



OASI News

The newsletter of the Orwell Astronomical Society



Comet Catalina

Photo by David Murton, 9 Dec

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

Astrophotography pictures

By David Murton



NGC 700 – 3x36s, ISO400



Jupiter and the Galilean moons

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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

The OASI Forum has been decommissioned as usage had dwindled to just one contributor

The OASI Facebook pages are now proving very popular. Several non-members are active contributors.

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.

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 16.

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.
	Avtar Nagra	Newbourne Observing Group
Co-opted	Matt Leeks	Safety & security
	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 26 January 2016, *Shepherd and Dog*, starting 8.00pm. This is an open meeting.

Annual General Meeting

Saturday 30 January 2016, 8pm at Museum St Methodist Church Hall.

Written reports to the Secretary (Roy Gooding) soonest, please, for distribution to members prior to the AGM.

Signing in and out

Please ensure you sign in and out when visiting the Observatory and/or Newbourne. This is for fire safety precautions and also provides an historic record.

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



[Download the OASI 2016 year planner](#) from the web site. An A3 printer is advised.

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.
2016			
Tuesday 5 January 20:15	Orwell Park Observatory	ston@oasi.org.uk	STON: Small Telescope Observing Night
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, <i>New Horizons of Pluto</i> .
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.
Tuesday 19 January 18:30	TBD	James Appleton info@oasi.org.uk	Field trip to observe graze of Hyadum I. More info.
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 26 January 20:00	Shepherd & Dog	Roy Gooding secretary@oasi.org.uk	OASI Committee Meeting

Date and Time	Location	Contact	Event
Saturday 30 January 20:00	Museum St Methodist Hall, Black Horse Lane, Ipswich	Roy Gooding secretary@oasi.org.uk	ANNUAL GENERAL MEETING
Tuesday 2 February 20:15	Orwell Park Observatory	ston@oasi.org.uk	STON: Small Telescope Observing Night
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
Tuesday 1 March 20:15	Orwell Park Observatory	ston@oasi.org.uk	STON: Small Telescope Observing Night
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
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
Saturday 09 October			International Observe the Moon Night
Friday-Sunday 9 -11 September	Dundee	https://britastro.org	BAA Autumn Weekend Meeting <i>Stars: Theory, Physics and Effects.</i>

Date and Time	Location	Contact	Event
Friday - Sunday 9 - 11 September	Horncastle, Lincolnshire	https://britastro.org	Horncastle Astronomy Weekend
Monday 19 September 23:30	TBA	James Appleton info@oasi.org.uk	Field trip to observe graze of 87 Cet. More info.
Saturday 24 September, 10:00 - 17:30	Burlington House, LONDON W1J 0DU	https://britastro.org	BAA Observers' Workshop Asteroids & Remote Planets
Friday 14 October 20:00	Methodist Church Hall Black Horse Lane, Ipswich	Pete Richards lectures@oasi.org.uk	Lecture Meeting. Roger Pickard (Director of Variable Star Section of the BAA), <i>Why Observe Variable Stars?</i>
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.

DASH Astro Events – 2016

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

All DASH Astro observing sessions will take place at WESTLETON COMMON. ASOG observing sessions and locations may be arranged at the time of observation.

Unless stated all group meetings will take place at WESTLETON VILLAGE HALL from 7:30 pm

Date	Event
9 Jan	Dash Observing Session
15 & 16 Jan	Star Gazing Live Event at RSPB Minsmere
23 Jan	Dr.Paul Whiting (OASI) - Radio Astronomy for beginners.
6 Feb	Dash Observing Session
20 Feb	Dr Steve Hubbard - Observing Active Galaxies AGN's M77,87,106
5 March	Dash Observing Session
19 March	Bob Greef (BAS) - An introduction to astrobiology.
2 April	Dash Observing Session
16 April	Dave Murton - Beginners' guide to night sky Naked eye observations
30 April	Dash Observing Session
14 May	Meeting - David Gwynn/Bill Barton - Our Sun, Safe solar observing
4 June	Dash Observing Session
18 June	Bill Barton - History of the Royal Observatory (Historical Lecture)
2 July	Solar Observing - Location TBA
6 Aug	Solar Observing - Location TBA
13 Aug	Meeting – DASH Summer social in the hall
3 Sept	Solar Observing - Location TBA
17 Sept	Reg Hunt/Oliver Hunt - Astronomical numbers. Dr.Leonard Brundle - TBA
1 Oct	Dash Observing Session

15 Oct	Paul Webb - Autumn/winter observing Prof Michael Rowan-Robinson - I/R Astronomy
29 Oct	Dash Observing Session
12 Nov	Ian Lomas - 1st part (30 mins max). - An Introduction to Cosmology 2nd Part panel of 3 answering questions from audience.
26 Nov	Dash Observing Session
10 Dec	DASH Christmas Social

Small Telescope Observing Nights (STONs)

Contact: Paddy O'Sullivan and Dave Robinson Email: ston@oasi.org.uk

These evenings enable members to gain hands-on experience of using the society's telescopes and to practice locating astronomical objects. They are organised by Paddy O'Sullivan and David Robinson and currently take place at Orwell Park Observatory. They are held on the first Tuesday of the month, starting at 20:15, *but only when there is a demand from members*. To ensure there will be an organiser in attendance, members should email the above address.

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 normally 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.

NOG Meetings in 2016 (back to Newbourne)

2016 Jan. 11th & 25th

We open up for all meetings at 7pm.

WANTED: OASI History

I'm trying to locate any photos from the early days of the society, and specifically pictures showing 'old style' open days when they were held in the old gymnasium at Orwell Park (from mid '70s to 'late '80's).

Alan Smith

Astronomy Workshops

Contact Mike Whybray

Location: Newbourne Village Hall IP12 4NP

Doors open at 7:00pm.

Workshops start at 8:00pm

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 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

Contact: Pete Richards

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

Friday 14 October: Roger Pickard "Why observe variable stars?"

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

Caption competition, anyone?



The Night Sky in January

Martin RH

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
24 January 01:46	02 January 05:30	10 January 01:31	16 January 23:26

Sun, Moon and planets

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

Object	Date	Rise	Set	Mag.	Notes
Sun	1	07:41	15:47		
	31	08:03	15:53		
Moon	1	23:56	11:02		* rises at 23:46 on 30th and then at 00:49 on 1 Feb
	31	23:46*	10:34		
Mercury	1	09:17	17:23	-0.4	Maximum eastern elongation was on 29 Dec 2015. Mercury reaches perihelion on 08 Jan.
	31	06:20	14:30	0.3	
Venus	1	04:58	13:33	-0.39	
	31	06:01	13:47	-0.38	
Mars	1	01:52	12:11	1.3	Mars is in Libra, close to the Moon on 31st
	31	01:24	10:46	0.9	
Jupiter	1	22:27	11:09	-2.0	Jupiter is close to the Moon on 1st
	31	20:24	09:11	-2.2	
Saturn	1	05:46	13:57	1.4	
	31	04:03	12:09	1.3	
Uranus	1	11:44	00:46	5.8	
	31	09:47	22:47	5.9	
Neptune	1	10:40	20:59	7.9	
	31	08:44	19:06	8.0	

Meteor Showers

Source: BAA Handbook 2016 p97-99

Shower	Limits	Maximum	ZHR	Notes
Puppids-Velids	Nov 27 - Jan	Dec 9, Dec 27	15	Two of several radiants in Puppis, Vela and Carina from November to January
Quarantids	Jan 1 - 6	Jan 4 09z	80?	Blue and yellow meteors. Diffuse radiant except at peak. Strong in 1992. Quite favourable.

Occultations during January 2016

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(°)	Star Alt(°)	Mag	Star
16 Jan	18:45:33	D	0.47+	-23	42	4.8	mu Psc
	19:52:59	R		-33	37		
16 Jan	22:19:40	D	0.49+	-53	19	7.0	ZC 237
17 Jan	18:05:15	D	0.59+	-16	47	6.9	Hip 11228
17 Jan	19:46:20	D	0.59+	-32	46	6.4	25 Ari
18 Jan	17:45:51	D	0.69+	-13	47	7.1	Hip 15508
19 Jan	00:52:55	D	0.72+	-57	18	6.9	ZC 516
19 Jan	22:31:29	D	0.81+	-53	46	6.4	70 Tau
20 Jan	00:00:23	D	0.81+	-58	35	5.0	75 Tau
20 Jan	00:09:13	D	0.81+	-58	34	6.6	ZC 672
20 Jan	00:13:01	D	0.81+	-58	33	3.8	theta 1 Tau
	00:41:03	R		-58	29		
20 Jan	00:54:29	D	0.81+	-57	28	4.8	ZC 677
20 Jan	01:01:49	D	0.81+	-56	26	6.5	ZC 680
20 Jan	02:17:48	D	0.82+	-49	15	6.6	ZC 685
20 Jan	03:24:39	D	0.82+	-40	6	0.9	Aldebaran
20 Jan	22:59:37	D	0.89+	-56	50	5.0	111 Tau
21 Jan	18:44:02	D	0.94+	-21	38	5.9	ZC 944
30 Jan	02:59:37	D	0.68-	-42	29	4.4	theta Vir
	04:03:27	R		-33	32		

Lunar Graze: 19 January

On 19 January at 19:35 there is a southern limit graze of the magnitude 3.7 star Hyadum I. Details can be found on the OASI website: http://www.oasi.org.uk/Occs/Occ_summary_2016.php. An observing trip will be organised if weather conditions are favourable: details will be provided via the OASI email list.

James Appleton

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 due to craft adjustments. Check the day before.

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
03 Jan	-0.2	06:54:17	10°	S	06:56:21	16°	SE	06:58:28	10°	ESE
05 Jan	-1.1	06:43:19	10°	SSW	06:46:06	27°	SSE	06:48:55	10°	E
06 Jan	-0.6	05:50:47	10°	S	05:53:03	18°	SE	05:55:21	10°	E
07 Jan	-2.2	06:32:44	10°	SW	06:35:50	42°	SSE	06:38:57	10°	E

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
08 Jan	-1.6	05:41:37	23°	S	05:42:41	29°	SSE	05:45:34	10°	E
08 Jan	-3.2	07:15:35	10°	WSW	07:18:50	76°	S	07:22:07	10°	E
09 Jan	-0.4	04:50:47	16°	ESE	04:50:47	16°	ESE	04:52:01	10°	E
09 Jan	-3.0	06:23:24	19°	WSW	06:25:34	62°	SSE	06:28:48	10°	E
10 Jan	-2.5	05:32:25	45°	SSE	05:32:25	45°	SSE	05:35:27	10°	E
10 Jan	-3.3	07:05:20	10°	W	07:08:36	86°	S	07:11:52	10°	E
11 Jan	-0.1	04:41:19	15°	E	04:41:19	15°	E	04:42:01	10°	E
11 Jan	-3.3	06:13:55	33°	WSW	06:15:15	79°	S	06:18:31	10°	E
12 Jan	-2.2	05:22:44	44°	ESE	05:22:44	44°	ESE	05:25:09	10°	E
12 Jan	-3.3	06:55:19	12°	W	06:58:16	83°	S	07:01:32	10°	E
13 Jan	-3.4	06:04:04	48°	W	06:04:53	86°	S	06:08:09	10°	E
14 Jan	-1.6	05:12:45	34°	E	05:12:45	34°	E	05:14:44	10°	E
14 Jan	-3.2	06:45:20	16°	W	06:47:50	70°	SSW	06:51:05	10°	ESE
15 Jan	-3.5	05:54:00	64°	W	05:54:24	82°	S	05:57:41	10°	E
16 Jan	-1.1	05:02:38	26°	E	05:02:38	26°	E	05:04:13	10°	E
16 Jan	-2.8	06:35:12	19°	W	06:37:15	50°	SSW	06:40:26	10°	SE
17 Jan	-3.3	05:43:50	66°	SSW	05:43:50	66°	SSW	05:47:04	10°	ESE
17 Jan	-1.5	07:17:17	10°	W	07:19:52	22°	SSW	07:22:28	10°	SSE
18 Jan	-0.7	04:52:27	20°	ESE	04:52:27	20°	ESE	04:53:37	10°	ESE
18 Jan	-2.2	06:25:01	21°	WSW	06:26:32	32°	SSW	06:29:29	10°	SE
19 Jan	-2.5	05:33:39	41°	S	05:33:39	41°	S	05:36:15	10°	SE
20 Jan	-1.6	06:14:53	19°	SW	06:15:38	20°	SW	06:18:05	10°	SSE
21 Jan	-1.3	05:23:34	21°	SSE	05:23:34	21°	SSE	05:25:08	10°	SE

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.

Iridium flares

Too many to list but see [Iridium Flares http://heavens-above.com/IridiumFlares.aspx](http://heavens-above.com/IridiumFlares.aspx)

Paul's Astronomy Podcast for January

Paul Whiting FRAS

Podcast, Jan 2016 www.oasi.org.uk/2016_01_pod.mp3

Lunar Occultations during 2016

Introduction

During 2016, there are over 600 lunar occultations potentially observable from East Anglia, although many involve faint stars. The tracks of six grazing occultations cross the region during the year, passing within a few kilometres of Orwell Park Observatory. No lunar occultations of planets are visible from the region during the year.

This article summarises circumstances of the best occultations during the year. It provides details for the location of Orwell Park Observatory; differences will in general be negligible for locations throughout East Anglia.

This year, I have continued to use my own software to predict total occultations, but have switched to using the *Occult 4.1* package (created by Australian amateur David Herald) to predict grazing occultations. *Occult 4.1* offers several improvements over my efforts, the most significant of which is the use of lunar limb data from the 2007 Japanese *Kaguya (Selene)* mission to replace the 1963-vintage Watts charts upon which I relied. This significantly improves the accuracy of graze predictions.

Occultations of bright stars

Table 1 lists occultations during the year, of stars to magnitude 5.0, where the circumstances are favourable. The events should be readily visible in small telescopes or binoculars. The first two columns of table 1 list the date and time (UT) of the occultation. Column three gives the phenomenon: 'D' denotes a disappearance and 'R' a reappearance. The table lists circumstances of disappearances and reappearances as dictated by the visibility of each phenomenon (determined by altitude, lunar phase, etc). Column four details the lunar phase ('+' for waxing and '-' for waning). Columns five and six give the altitude of the Sun and the star, both in degrees. (A negative solar altitude means that the Sun is below the horizon.) Columns seven and eight provide the star's magnitude and catalogue number.

Table 1. Occultations of stars of magnitude 5.0 or brighter.

Date	Time (UT)	D/R	Lunar Phase	Sun Alt(°)	Star Alt(°)	Mag	Star
16 Jan	18:45:33	D	0.47+	-23	42	4.8	μ Psc
	19:52:59	R		-33	37		
20 Jan	00:00:23	D	0.81+	-58	35	5.0	75 Tau
20 Jan	00:13:01	D	0.81+	-58	33	3.8	θ1 Tau
	00:41:03	R		-58	29		
20 Jan	00:54:29	D	0.81+	-57	28	4.8	ζC 677
20 Jan	03:24:39	D	0.82+	-40	6	0.9	Aldebaran
20 Jan	22:59:37	D	0.89+	-56	50	5.0	111 Tau
30 Jan	02:59:37	D	0.68-	-42	29	4.4	θ Vir
	04:03:27	R		-33	32		
13 Feb	19:28:07	D	0.33+	-23	34	4.4	ξ1 Cet
	20:17:56	R		-30	28		
10 Apr	20:02:33	D	0.16+	-12	22	3.8	θ1 Tau
	20:59:10	R		-19	14		
10 Apr	20:06:36	D	0.16+	-12	22	3.4	θ2 Tau
	20:58:21	R		-19	14		
10 Apr	21:00:35	D	0.16+	-19	14	4.8	ζC 677
21 Apr	00:12:41	D	0.99+	-26	31	4.4	θ Vir
16 May	00:54:18	D	0.72+	-18	10	4.9	τ Leo

Date	Time (UT)	D/R	Lunar Phase	Sun Alt (°)	Star Alt (°)	Mag	Star
15 Jun	22:20:48	D	0.82+	-12	23	4.2	K Vir
21 Sep	22:28:47	D	0.66-	-35	12	4.7	σ 2 Tau
	23:20:28	R		-37	20		
18 Oct	23:12:05	D	0.88-	-48	38	3.7	Hyadum I
	00:14:52	R		-47	46		
19 Oct	03:37:30	D	0.87-	-27	52	3.8	θ 1 Tau
	04:46:59	R		-16	45		
19 Oct	03:42:40	D	0.87-	-26	51	3.4	θ 2 Tau
	04:43:28	R		-17	46		
25 Oct	02:35:10	D	0.26-	-37	15	4.4	31 Leo
	03:36:10	R		-28	24		
26 Oct	04:59:18	D	0.17-	-16	26	5.0	59 Leo
12 Nov	19:12:59	D	0.95+	-28	31	4.4	ν Psc
12 Dec	21:41:28	D	0.98+	-52	51	3.7	Hyadum I
	22:46:46	R		-59	54		
13 Dec	02:08:38	D	0.98+	-51	38	3.8	θ 1 Tau
	03:01:50	R		-43	30		
13 Dec	02:20:42	D	0.98+	-49	36	3.4	θ 2 Tau
	02:52:27	R		-45	31		
13 Dec	02:22:47	D	0.98+	-49	36	5.0	75 Tau
13 Dec	03:00:00	D	0.98+	-44	31	4.8	ZC 677
13 Dec	05:24:28	D	0.99+	-22	10	0.9	Aldebaran
	05:51:12	R		-18	6		

Table 1. Occultations of stars of magnitude 5.0 or brighter.

Occultation Seasons

The Moon's orbit is defined by a range of periodicities, both short and long term. The short term periodicities cause the Moon's path through the sky to follow a pattern whereby it almost repeats every month. The longer term periodicities gradually shift the orbit so that no particular pattern of approximate repetition can last more than a few years. This results in so called "occultation seasons", lasting for months or years, during which particular stars are repeatedly occulted, or repeatedly not occulted. In 2016, the phenomenon is evident through repeated occultations during the year of the stars Aldebaran and others in Taurus.

Nights with many Occultation Events

During the year, the Moon traverses some rich star fields. When this happens, a large number of occultations can occur during a single evening. Table 2 lists all evenings throughout the year when the Moon occults 10 or more stars. The large numbers of occultations on 11 April and 10 May are associated with star fields in Taurus and Gemini respectively.

Date	# occs	Date	# occs	Date	# occs	Date	# occs
13 Jan	14	14 Jan	14	16 Jan	13	11 Feb	12
12 Feb	18	13 Feb	10	11 Mar	16	12 Mar	14
10 Apr	17	11 Apr	40 (!)	12 Apr	24	09 May	21
10 May	40 (!)	11 May	11	12 May	11	07 Oct	10
04 Nov	28	05 Nov	14	03 Dec	15	04 Dec	16

Table 2. Evenings with 10 or more occultations.

Grazing Occultations

Six grazing lunar occultations are predicted for the year. Table 3 summarises the circumstances as follows. Columns one and two give the date and time of each graze and column three specifies the lunar phase ('+' for waxing and '-' for waning). Column 4 specifies the lunar limb involved; columns five and six give the altitude of the Sun and the star, both in degrees. (A negative solar altitude means that the Sun is below the horizon.) Column seven indicates the minimum distance from Orwell Park Observatory to the graze track and Columns 8 and 9 specify the star and its magnitude.

Note that the graze of Hyadum 1 on 19 January is preceded at 17:21 by a graze of the magnitude 6.3 star 48 Tau; however, the Sun is only a few degrees below the horizon at this time, so the observational prospects are poor. Note also on 21 October, the grazes of both 20 Gem and 21 Gem: the graze tracks are approximately parallel so it is not possible for a single observer to observe both.

Weather permitting, the usual band of dedicated OASI occultation observers will organise observing trips to the grazes! Please get in touch if you are interested in participating. Google Earth plots of the tracks are on the OASI web site for those keen to select a good observing site: www.oasi.org.uk/Occs/Occs.shtml.

Date	Time (UT)	Lunar Phase	Limb	Sun Alt(°)	Star Alt(°)	Track Dist from OPO (km)	Mag	Star
19 Jan	19:35	0.80 +	S	-29	52	22	3.7	Hyadum 1
11 Feb	18:19	0.13 +	N	-13	22	6.5	7.7	Hip 1397
20 Sep	00:28	0.86 -	S	-36	40	8.6	4.3	87 Cet
21 Oct	05:02	0.67 -	S	-14	55	20	6.9	20 Gem
21 Oct	05:02	0.67 -	S	-14	55	18	6.3	21 Gem
22 Dec	06:36	0.38 -	S	-12	34	19	7.7	Hip 63099

Table 3. Grazing lunar occultations.

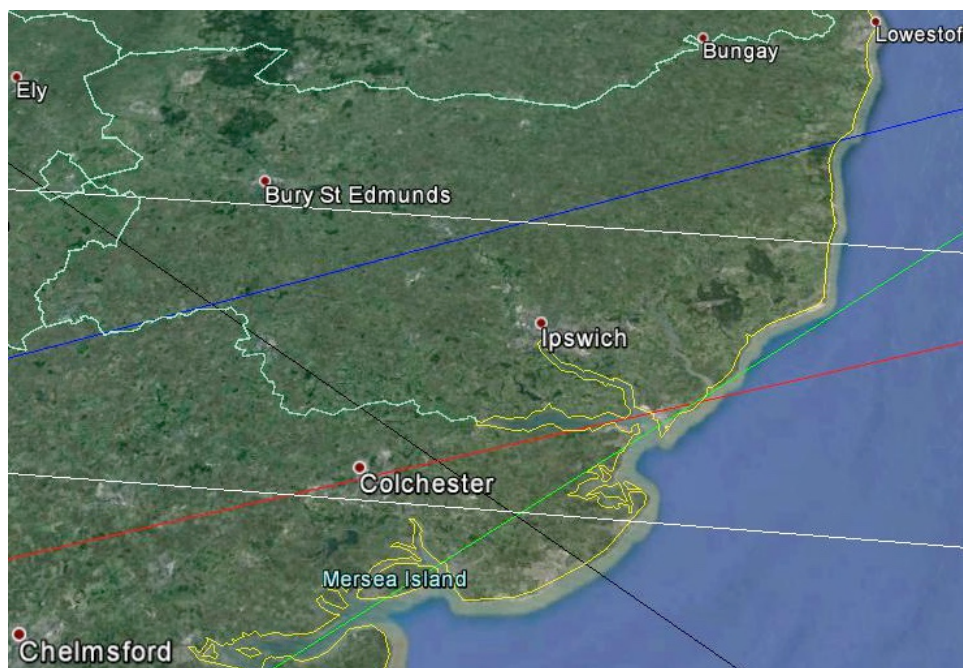


Figure 1. Graze tracks. (Hyadum 1 blue; Hip 1397 red; 87 Cet green; 20 Gem white north; 21 Gem white south; Hip 63099 black.)

James Appleton

OASI Logo Clothing

Sweatshirts, Grey or Navy

Small, Medium, Large & Ex.Large £18.00 ea.

Cotton Pique Polo Shirt

White, Azure Blue, Sky Blue & Black

Small, Medium, Large & Ex.Large £16.00 ea.

Fleece Zip Jacket Front Pockets

Navy.

Small. Medium, Large & Ex.Large £22.00 ea.

Thinsulate Beanie Hat

Dark Graphite £9.50 ea.

Base Ball Cap

Navy/Stone £8.00 ea.

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

Other items to special order, usually about 2 weeks.



See Mike Norris for details.

Principia Mission to the ISS

<https://principia.org.uk>

Tim Peake, Tim Kopra and Yuri Malenchenko left Earth to the International Space Station Tuesday 15 December 11:03 GMT. Sitting atop 274 tonnes of rocket fuel reaching speeds of around 28 800 km/h in less than ten minutes will be an intense experience for Tim and his fellow astronauts as well as for onlookers on Earth.

Docking: 17:23:07 GMT 15 December 2015

Hatch opening: ~19:00 GMT 15 December 2015

Landing: 5 June 2016

This link leads to information about the ESA experiments to be performed on board the ISS.

<https://principia.org.uk/the-mission/experiments-in-space/>

Official NASA portrait of British astronaut Timothy Peake a member of Expedition 46 and 47.



NASA/Robert Markowitz - <https://www.flickr.com/photos/nasa2explore/18306699143/>

Your Editor and Mrs RH feature (very briefly!) in [a video compiled by the BBC](#)

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

OASI Member of the year competition											
NAME	EVENT										
	6-Sep Bentley	19-Sep Nowton	23-Oct Chantry	Oct News	Nov News	26-Oct Wkshp	Dec News	Jan News			Total
Pete Richards	10	10		\							20
Nicky Richards	10	10	10	\							30
Mike Nichols	10	\		\							10
Bill Barton	10	\	10	15	3						38
Mike O'Mahoney	\	10		\							10
Joe Startin	\	10		\	3						13
Charlie Green						20					20
Alan Smith	\	\		3	6		3				12
Mike Norris	\	\		3							3
Neil Short							3				3
Your name here?											

OASI Christmas Meal

33 members met at the Fox Inn, Newbourne on Wednesday 9 Dec and enjoyed an excellent 3-course meal. Roy has already booked for next December!

The bottle of malt whisky (Bowmore Legend, single Islay malt), was won by Richard Grueber and I'm told it will be enjoyed during his fishing trip to France with Jeremy Startup in summer.

Surely it needs sampling before then just to check it's OK??





**The OASI Christmas
Meal at the Newbourne
Fox.**

**So good we're booked
for 2016!**

Jodrell Bank 70th Anniversary 1945–2015

The Jodrell Bank Observatory is a very special place. It is one of the most significant places, worldwide, that played a role in the development of the new science of Radio Astronomy. This year marks the 70th anniversary of astronomy at Jodrell Bank. To begin the celebrations they will be launching a year long anniversary programme on **14th December**, 70 years to the day since Sir Bernard Lovell first began scanning the skies from Jodrell Bank.

www.jodrellbank.net/explore/heritage/



Photo by Martin RH