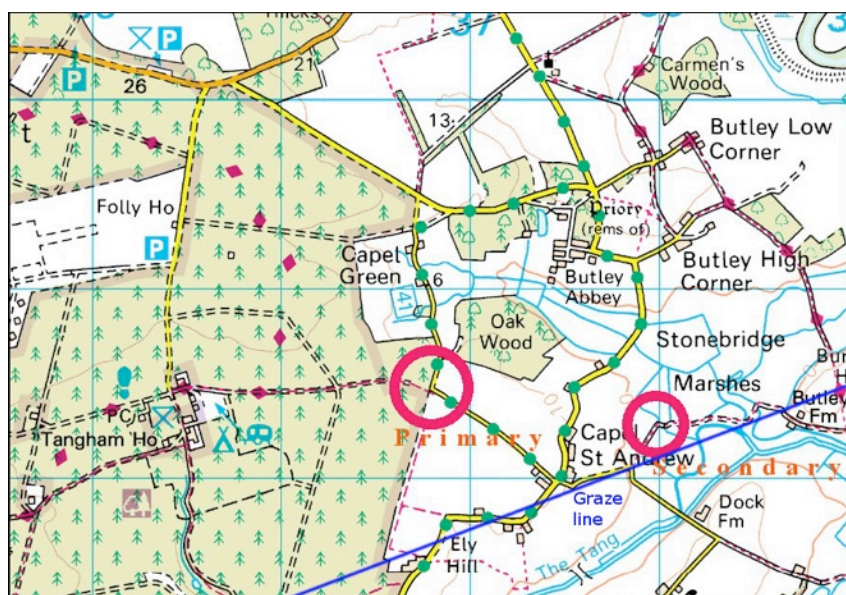
- | | |
|-----------------------|---|
| Paul Whiting | L0 during penumbral eclipse.
L2 at start of umbral eclipse with very bright lower edge.
L3 at mid-point of umbral eclipse. |
| David Murton | L2 very dark with discernible white rim at totality. |
| Mike Norris | L3 |
| Martin Richmond-Hardy | L2 |

A grazing occultation of ZC618 (or was it a close encounter....?)

Alan Smith

The fourth of this year's grazing occultations was predicted to take place during the very early Friday morning of 2nd Oct. 2015.

This year's grazes have been plotted using a freely available software suite (Occult 4.0), which although a bit 'heavy' to use produces detailed plots of the lunar topography and draws a Google Earth line showing the very narrow path of visibility across the Earth. This graze was initially predicted to pass almost through the OASI observatory at Orwell Park. However, upon close inspection of the predicted limb profile for the event, we decided that a location approximately 1km north of the line would provide the best chance of seeing multiple disappearance/reappearance events. Once again, a search along the line was made to find the most promising location for us to set up our telescopes, away from vehicles, light pollution and too much interference. This time, a site between Butley and Capel St. Andrew was found, adjacent to a public footpath alongside a field boundary. As usual, I checked out the site beforehand and found that it was clear of any obstructions and provided easy vehicular access and a firm surface. A secondary site was also located in case of 'complications'. The following diagram shows the topography.



As is normal for these events, a 'go/no-go' conference call was set up for 2200hrs on the 1st of October, with those who had expressed an interest in attending the graze being invited to join the call. The weather for the preceding days had been very fine, with clear skies forecast for the crucial time (0300hrs BST). Only Mike O'Mahony, Martin Cook, James Appleton and I were silly enough to even consider observing the event. At 2200hrs, all potential observers joined the conference and all had some reservations, the moon being completely obscured and Mike reporting rain at Felixstowe! Mike decided that he would 'pass' on this occasion, but the rest of us decided that we would at least get out of bed at 0200hrs to check the last minute conditions.

Off to bed for a couple of hours sleep and I was awakened by the alarm clock and bright moonlight streaming through the window. Martin and James phoned me in quick succession and we arranged to meet on site at 0300hrs. Just time for a quick cup of tea, and having loaded the car the previous afternoon I was on the road at 0230hrs. Driving out of Grundisburgh I was quickly into patchy mist, but the sky was clear.

I arrived at the site just before 0300hrs to be joined almost immediately by Martin and James.

The site was perfect with a clear view of the moon and no light pollution to be seen. There was however, a mysterious 'totem', consisting of a large white sheet draped over a tall pole, seemingly guarding the field entrance!

Reversing our cars along the field boundary, we set up telescopes and set about trying to acquire the relevant, magnitude 7.2 star. Unusually, I was the first to see it dimly showing through the bright haze surrounding the moon. Martin, having set up his 'scope, walked past an innocent looking plastic pole and immediately set off some sort of intruder alarm! This went on for a few seconds before silence. This was followed by the distant groaning of deer in rut. The alarm continued to sound intermittently throughout the observation however.

James and I were following the star, but Martin seemed to be having all sorts of problems with his 'scope. His finder 'scope had been knocked and was out of alignment, the Skywatcher mount insisted on being polar aligned from scratch and he was using a Barlow to increase magnification for the first time. He did manage to acquire the target just before the event, but then realised that he hadn't started his recorder, so left the 'scope to rectify this, only to find that he couldn't then re-acquire the star in time!

The observation was very difficult, with the haze around the moon making the star almost invisible against the illuminated lunar limb.

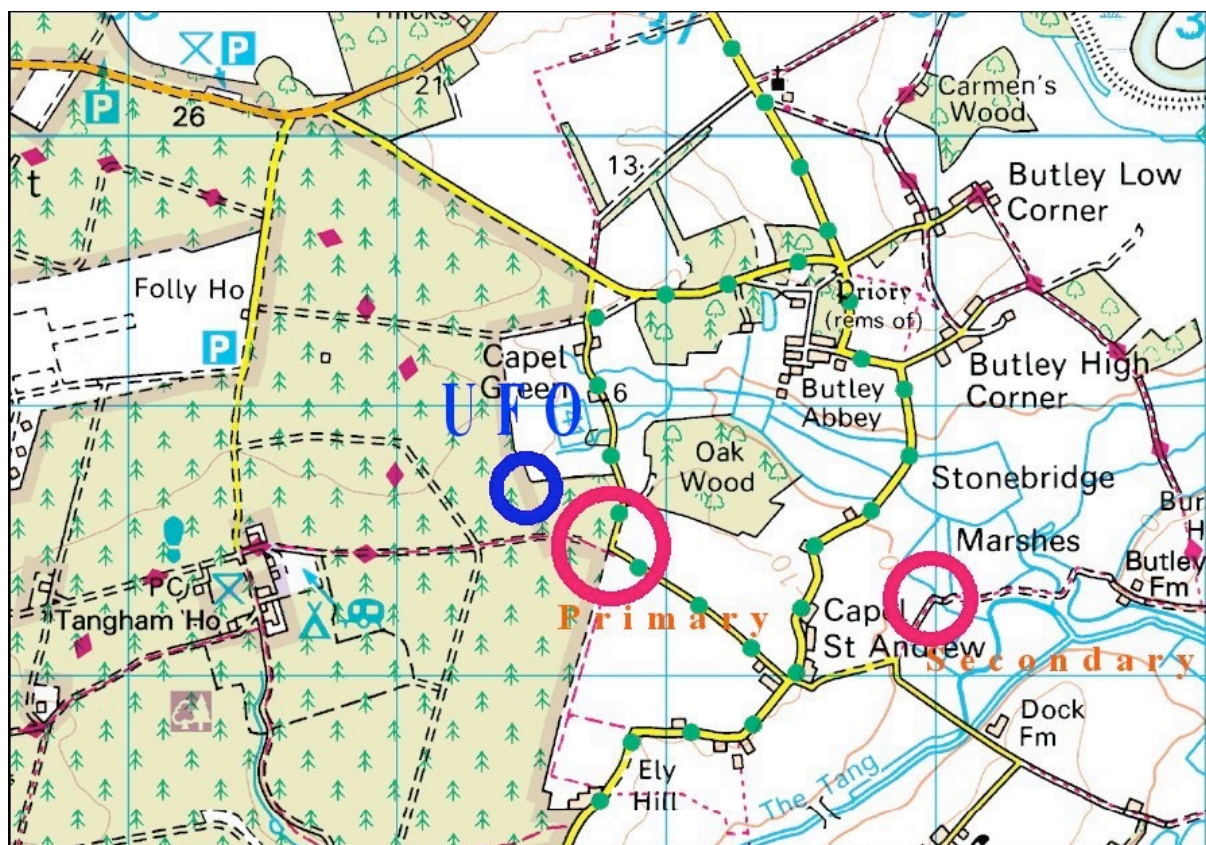
At 03:48:03hrs (BST) the star winked out, re-appearing 12 seconds later. 8 seconds after that it disappeared again, remaining invisible until finally re-appearing at 03:49:30hrs.

It was only then that James confided that he too had been unable to start his recording and that hopefully his comments would have been picked up by my MP3 recorder hanging around my neck. Just in case of problems with my recorder I usually have a secondary device attached to my 'scope, but don't you just know it, that too had failed! The primary recorder did seem to have worked, fortunately.

After taking the obligatory team pictures, we packed up and set off past the 'gate guardian' and returned home.

What I hadn't told the other members of the team was that our chosen site was just a few yards from one of the most famous (or should that be infamous?) events seen over British skies, the so called Rendlesham UFO, which 'landed' immediately adjacent to our location at 0300hrs on 26th December 1980 (see e.g. [1]).





So, ghostly wraiths standing at the entrance, electronic surveillance devices, ghastly noises, swirling mists and multiple equipment failure.....who was watching what?.....

And now the “scientific” bit...

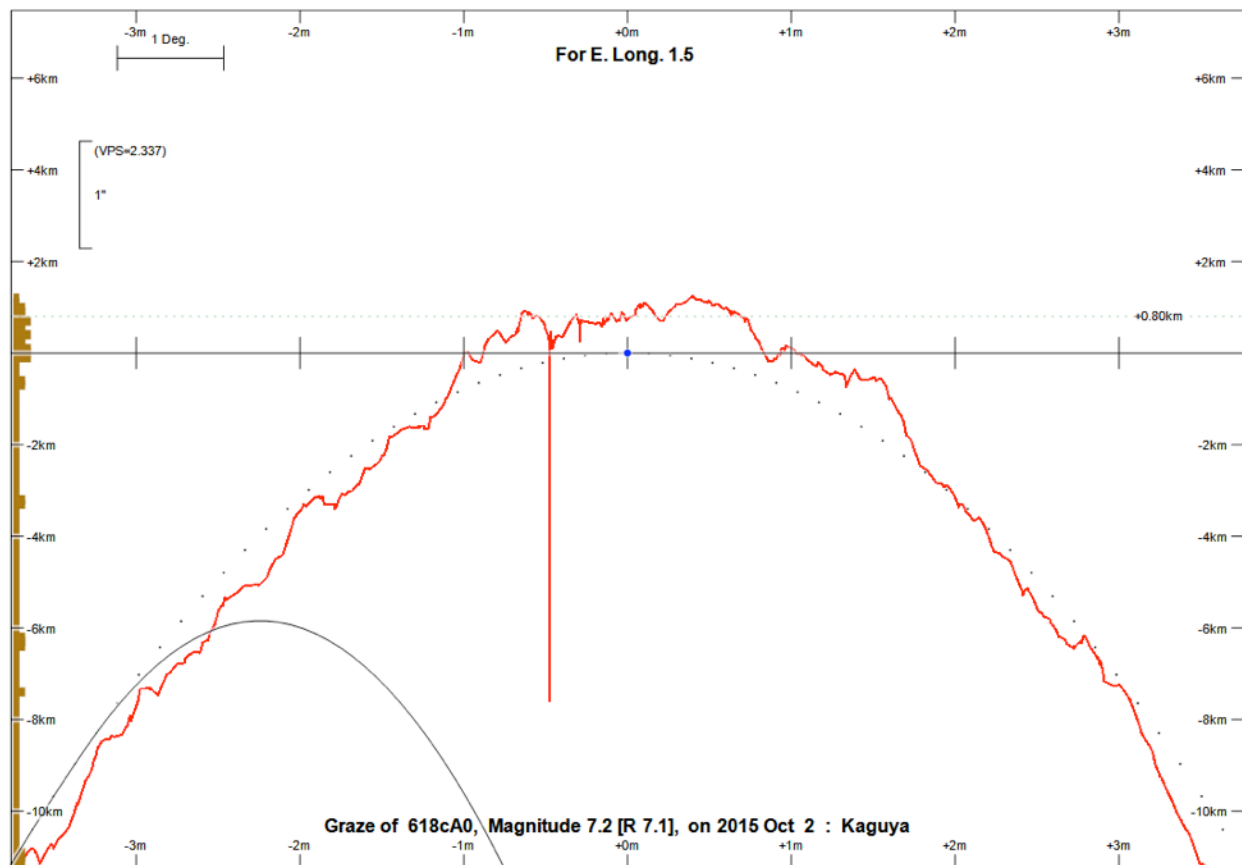
by James Appleton...

The circumstances of the graze of ZC618 were not ideal:

- The star is a magnitude 7.2 object (located towards the nose of the “bull” in Taurus).
- The graze was a north limb event. In general terms, the lunar northern limb is less cratered and jagged than the southern, thus the prospect of observing multiple disappearance and reappearance events is reduced.
- The Moon on the evening of 02 October was not very long past full (phase 78% waning).
- The apparent approach of the star was against the bright limb.
- The event took place at the very inconvenient time of almost 4.00am BST (02:48 UT)!

However, OASI observers have enjoyed many successes in recent years in observing graze events (see www.oasi.org.uk/Obsvns/grazing_occs/grazing_occs.shtml for details) so, under Alan's guidance, “the usual suspects” made plans to observe the event.

The Occult 4.0 software limb predicted the limb profile below (red line) for the event. This indicated that the optimum location would be approximately 800m N of the nominal graze line (indicated by the dotted line), a requirement which Alan satisfied precisely in his choice of observing location.



As indicated by Alan earlier, we were beset by equipment problems! Martin's difficulties with the polar alignment of his telescope were particularly unfortunate and prevented him making any observations at all. My difficulties were of a different nature... Part of the fun of observing a graze is identifying the features on the lunar limb which alternately obscure and reveal the star. In order to aid the process of identification, having located the star with confidence, I ignored it and concentrated instead on the Moon, drawing a "quick" sketch of the features on the limb which were in the apparent path of the star. Unfortunately, my quick sketch turned out to take much longer than intended and by the time it was complete, the limb was very close to the star and I could no longer find the latter due to the glare in the eyepiece. Fortunately, Alan saved the day by calling out the position of the star in relation to a double crater near the limb, and I was able to find it again. Disaster averted! However, by this time, the first disappearance event was clearly imminent and I did not have time to fetch my trusty multi-event stopwatch from the car, and had to content myself by calling out observations for later analysis; fortunately, both Alan's and Martin's voice recorders were sensitive enough to catch my comments. (Having reacquired the star, I was able to follow it through the entirety of the graze without great difficulty.)

The following diagram illustrates the Alan's timings, my timings and the theoretical (predicted) timings evaluated from the limb profile generated by Occult. Our timings associated with the initial disappearance accord well with theory. However, for the second (longer) disappearance, the theoretical limb profile appears to lie inside the empirical for the first 25 seconds or so. This section of the theoretical limb appears to be incorrectly baselined at too small a radius.

References

- [1] Jenny Randles, *UFO: Crash Landing? Friend or Foe? – True Story of the Rendlesham Forest Close Encounter*, Cassell, 1998.
- [2] Antonín Růkl, *Atlas of the Moon*, Hamlyn, 1990.

By Alan Smith and James Appleton

A lunar occultation occurs when the Moon appears to pass in front of a star, hiding it from view. If the moon appears to pass centrally in front of the star, it can obscure the star for more than an hour. However, generally the moon's path will be such that the centre of the visible disk passes to the north or south of the star, in which case the star is obscured for a shorter period. In the limit, the north or south polar limb of the moon briefly obscures the star – this case is termed a grazing lunar occultation, or simply a graze.

During a graze, mountains and valleys on the lunar limb can appear to pass in front of the star, alternately obscuring and revealing it. When this happens, the star can appear to flash on and off. For a graze of any given star, such an effect is visible only along a path across the Earth's surface at most few kilometres wide: this path is referred to as the graze track. Generally, a south polar graze is more spectacular to observe than a north polar graze because the moon's south limb is the more rugged of the two.

Although the lunar limb profile was not known with great accuracy until recently, a Japanese satellite (Kaguya) launched in 2007 has mapped the surface of the moon using lasers. This has given us a detailed (although still incomplete) limb profile.

An observation of a graze establishes a relationship between several quantities: the location of the observer, the position of the moon, the position of the star and the topography of the lunar limb.

A team of observers from OASI (the usual suspects) attempts to observe these events. If you would like to join us, please be aware that you will need a 'reasonable' telescope capable of handling a fairly high power (x100 ?) magnification.

One for December

The last of this years events will occur at about 20:18 UT on 17/12/15 (a Thursday evening) The track is conveniently placed close to Ipswich, the altitude of the moon and the time of the event is 'favourable' but again the 'north limb' apparition usually gives a less spectacular view.

The final location for observing this graze has not yet been decided, but is likely to be in the Clopton area – see next month's newsletter.

If you would like to join us, please [contact me](#) to get further details of the 'pre-event' conference call and any other details you might need.

Seconds of Arc

Joe Startin

For the "International Observe the Moon Night" event at Nowton Park, Bill Barton emailed us some advice about how big the smallest feature visible on the Moon might be. Their size is indirectly proportion to the diameter, D, of the aperture of the equipment you are using.

The angular resolution available from your kit is given by the Dawes limit. If D is measured in inches, and assuming the wavelength of the light used is in the middle of the visible spectrum, the formula is $4.56/D$. Using this, Bill derived a look-up table, which gave the smallest resolvable distance on the Moon, in miles or km, for various sizes of objective, assuming the Moon was at its mean distance. What he did not make explicit, because he didn't really need to, was that the formula for the Dawes limit gives the angular resolution measured in seconds of arc.

We are talking of very small angles, and astronomers always measure these in seconds of arc.

For me, 'seconds of arc' chimes with 'pieces of eight'. I see eighteenth century maps and the tools of navigation spread out over the captain's table.

Next, a world of deep leather armchairs is conjured up, with gleaming brass instruments dotted around the wood-panelled room. Earnest gentlemen from the Age of Enlightenment, ranging from aristocrats to eccentrics, could burst in at any time, breaking from discussion when the need arises to scratch away with quill pens.

Another vision is of museum cases packed with old astronomical instruments, meticulously engraved with elegant numerals, where anything that might need to be gripped or turned has been lovingly knurled.



But for the sexagesimally-challenged, the obvious unit to use is the microradian. The radian is a natural unit of angular measure, which makes the sort of sums Bill was doing very easy. The 'micro' part is there just to make the numbers manageable. The conversion factor from seconds of arc is:

$$\frac{2\pi \cdot 10^6}{360.60.60}, \text{ or a handy } 4.848.$$

It will never catch on.

Christmas Prize Raffle

Tickets are now on sale (£1 per ticket) for a bottle of malt whisky (Bowmore Legend, single Islay malt, retail £29.99). The winning ticket will be drawn at the OASI Christmas Dinner.

Tickets from Paul Whiting.



Astrophotography

By Mike O'Mahoney, Kevin Fulcher, ???



Vallis Schroten by Mike O'Mahoney



Andromeda taken Monday 20 September 2015 by Kevin Fulcher

Very brief clear path of sky. 4x30 exposures using 300mm lens and my Canon 70D.

Stacked in DSS and tweaked in Lightroom.

More Lunar eclipse pictures

The lunar eclipse of 28 September 2015 was notable in that it occurred with the Moon at perigee (so appearing slightly larger than average). The Moon entered the umbral shadow at 01:07 UT and left it at 04:27 UT. Several members of OASI observed the event; the best photos and video are on the web site at www.oasi.org.uk/Obsvns/20150928_LE/20150928_LE.php



Kevin Fulcher



Martin Richmond-Hardy - Skywatcher 200 + Canon 500D 1/30s ISO100