No. 513 Registered Charity 271313 October 2015

OASI News

The newsletter of the Orwell Astronomical Society

The Plough

Photo: Kevin Fulcher

Pictures

Kevin Fulcher

Contents

Society Contact details

Observatory (meeting nights only) 07967 519249
Email queries: info@oasi.org.uk
Facebook: https://www.facebook.com/groups/445056098989371/
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.

The Newsletter

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

Newsletter archive 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
	Andy Willshere	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 8 Sept 2015, starting 8.00pm. at the Shepherd & Dog.

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

New Members

Mr Stephen Hodd

Mr Christopher Nash

Bury St Edmunds Branch of OASI?

Interested in setting up a branch for the western end of Suffolk? Contact David Murton.

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 or David Murton

Nowton Park, Bury St Edmunds

19 September Stargazing: Observe the Moon Night (see p16)

Astronomy Course for Beginners

Paul Whiting FRAS

There will be a 9 week astronomy course for beginners held at the Ipswich Institute in Ipswich, starting in October. The course is open to anyone – you don't have to be a member of the Institute. The course runs on a Monday night between 6.30 and 8.30pm from 19th October 2015 to 14th December 2015. Week 3 is a guided visit to the Observatory, on Tuesday 2nd November.

The details are as follows:

- Week 1: History of Astronomy
- Week 2: The Solar System Family
- Week 3: Visit to Orwell Park Observatory
- Week 4: Earth Based Phenomena
- Week 5: The Big Bang and the History of the Universe
- Week 6: Exo-planets and life
- Week 7: Telescopes and Satellite Communication
- Week 8: Radio Astronomy and Radio Telescopes
- Week 9: The Night Sky

The cost will be £63.

Now the bad news – I will be your tutor!

If you would like more details or would like to book, please contact the Ipswich Institute via:

www.ipswichinstitute.org.uk/course.php?id=221&cat=5&public=1

Library & Reading Room, Library/Office: 01473 253992 library@ipswichinstitute.org.uk

15 Tavern Street, Ipswich, IP1 3AA

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."*?

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.
Monday 28 Sept from 00:11			Total Lunar eclipse. See p11 or online Diary for timings.
Monday 28 Sept. 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group and Workshop: David Murton - Building my new observatory
Fri/Sat 2-3 Oct	Stoneleigh Park CV82LG	www.ukastroshow.com	International Astronomy Show
Friday 02 October 01:00	Location TBD See p21	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: *Night Vision: Exploring The Infrared Universe*.
Oct 4 – 10		www.worldspaceweek.org/	**World Space Week**
Monday 12 October 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Tuesday 13 October	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 17 October 09:00 – 17:30	Chelmer Valley High School, Court Rd, Broomfield, Essex CM1 7ER	http://neas.me.uk/starfest2015/	**Starfest 2015**
Saturday 17 October 11:00	Visit to the observatory at Bury St Edmunds Athenaeum	Pete Richards lectures@oasi.org.uk	Visit to the observatory at Bury St Edmunds Athenaeum. Places must be booked in advance with Pete Richards.
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.

Date and Time	Location	Contact	Event
Monday 26 October 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group and Workshop At 20:00, Charlie Green, CERN: Accelerating Science. Charlie will talk about his recent working visit to the Large Hadron Collider at CERN, Switzerland.
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.
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.
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.
Monday 23 Nov. 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
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	Xmas meal. (Open to members of OASI and their guests. Places must be booked.)
Monday 14 Dec. 19:00	Newbourne Village Hall	Avtar Nagra nog@oasi.org.uk	Newbourne Observing Group.
Thu 17 Dec, 18:00	Location TBD See p21	James Appleton info@oasi.org.uk	Field trip to observe graze of Tycho 5248-0249-1. More info.
2016			
Monday 11January 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.
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.
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.
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.
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 – October

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

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.

Sept. 14th & 28th Oct. 12th & 26th Nov. 9th & 23rd Dec. 14th

Jan. 11th & 25th

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!.

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 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 28th September: Building my Observatory – David Murton.

David will give an illustrated talk on the building of his new observatory detailing how it was done and the lessons learned.

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

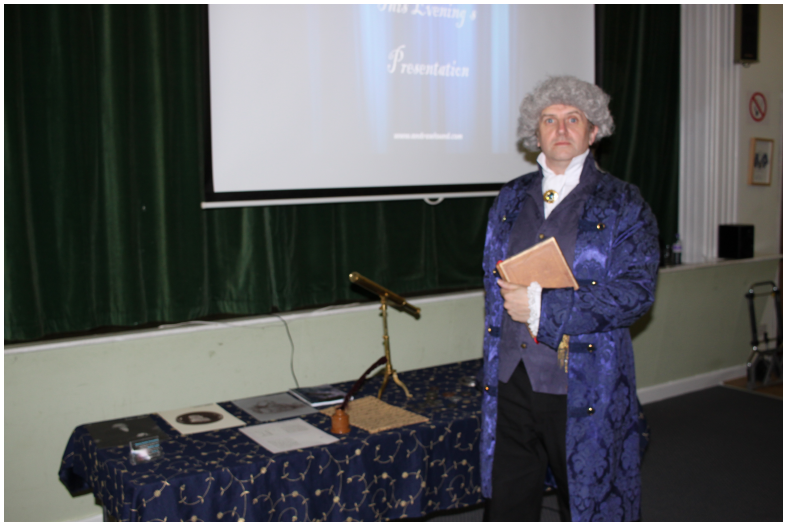
Monday 11 January: New Horizons of Pluto – Paul Whiting

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.



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

Professor Rowan-Robinson, Imperial College – "Night Vision: Exploring The Infrared Universe"

Friday 02 October at 8pm

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

2016: Roger Pickard "Why observe variable stars?"

14 October 2016. Note this is next year.

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

The Night Sky in October

Martin RH

NB Change to GMT is on 25 October. Clocks go back 1 hr (Spring forward, Fall back)
All event times given for the 1st of the month are BST and times for 31st are GMT
Times are 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
28 Sept 03:51 27 Oct 12:05	4 Oct 22:06	13 Oct 01:06	20 Oct 21:31

28 Sept Total Lunar eclipse

P1	00:11:46 UT (first penumbral contact)	U3	03:23:07 UT (end of totality)
U1	01:07:12 UT (first umbral contact)	U4	04:27:06 UT (last umbral contact)
U2	02:11:11 UT (beginning of totality)	P4	05:22:23 UT (last penumbral contact)

Bill Barton

Sun, Moon and planets

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

Object	Date	Rise	Set	Mag.	Notes
Sun	1	06:55	18:33		**NB Change to GMT is on 25 October so all times for the 1st are BST and times for 31st are GMT**
	31	06:48	16:29		
Moon	1	20:46	11:04		Full Moon and Total Lunar Eclipse 28 Sept
	31	20:04	11:01		
Mercury	1	06:59	18:11	4.8	
	31	05:44	16:13	-0.9	
Venus	1	03:03	16:52	-4.4	Maximum western elongation 2015-Oct-26
	31	02:25	15:06	-4.2	
Mars	1	03:41	17:39	1.8	
	31	02:29	15:13	1.7	
Jupiter	1	04:23	17:49	-1.6	
	31	01:58	15:01	-1.7	
Saturn	1	11:54	20:28	1.3	
	31	09:12	17:39	1.4	
Uranus	1	18:50	08:01	5.7	Opposition 2015-Oct-12
	31	15:50	04:56	5.7	
Neptune	1	17:42	04:05	7.8	
	31	14:43	01:04	7.9	

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
18 Oct 2015	17:51:15	D	0.28+	-9	15	6.5	ZC 2578
19 Oct 2015	18:50:52	D	0.38+	-19	15	6.8	ZC 2745
20 Oct 2015	18:08:02	D	0.49+	-13	21	6.9	V4026 Sgr
20 Oct 2015	18:24:38	D	0.49+	-15	21	7.2	Hip 97393
23 Oct 2015	18:11:41	D	0.81+	-14	24	7.0	Hip 111577
23 Oct 2015	18:36:37	D	0.81+	-18	26	7.5	LO Aqr
23 Oct 2015	22:11:54	D	0.82+	-46	27	6.4	67 Aqr
26 Oct 2015	18:50:35	D	0.99+	-21	21	4.8	Mu Psc
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		

At 02:48 on 02 October, there is a graze of the magnitude 7.2 start ZC618. The Sun is at altitude -28°, the star at 53°, the event takes place on the north limb and the lunar phase is 0.78 waning. The nominal track passes Orwell Park at a distance of only 3km; however, a re-computed track, optimised for the the chance of multiple limb events, passes through the front door of Orwell Park School!

Weather permitting, the usual band of OASI graze observers will attempt to observe the event, with at least some of the observers doing so from Orwell Park. Please contact Alan Smith if you are interested in joining the observing party.

Meteor Showers

Source: BAA Handbook 2015 p97-99

Shower	Limits	Maximum	ZHR	Notes
Piscids	Sept - Oct	Sept 9	10	Other maxima on 21 Sept and 13 Oct
Orionids	Oct 16-30	Oct 21-24	25	Fast meteors, many with persistent trains. Flat maximum, with several sub-peaks.

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.

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
05 Oct	-1.5	20:32:39	10°	SW	20:34:09	22°	SSW	20:34:09	22°	SSW
06 Oct	-2.1	19:40:56	10°	SSW	19:43:39	25°	SSE	19:44:20	23°	SE

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
07 Oct	-1.4	18:49:31	10°	S	18:51:41	17°	SE	18:53:54	10°	E
07 Oct	-2.7	20:24:30	10°	WSW	20:27:05	45°	SSW	20:27:05	45°	SSW
05 Oct	-1.5	20:32:39	10°	SW	20:34:09	22°	SSW	20:34:09	22°	SSW
06 Oct	-2.1	19:40:56	10°	SSW	19:43:39	25°	SSE	19:44:20	23°	SE
07 Oct	-1.4	18:49:31	10°	S	18:51:41	17°	SE	18:53:54	10°	E
07 Oct	-2.7	20:24:30	10°	WSW	20:27:05	45°	SSW	20:27:05	45°	SSW
08 Oct	-2.7	19:32:32	10°	SW	19:35:37	41°	SSE	19:37:03	25°	ESE
08 Oct	-0.7	21:08:40	10°	W	21:09:43	19°	W	21:09:43	19°	W
09 Oct	-3.3	20:16:32	10°	WSW	20:19:38	73°	SSW	20:19:38	73°	SSW
10 Oct	-3.2	19:24:25	10°	WSW	19:27:39	61°	SSE	19:29:30	23°	E
10 Oct	-0.9	21:00:49	10°	W	21:02:09	23°	W	21:02:09	23°	W
11 Oct	-3.5	20:08:38	10°	W	20:11:55	86°	S	20:11:59	85°	SE
12 Oct	-3.4	19:16:29	10°	WSW	19:19:46	80°	S	19:21:48	21°	E
12 Oct	-1.1	20:52:57	10°	W	20:54:27	25°	W	20:54:27	25°	W
13 Oct	-3.5	20:00:46	10°	W	20:04:03	83°	S	20:04:15	76°	SE
14 Oct	-3.4	19:08:35	10°	W	19:11:52	87°	S	19:14:03	20°	E
14 Oct	-1.2	20:45:05	10°	W	20:46:43	26°	W	20:46:43	26°	W
15 Oct	-3.3	19:52:54	10°	W	19:56:09	67°	SSW	19:56:32	59°	SSE
16 Oct	-3.3	19:00:43	10°	W	19:03:59	80°	S	19:06:23	17°	ESE
16 Oct	-1.2	20:37:16	10°	W	20:39:02	24°	WSW	20:39:02	24°	WSW
17 Oct	-2.6	19:45:01	10°	W	19:48:11	46°	SSW	19:48:56	38°	SSE
18 Oct	-3.0	18:52:50	10°	W	18:56:04	62°	SSW	18:58:52	13°	ESE
18 Oct	-0.9	20:29:41	10°	W	20:31:32	19°	SW	20:31:32	19°	SW
19 Oct	-1.7	19:37:15	10°	W	19:40:09	29°	SSW	19:41:33	20°	SSE
20 Oct	-2.2	18:44:58	10°	W	18:48:05	41°	SSW	18:51:11	10°	SE
21 Oct	-0.7	19:29:47	10°	W	19:32:00	17°	SW	19:34:12	10°	S
22 Oct	-1.2	18:37:15	10°	W	18:40:00	25°	SSW	18:42:45	10°	SSE
24 Oct	-0.4	18:29:55	10°	WSW	18:31:50	15°	SW	18:33:41	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 October

Paul Whiting FRAS

Podcast, August 2015 www.oasi.org.uk/2015_010_pod.mp3

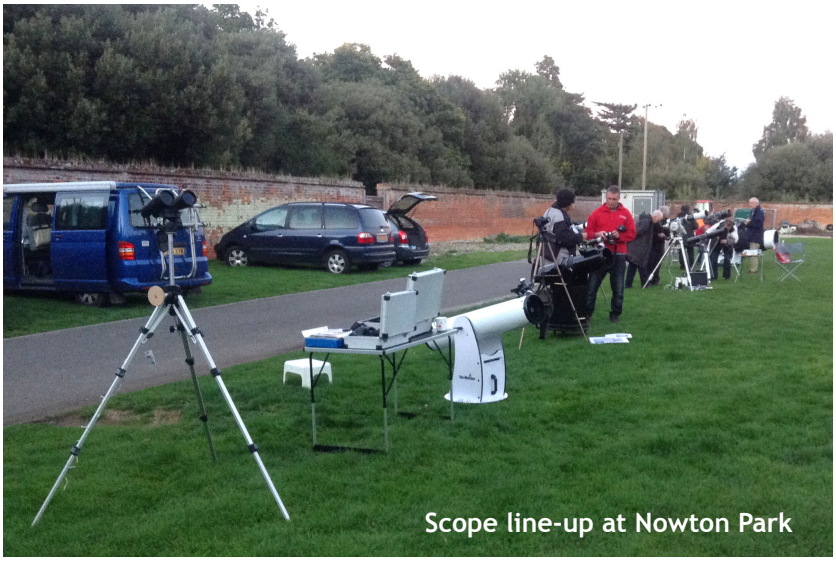
International Observe the Moon Night Report

Martin Richmond-Hardy

Saturday 19 Sept, Nowton Park, Bury St Edmunds

Star party for International Observe the Moon Night

Hosted by award-winning Nowton Park (*East Anglia in Bloom* best park), we enjoyed a clear night and a full house (~60 visitors and several OASI members).



Scope line-up at Nowton Park

Paul Whiting gave a talk – a first for a greenhouse venue – and we had several telescopes outside looking at not only the Moon but deep sky objects.

Unfortunately the Moon soon set behind trees and it wasn't dark enough to catch a glimpse Saturn. Nevertheless, the clear skies gave spectacular views of the Ring Nebula M57, Andromeda Galaxy M31, Albireo, the Mizar double and sundry other objects.

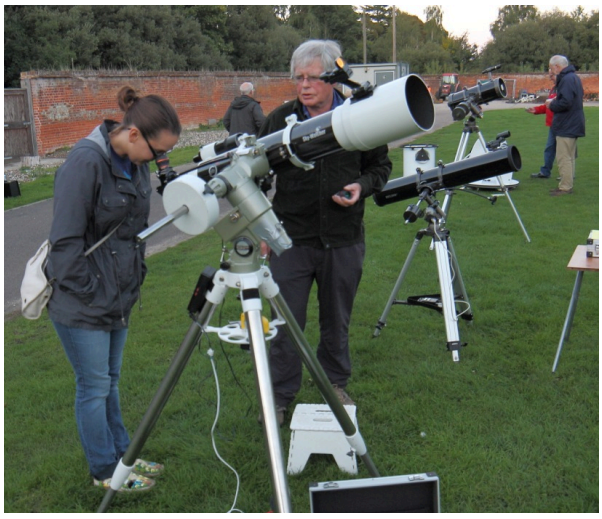
John Wainwright brought along his BIG Dob-mounted Newtonian, Mike O'Mahoney refractor, Pete & Nicky – Newtonian, David Murton – refractor, Kevin Fulcher – 15x70 bins and borrowed David's Dob-mounted Newtonian, Mike Whybray – 114mm Newtonian and me with 200mm Dob + 15x70 bins. Also present were Joe Startin, and we welcomed back Steve Steele.

Heavy dew eventually gave rise to a few extra fuzzies.

Moon by MartinRH

More pictures next month.

MartinRH



Visitor enjoys a view of the Moon through Mike's refractor

A Neat Trick to Understand the Size of the Galaxy

Mike Norris

The nearest star, Proxima Centauri, is some 25 trillion miles away. The Orion Nebula lies about 8,000 trillion miles away. And we are some 162,000 trillion miles from the centre of our own galaxy, the Milky Way. These are mind-numbing distances, completely foreign to the everyday experience of even the most hardened stargazers, and they make it hard to grasp the distance scale of our immense galaxy.

But there's a happy numerical coincidence that makes it much easier to contemplate such distances.

Here's how it works…

A light year, the distance light travels in one year, works out to be about 5.88 trillion miles. An astronomical unit, the distance from the Earth to the Sun, is about 93 million miles, a much smaller distance. A quick calculation shows there's about 63,200 astronomical units (AU) in a light year.

So far so good.

Now it turns out, completely by chance, there's also about 63,200 inches in a mile (I'll let you do the math). So an inch to a mile is the same as an AU to a light year.

Using this compressed scale, where one inch is the Earth-Sun distance, you can get a better feel for the stupendous size of our galaxy…

If the Sun was a grain of sand, and the Earth a microscopic speck one inch away, then Jupiter would lie 5.2 inches away and Pluto an average of 40 inches away. Next stop… the nearest star, about 4.3 miles away, with mostly empty space between it and the Sun. The star Vega would be 26 miles away, the Orion Nebula 1340 miles away, and the globular cluster M15 some 25,000 miles distant (about three times the diameter of the Earth).

And even on this massively compressed scale, the diameter of the Milky Way Galaxy itself would be about 100,000 miles.

This little trick of scale helps you wrap your mind around relative distances and appreciate the immense scale of a big galaxy like our Milky Way, where even a light year doesn't count for much…

Or another way?

Bill Barton FRAS

At public outreach events we often get asked how far away an object is, and (for things in the solar system) answer in miles or Astronomical Units.

To me neither of these is particularly good answer as the first has too many zeros to mean much to the questioner and they have little experience of using the second for it to be useful either.

A possible comparison, however, might be the total length of roads on the Earth. According to 'the net' (www.answers.com/Q/How_many_miles_of_paved_roads_are_there_in_the_world) this currently comes out as 11,194,445 miles (or 18,015,713 km). This equates to 1/8.3 or 12% of an Astronomical Unit.

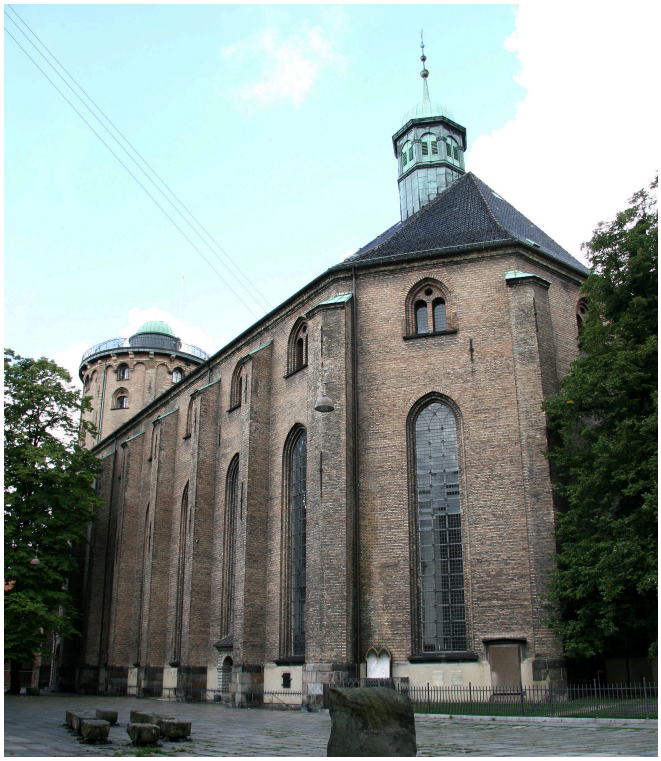
Do you think this would mean more to people?

Example: How far away is Venus? Answer around 0.3AU (28 million miles/45 million km) or 2.5 times the total world road mileage.

> *"Space is big. You just won't believe how vastly, hugely, mind-bogglingly big it is.*
> *I mean, you may think it's a long way down the road to the chemist's, but that's just peanuts to space."*
>
> Douglas Adams, The Hitchhiker's Guide to the Galaxy

The Round Tower Observatory

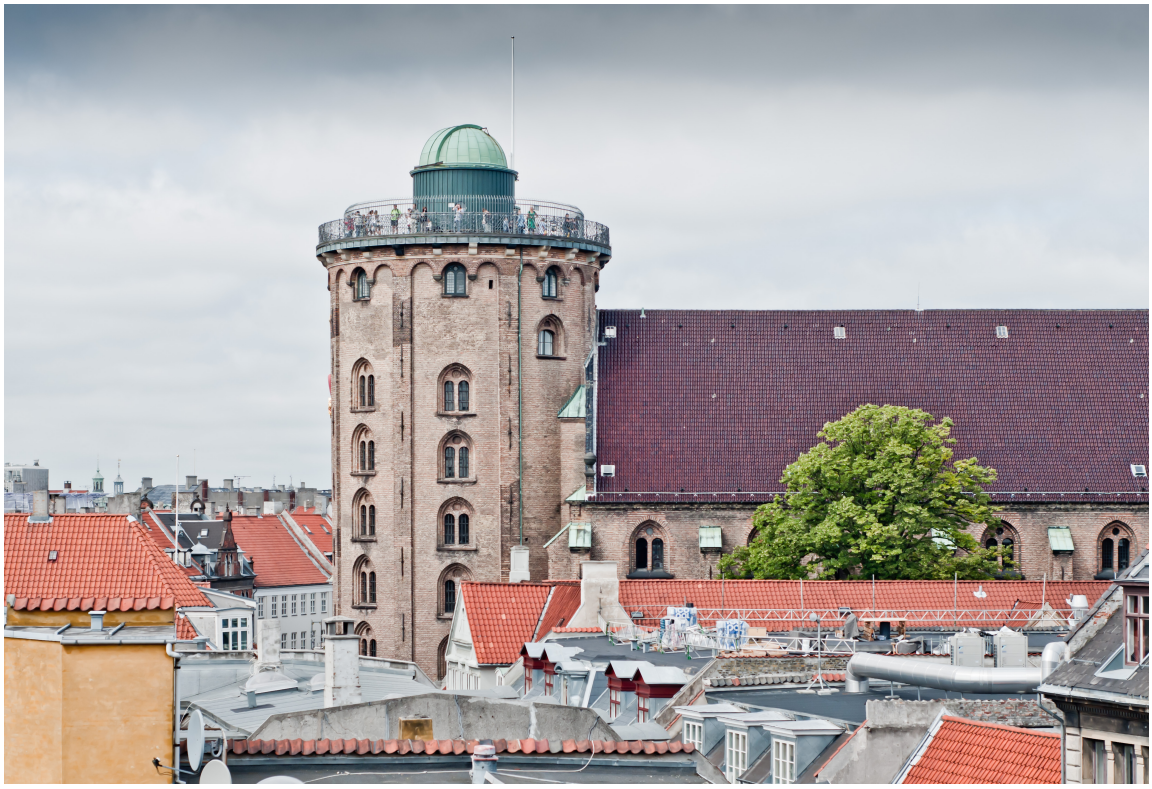
Bill Barton, FRAS.

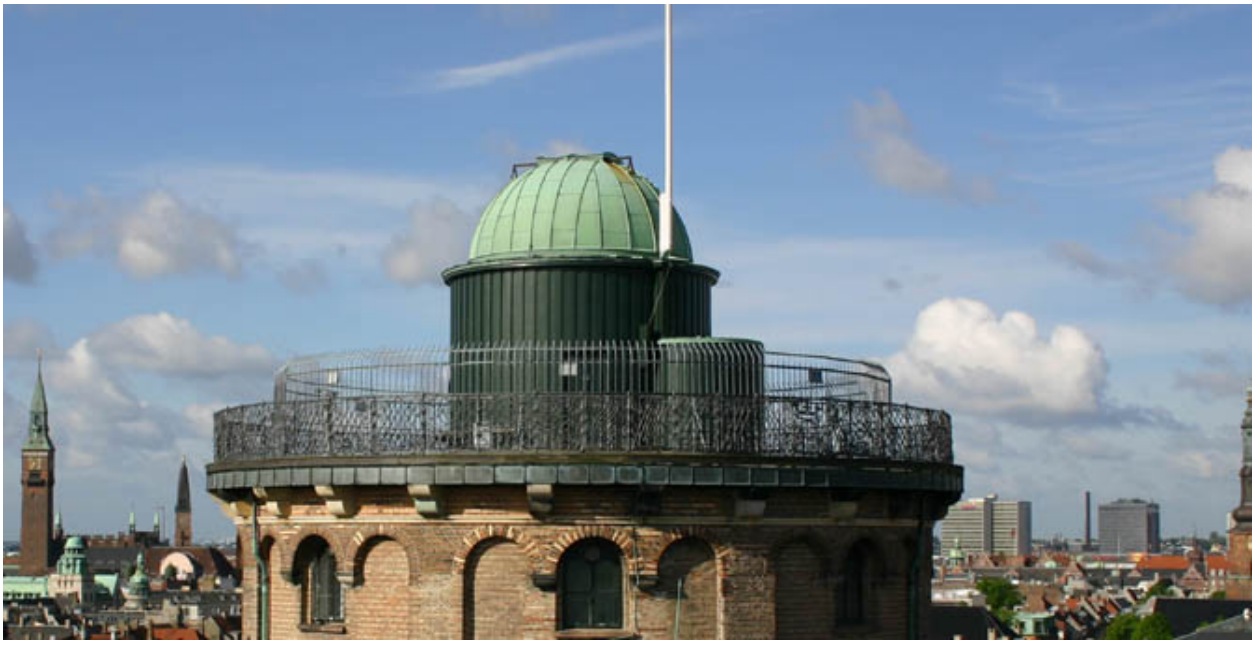


This is Europe's oldest working observatory (lat 550 40' 53" N, long 120 34' 33" E). It is located in central Copenhagen and was built on the order of King Christian IV of Denmark (12 April 1577 - 28 February 1648) between 1635 and 1642. In Danish its name is "Rundetårn" and is commemorated by asteroid 5505 (Rundetårn). The architect is not known for certain, but is generally assumed to be Hans van Steenwinckel the Younger (24 June 1587 - 6 August 1639) though he did not live to see the tower completed.

An unusual feature of the building is that the observing platform is accessed, not by stairs or a lift, but by a helical ramp. This corridor takes 7 ½ turns to reach the top and is of sufficient size that a horse may be taken up it. This might seem a little strange to us now that parts of a building were made sufficiently large for equine use, but back in the day when the only power available was animal or human muscle (perhaps with the assistance of 'block and tackle') it would make sense to include such things. The winding corridor has an average length of 210 m (689ft) climbing 3.74 m (12ft) per turn. Along the outer wall it has a length of 257.5 m (845ft) and an easy grade of 10%, while along the wall of the inner core the corridor is only about one third as long at 85.5 m (280ft 6in) but at a steeper grade of 33%. There have been several novel ascents and descents. In 1716 Tzar Peter the Great ascended by horse while visiting Copenhagen, his wife, Catherine I, reportedly followed in a carriage. In 1902, a Beaufort car was the first motorized vehicle to ascend. In 1989, Thomas Olsen went up and down on a unicycle in 1 minute and 48.7 seconds and in 1993, Henrik Djernis won a bicycle race against Jens Veggerby in a time of 50.05 seconds.

From the platform 34.8m (114 ft) above the street level the visitor has a magnificent view over the old part of Copenhagen. At the edge of the platform there is a wrought-iron latticework fence made in 1643 by Caspar Fincke (circa 1584 - buried 9 February 1655), Court Artist in metalwork. It includes Christian IV's monogram and the letters RFP; these represent the his motto: *Regna Firmat Pietas* (Piety strengthens the Realms).

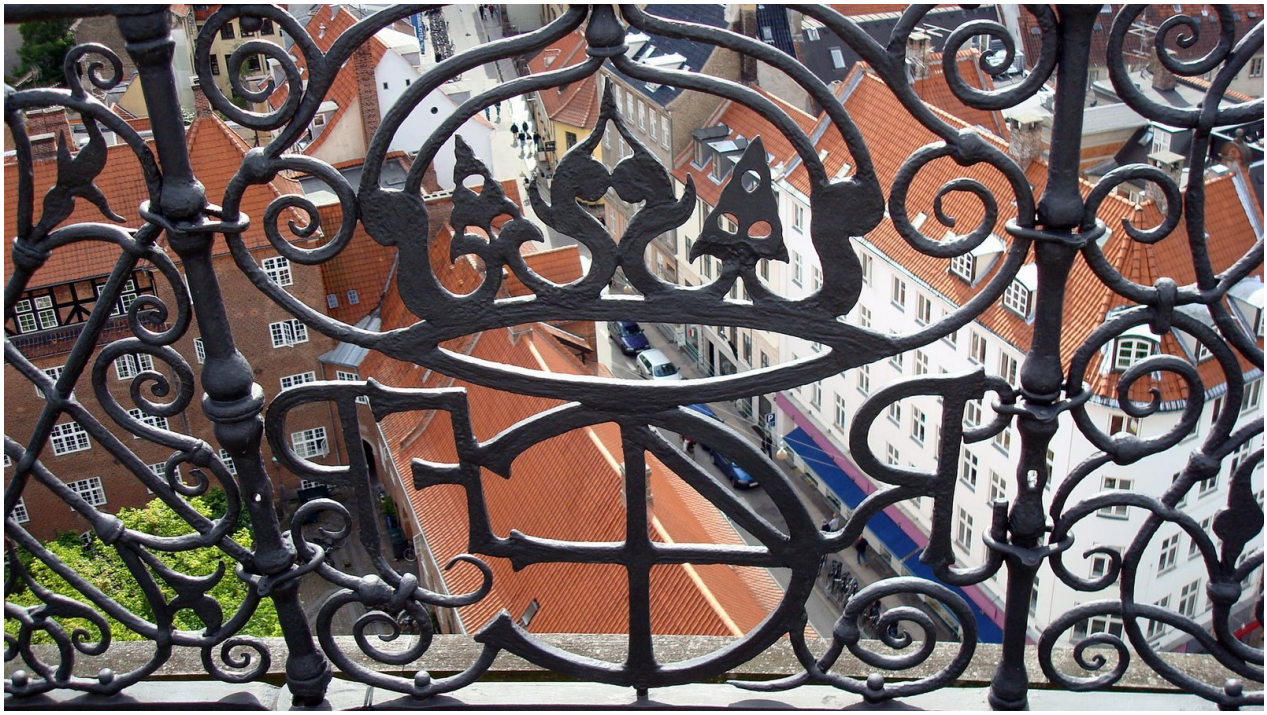




The 17th century European exploration and establishment of colonies created the need for accurate transoceanic navigation. Astronomical data allowed this to happen and national observatories were therefore established, the first in 1632 at Leiden in Holland. Five years later the Round Tower Observatory, first referred to as *STELLÆBURGI REGII HAUNIENSIS*, was constructed. Our own at Greenwich was started later in 1675.

After Tycho Brahe (14 December 1546 - 24 October 1601) had fallen from royal favour and left Denmark, Christian Longomontanus (4 October 1562 - 8 October 1647) became the new court astronomer. In 1625 he suggested to the king that an astronomical observatory be built as a replacement for Brahe's second observatory of Stjerneborg (Star Castle) which had been demolished after his death in 1601. Initially it was proposed to erect the new observatory on Solbjerget hill, but since there were also plans in place for the construction of a new students' church and library for the university, the idea of merging the three buildings into one was

conceived. Since 1622 the crown owned the land where it was eventually decided to build the new Trinitatis Complex.



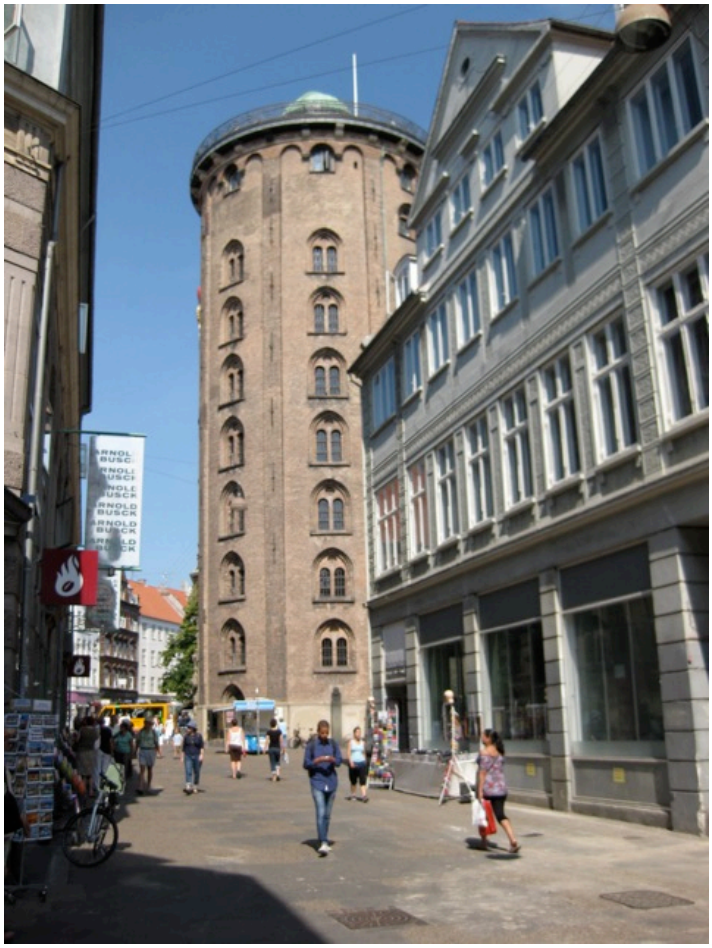
The Round Tower was built along the same lines as the one at Stjerneborg and they both have the same diameter.

The aging Longomontanus became the first director of the observatory and professor of astronomy at Copenhagen University, but died after only five years in office. His successor was Ole Rømer (25 September 1644 - 19 September 1710) who came from Århus to Copenhagen in the mid 1660s to study astronomy. When the French astronomer Picard came to Denmark to determine the true position of Uraniborg, Brahe's first observatory, he chose Rømer as his assistant. The pair returned to Paris, and Rømer became a member of the Royal French Academy. He had a lot of other duties that kept him too busy to do much astronomy, he was a Supreme Court judge, a police master and chief of the fire brigade, but still found time to make a new measuring system (he founded every other unit on only one unit (a foot)), and also introduce the Gregorian calendar into Danish life.

Thus it fell to one of Rømer's pupils, Peder Horrebow (14 May 1679 - 15 April 1764) to publish much of Rømer's work. Among other things, he determined the solar parallax as 9″ (seconds of arc, or 0.0025 degrees), derived an approximate solution to the Kepler equation and evolved (what is now known as) the Horrebow-Talcott method for determining polar altitude. There was a great fire in Copenhagen in 1728 and the Trinitatis Complex was severely damaged but was subsequently rebuilt, although all the observatory papers were lost. His son, Christian Pedersen Horrebow (15 April 1718 - 15 September 1776), in turn, succeeded him as director. Between 1766 and 1768 Christian was the last in a long line of astronomers to erroneously observe 'Neith', a supposed moon of Venus.

The hollow core of the Round Tower is Denmark's equivalent of our 'Greenwich Meridian'. In 1762 astronomer Thomas Bugge (12 October 1740 - 15 January 1815) was commissioned to survey Denmark and draw up a new and more accurate map of the kingdom. This was done by triangulation. The first one was between the Round Tower, Brøndbyhøj and Tinghøj in Gladsaxe, where the terrain was flat and measuring easy. The Round Tower was used as the starting point (zero degrees of latitude and longitude) for the calculations. The King appointed a number of surveyors who spent the summer months taking measurements around the country and retreated to the Round Tower in the winter to perform their calculations. The surveyors' measurements formed the basis for the first accurate map of Denmark, which was published in 1841. Following Christian Horrebow's death Bugge also became observatory director.

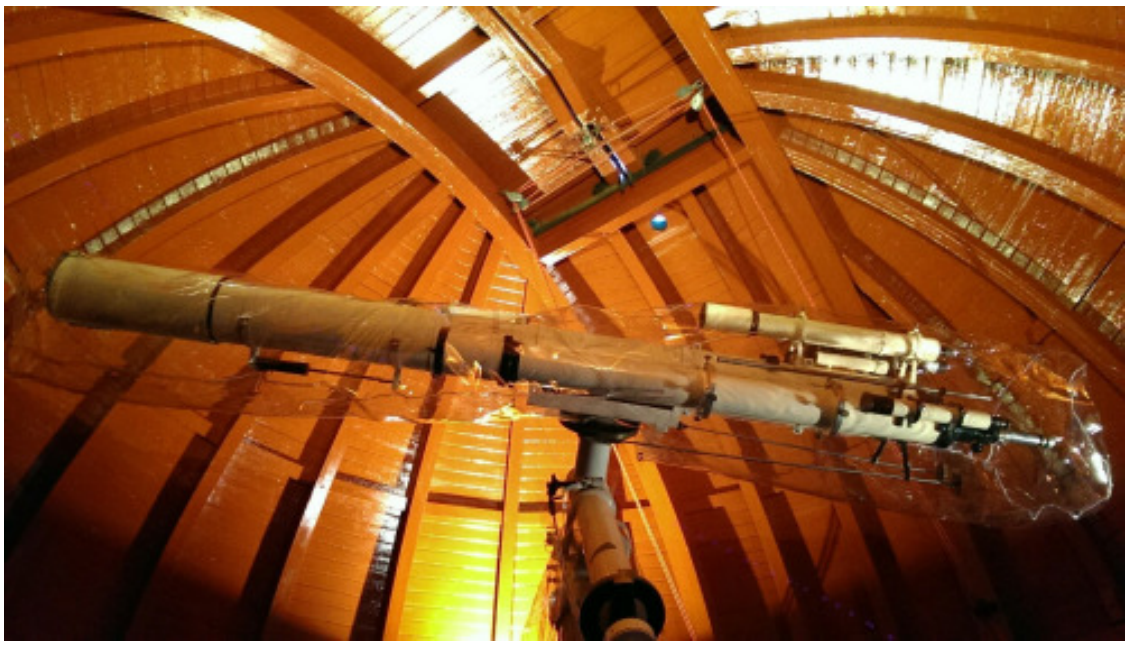
The Library which housed the entire University book collection was situated halfway up the Round Tower from 1657. It consisted of 10,000 books which had previously been spread around other University buildings in the city. When the University left in 1861, the book collection was moved to new premises on Fiolstræde. This part of the observatory was restored in 1987 and is now used as an art gallery and concert venue.



The bells of the Church of the Trinity hang in the Bell Loft, however, the bells do not take up much of the 900m² space, and so this has been rented out for all kinds of purposes over the years. At one stage, the people of Copenhagen discovered that it was an ideal spot in which to dry laundry. Later, it was used to store leather, dried herbs, painted theatre sets and feathers for the fine clothes and hats of society ladies.

After the fire of 1728, the Bell Loft was rebuilt from Pomeranian pine. The impressive original timbers are still intact and visible in the loft, which also houses a clock from 1731.

There is an orrery in the Round Tower displaying the movements of the six innermost solar system planets. The background sky is copied from Bayer's early 17th century maps. The original showed both Tycho Brahe's divergent system, with the Earth at its centre and the Copernican system, with the Earth orbiting around the Sun. It was built by Ole Rømer, in the 1670s, but not installed at the Round Tower until 1697. The model seen today is a replacement dating from 1928.



The observatory was in use by the University of Copenhagen until 1861, by which time the city conditions were unsuitable for celestial observing. It now sees amateur use with a six inch

(152 mm) refracting telescope by the somewhat obscure maker Jens Olsen (27 July 1872 – 17 November 1945) dating from 1929 in a 6.75m (22ft) high, 6m (20ft) diameter dome. Olsen is much more famous for his 'World Clock' which is installed in the Copenhagen City Hall. When he was about fifty, Olsen completed the calculations for the world clock he envisioned. He showed them to Professor Elis Strömgren (31 May 1870 – 5 April 1947) who approved them. However, it took another twenty years to acquire the funds necessary to build the clock. The clock was started at 3 o'clock in the afternoon of the 15 December 1955 by King Frederick IX (11 March 1899 – 14 January 1972) and Jens Olsen's youngest grandchild Birgit. Olsen had died ten years earlier of thrombosis. His clock continues to work, and is one of the most accurate mechanical devices in the world.

The two original privies in the Round Tower still exist - one on the top floor, the other beside the Library, halfway down the tower. Although not in use, the Library privy has been restored and re-opened. You may enter, sit yourself down and gaze up at the arched ceiling, yellowed by nicotine which used to seep through the limestone in the days when it was popular to smoke while visiting the smallest room. Famous names such as Ole Rømer, Ludvig Holberg, Hans Christian Ørsted and Hans Christian Andersen studied in the Library, and probably also needed to visit the privy now and again - with or without a pipe. Waste from the privy ran down into a large brick container without any outflow (the latrine pit), but despite experiments with open windows and double doors, the stench up in the Tower was almost overpowering. Water closets were installed in 1902, but the pit was not emptied until 1921 when nine truckloads of effluent were removed.

In Hans Christian Andersen's fairy tale 'The Tinder Box', the largest of the three dogs is said to have eyes as large as the Round Tower at Copenhagen. And in 'The Elder Tree Mother', an old married couple remember that they used to go "up the Round Tower, and looked down on Copenhagen, and far, far away over the water; then we went to Friedericksberg, where the King and the Queen were sailing about in their splendid barges!"

Institute of Astronomy, Cambridge

http://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.

Observations of Grazing Lunar Occultations

By Alan Smith and James Appleton

The fourth of this years grazing occultations will occur at about 02:48 UT (0350hrs BST) on 2/10/15 (a Friday morning) The track is conveniently placed close to Ipswich, the altitude of the moon is favourable, but the time of the event is somewhat ‘unfavourable’ and the ‘north limb' apparition usually gives a less spectacular view.

A brief explanation, by James Appleton, of a grazing occultation follows:

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) will attempt to observe this event. 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.

The graze track can be seen on the OASI web site:

(www.oasi.org.uk/Occs/Occ_summary_2015.shtml)

and you will notice that it passes very close to Ipswich and surrounding villages. We are going to observe from a site between Butley and Capel St. Andrew, off the B1084 on a unmarked road. The Google Earth coordinates are: 52° 05' 01.11" N, 1° 27' 18.11" E). We would aim to meet at about 0300 hrs (BST) at the site. This gives us time to set up telescopes and 'get our eye in'.

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.

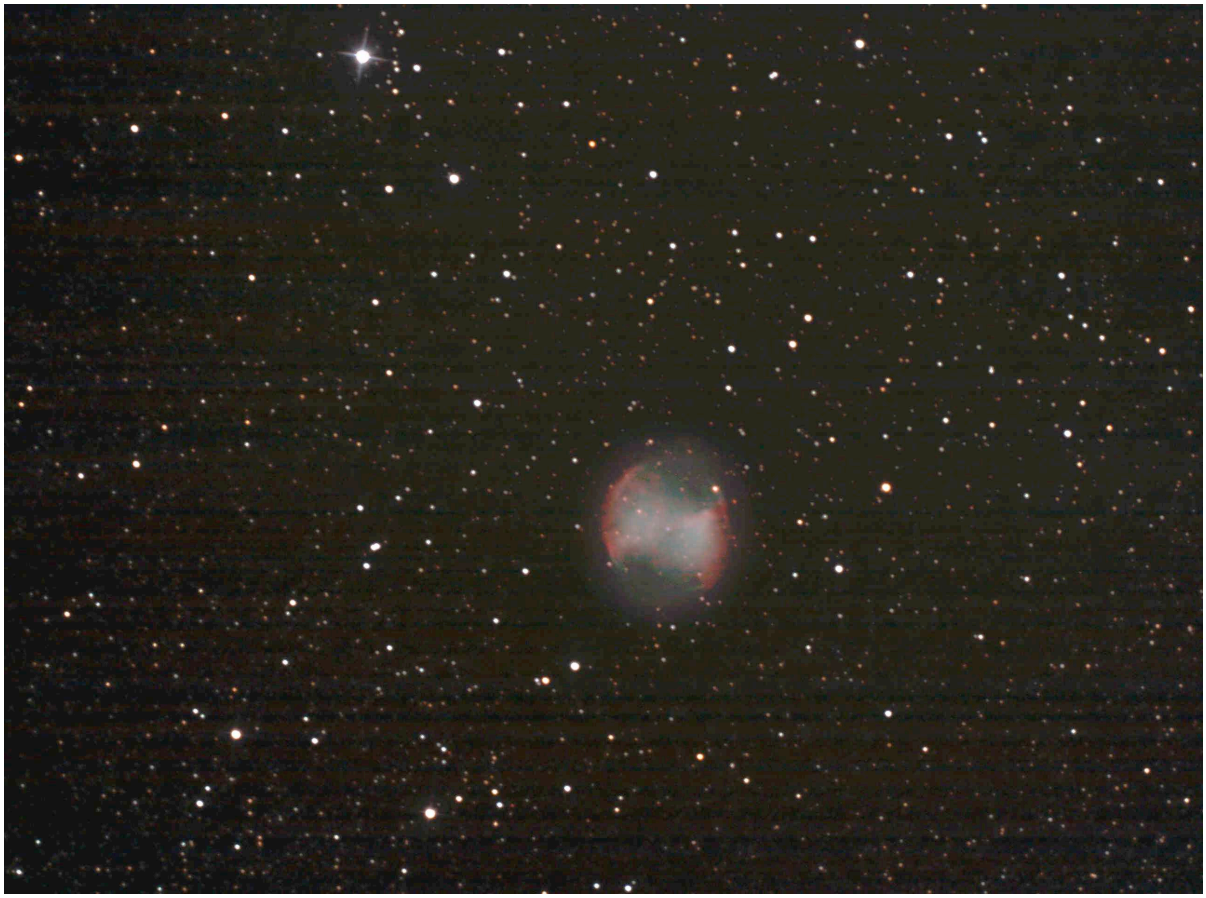
Alan Smith

Astrophotography

By David Murton

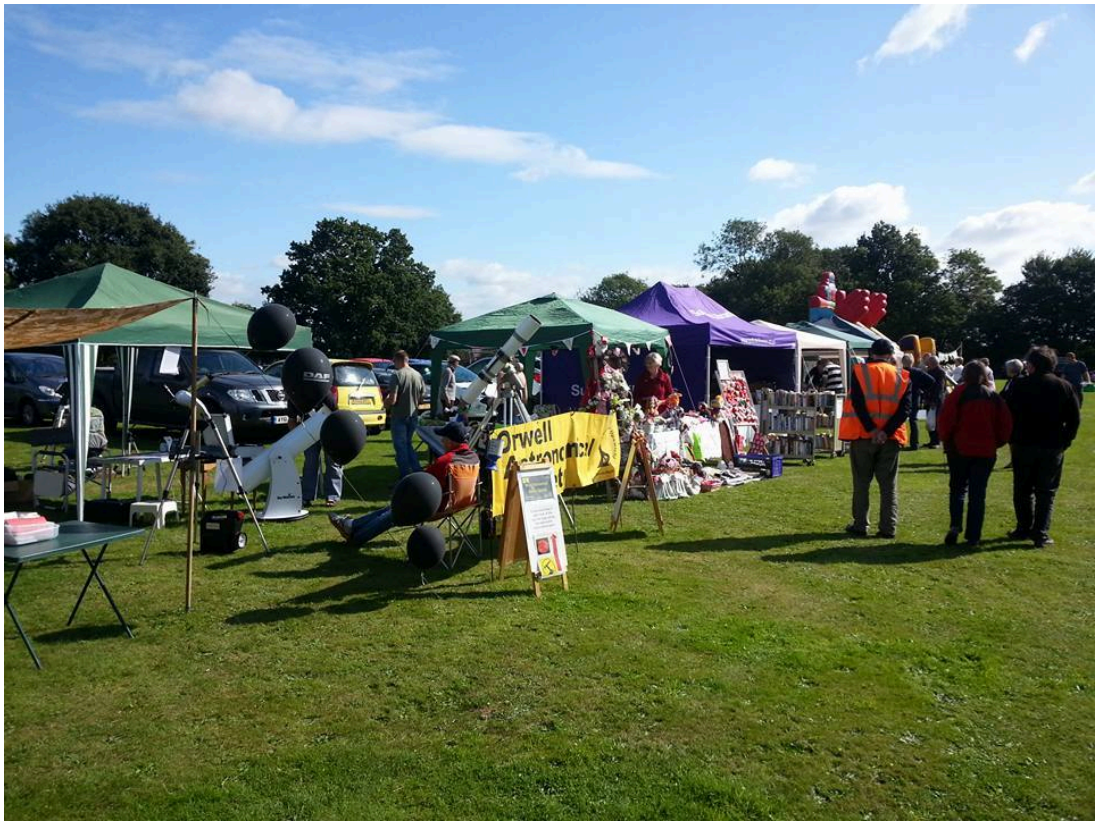
Taken 23 August. Ring is 10 no 360 secs at iso 200. Dumbell is 6 no. Both with darks and flats. Skywatcher 200pds and canon 1100d camera.

The Ring Nebula



Dumbell Nebula

M101



Solar observing at Bentley Family Day