



The Newsletter

of the



Orwell Astronomical Society (Ipswich)

2012
JUNE

Registered charity no. 271313

www.oasi.org.uk

No 475



Astronomy in the Park 19th May 2012

Mostly cloudy but the Sun made fleeting appearances. These are three of the different types of safe ways of looking at the Sun. In the front is a Coronado PST with Hydrogen Alpha filter, and behind left is a 90mm Maksutov with a mylar filter, and back right is a 70mm Maksutov telescope using eye piece projection.

Society News (Roy Gooding)

1 Committee Meeting Saturday 21st July

Any members who are interested are invited to attend this meeting.
Start time 20:00 Venue: Methodist Church Hall.

2 Access into the School Grounds and Observatory Tower

The code for the car park gate, is on the back of your membership card.

Please use the third gate into the school grounds, this is the gate behind the Gym. If the Black door entrance at the base of the observatory tower is locked, you will have to phone someone in the observatory to let you in. My mobile number is [REDACTED]. (Roy Gooding) alternatively the Observatory mobile is [REDACTED] during meeting hours.

3 Welcome to New Members

Mr David Murton

Mr Nick Sharman

Mr Glenn Povey

Mr Malcolm Edwards

Mrs Patricia Ware

4 Events Programme for 2012

This provisional event list will be updated through out the year

Event	Venue	Date
Yoxford Star Party	NEAS are holding a star party in the Yoxford area and have requested a visit to the observatory	Date & details TBC
Summer Barbecue For more information please contact Pete Richards	Newbourne Village Hall	30 th June From 14:00 ?
BAA Summer Garden Meeting	Hurst Community Centre Bexley Kent	7 th July Further details TBA
The Autumn Equinox Sky Camp www.starparty.org.uk/	Kelling Heath Kelling Norfolk	Extended event 10 - 21 September Main Event Weekend 14 - 16 September

Lecture meeting Nick Hewitt "Barnard, Gordon and the Darkness". It's about Dark Nebulae.	Methodist Church Halls, Blackhorse Lane	12 th October
Open Weekend Option 1	Orwell Park Observatory	27 th & 28 th October
FAS convention	Cambridge Institute Astronomy	Saturday 6 th October
Open Weekend Option 2	Orwell Park Observatory	17 th & 18 th November
Christmas Meal	TBA	5 th or 12 th December?

Other Observational Events 2012

Meeting	Venue	Date
Venus Transit See article by James Appleton	Orwell Park Observatory Alternative site: Behind the refreshment hut at "The Dip" Felixstowe	6 th June
Jupiter occultation	North Norfolk coast	15 th July
Perseids provisional meeting	Behind the refreshment hut at "The Dip" Felixstowe	11 th August
Geminids provisional meeting	Behind the refreshment hut at "The Dip" Felixstowe	15 th December

5 Observational Out Reach Meetings 2012

Star Party in Chantry Park

This event has been rescheduled for Saturday 22nd September.

6 OASI Email Distribution List

The society runs an email distribution list, for various communications between members. If you would like to be included on to this list, please send an email to Pete Richards

Sent your email address to [REDACTED]

7 BAA Summer Garden Meeting Saturday 7th July

If sufficient number of members are interested in attending this meeting. An excursion may be arranged.

Night Sky (June)

Moon

Full Moon	3 rd Quarter	New Moon	1 st Quarter
4 th	11 th	19 th	27 th

Object	Date			Mag	Notes
		Rise	Set		
Sun	1	03:41	20:07		
	30	03:39	20:19		
Mercury	1	03:53	20:48	0.0	Mercury will low down in the evening sky after sunset It will be best seen after the 20 th
	30	05:57	21:39		
Venus	1	04:00	20:46	-4.2	By the 15 th Venus will have moved back into the early morning sky.
	30	02:07	17:25		
Mars	1	11:40	01:01	0.7	Mars is now moving from Leo into Virgo
	30	11:06	23:22		
Jupiter	1	03:09	18:44	-1.9	Jupiter is now visible in the morning sky
	30	01:33	17:26		
Saturn	1	15:13	02:15	0.8	Saturn is observable until the early hours of the morning
	30	13:17	00:20		
Uranus	1	01:29	14:00	5.9	Uranus moves towards the borders of Pisces and Cetus
	30	11:06	12:09		
Neptune	1	00:30	10:42	7.9	Neptune is in Aquarius
	30	22:32	08:47		

Meteor Showers

Shower	Limits	Maximum	ZHR
Ophiuchids	May 19 th to July	June 10 th to June 20 th	5

Meteor source is the BAA Handbook

OCCULTATIONS DURING JUNE

No interesting lunar occultations occur during the month under favourable circumstances.

James Appleton

LOGO CLOTHING

I will be pulling together an order for OASI logoed clothing shortly, so if anyone would like to order any please go to the following URL and let me know the following for each item you would like. Please note that prices quoted will be for guidance only, as embroidery, VAT and carriage adds to the cost.

<http://v2.io8.co.uk/cid8v97xln3z6/index.pl>

I will need to know:

- quantity
- item brand and description
- code number
- colour (as stated in catalogue)
- size (as stated in catalogue)

for example:

- one Fruit of the Loom Sweatshirt, XX123, pongo red, XL

All orders will be placed at the end of June, and so need to be received by then. Please send orders to [REDACTED]

Paul

Newsletter Articles

Our Society is always on the lookout for newsletter articles! If you would like to submit an article, please email it in Microsoft word format <e.g.A5 landscape 12 point font> to the editor, Eric Sims at [REDACTED] by the third Wednesday of each month to ensure it appears in the next month's newsletter. If you don't have access to a computer, please phone me at the number published inside the back page of the newsletter.

Eric Sims

5

ARRANGEMENTS FOR OBSERVING THE TRANSIT OF VENUS, 06 JUNE 2012

The second and final transit of Venus of the 21st century occurs on Wednesday 06 June 2012. Unfortunately, from the UK, the transit starts before the Sun rises and only the final hour and 10 minutes will be visible. Key times are as follows:

Event	Time (UT)	Altitude
Sunrise	03:38	Centre of solar disk on horizon
Venus rises	03:43	Planet on horizon
3 rd contact	04:37	7°
4 th contact	04:55	9°

Orwell Park Observatory will be open to observe the transit. The transit will be visible from one of the balconies and from the dome. Martin Cook and James Appleton are coordinating arrangements. Martin and James will observe in the dome by solar projection using the Tomline Refractor. Observers intending to observe from the balcony will need to make their own arrangements regarding equipment. If you wish to observe the transit from Orwell Park, either in the dome or on the balcony, please proceed as follows. (All times below are BST).

1. Email info@oasi.org.uk ASAP to indicate your intention. If you do not have email, please speak to Martin or James – contact details are listed elsewhere in this *Newsletter*. (If you have already informed Martin or James, you do not need to contact them again.)
2. On the day of the transit, arrive at the gate of the car park at 04:00. Someone will be waiting to open the gate for you. **LAST ENTRANCE TO THE CAR PARK WILL BE AT 04:05.**
3. Once you gain entrance to the car park, make your way quickly to the observatory.

For the Tomline Refractor to point towards Venus on 06 June, the dome has to be orientated such that the turning wheel fouls the door, preventing it from opening. Therefore, all members of OASI intending to observe from the dome must be in position by 04:15. **THERE WILL BE NO INGRESS TO OR EGRESS FROM THE OBSERVATORY DOME BETWEEN 04:15 AND 06:00.**

The observatory will be open as above whatever the weather forecast may be.

In order for equipment to be set up and tested, the dome will be out of action and out of bounds to members of OASI from Wednesday 30 May until it opens to observe the transit of Venus.

James Appleton & Martin Cook

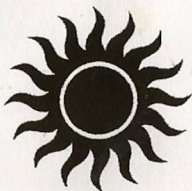
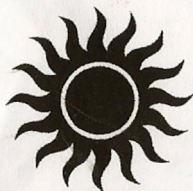
OASI SUMMER

Barbecue and Picnic

2012

Saturday 30th June

Newbourne Village Hall



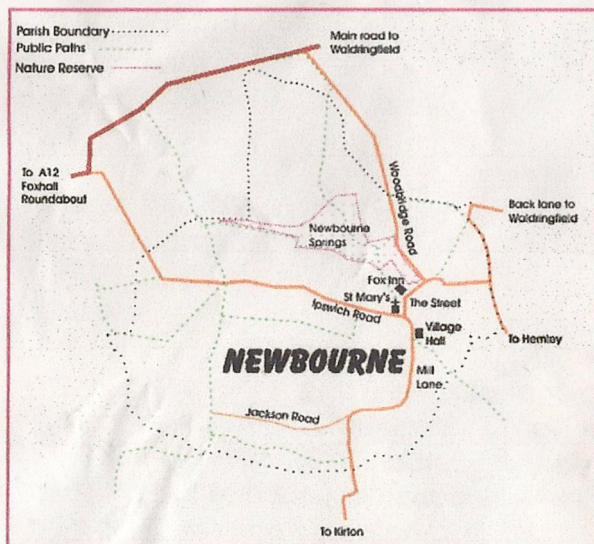
The event is open to all OASI members and their friends and families.
Entry is free.

Setting up time will be shortly after midday and the finish time late in the evening. The event is very informal so feel free to come along at any time even if you can only stay for a short time. The barbecue will be ready for use from about 3pm.

If you plan to eat please bring food to barbecue - and/or picnic food - and drink.

Feel free to bring picnic/garden chairs.

The venue has an excellent playing field so feel free to bring along equipment for outdoor games and if the sky is clear members and OASI solar telescopes will be available.



In case of bad weather bring party/picnic food only and the event will be held inside the hall.

Newbourne Village Hall is in Mill Road, Newbourne, Suffolk

**Satnav info: Venue
Postcode IP12 4NP**

Beginner's DIY Dob

After John Wainwright's fascinating talk on Dobsonian mounts in April, I was inspired to build my own – and it's been just the weather for indoor construction!

I bought a very cheap (£40) second hand 3" reflector some months ago. Yes, I now know the warning on the San Francisco Sidewalk site, but they also advise on what to do if you have bought a department store scope¹. Mine came with a very wobbly tripod and three very chromatic eyepieces 25, 12.5 and 6mm. This last one was totally useless.

Step 1

Buy 15mm Plossl from Telescope House. Very quick delivery and now I have a telescope with a usable image. The Moon

almost fills the field of view.

Step 2

Build Dobsonian mount. The scope came with an Az/El mount which was bolted onto the tube with M8 bolts. A band saw, spindle sander and table saw/ planer/router were invaluable. The rule of "think thrice, measure twice, cut once" applies!

Some spare recycled block pine shelving was cut into 4 squares and these were glued and cramped in pairs with the grain at 90°. Mark centres and draw 4" radius circle. Drill 8mm hole in each centre. Rough bandsaw into circle. Router

to smooth the edges and sand.

Yokes were cut and shaped to fit the tube. These were screwed and glued to the side disks with the disks bolted into place to align the yokes before screwing them into place. Mark which wheel is observer side! Sod's Law WILL apply. Bearings are plastic cabinet jointing blocks.

The azimuth mount is plastic veneered chipboard and I decided to try Mike Norris's suggestion of a Lazy Susan bearing. This needed the addition of 3 easy-glide PTFE buttons to reduce some residual wobble due to looseness in the bearing. The Lazy Susan does, however, give a bit of annoying backlash so may be replaced with a centre

bearing. The addition of an 8mm bolt and spring in the base to act as a 0° stop for initial Polaris alignment post-dates the picture.

The altitude scale from Jim Easterbrook's web site² needed some graphical editing as the one on his site is for a right side mounting and the numbers go the wrong way. The azimuth scale is fine – just needing scaling to suit my azimuth base. £1.50 form laminating at Pierrot's. The crescent Venus is now visible!

Step 3

Buy 40mm and 8mm Plossl eyepieces. Saturn's rings are now visible!

Now for something with a bigger aperture...



¹<http://www.sfsidewalkastronomers.org/index.php?page=fixing-the-department-store-telescope>

²<http://www.jim-easterbrook.me.uk/astro/scope/dob/>
Martin Richmond-Hardy

Kelling Heath Star Party - Spring 2012

Mike Norris

I understand that spare plots for the Kelling Heath Star Parties are about as rare as hens teeth so I jumped at the chance to take up the plot offered by Ben Jarvis.

I managed to scrounge a 'crawl in and hope' tent from my grandson last used on an abortive camping holiday in Wales ten years ago together with a junior sized sleeping bag of a similar vintage. I arrived in Kelling on Friday 20th in weak sunshine having delayed my start by a day since the weather had that week been so wet. Gordon a member of Breckland AS who I had met at their Star Party in March came over to help me rescue my tent which had been caught by the wind and was fast disappearing into the trees.

I walked round the site. There were plenty of empty pitches, possibly as a result of the weather but still there must have been over a hundred pitches with scopes under cover, some of them monster Dobs. By lunch it had started raining! The rain continued into the evening so I gave up any plans to cook outside and retreated to the pub. It rained most of the night, hammering on the tent but it remained dry inside. Saturday morning was cloudy, the trade stands arrived by about 10am, and so did the rain. It was hard work for those manning the stands, covering and uncovering their wares, at least I thought I was here by choice!

I called into the gents on the way back and stood next to a fellow astronomer, water dripping from his nose. 'I will never understand how astronomy took off over here' he said, 'what with the cold, the rain, and the worst light pollution in Europe, then you come here and buy things you will never use, I was in South America, inky black skies, that no one ever looks at! I left him, dreaming of inky black skies!

The rain continued into the evening. Again I retreated to the pub where I met up with David from the Grantham AS. His mates had deserted him and gone home. I crawled into my tent at about 11pm. I



awoke to the sound of voices, the noise of rain on the tent had abated I checked my watch it was 12.15am. Half asleep I opened the tent flap - an inky black sky! I togged up. Brian my next door neighbour was wrestling with a broken deck chair.' Just thought I would sit here' he said 'it's not worth getting out the scope'. It was true, light clouds were moving across but where the sky was clear the stars shone in such abundance and with such brilliance it looked as if they were falling to earth. We sat in silence as the Lyrid Meteor Shower put on a show for us. By 3am the clouds had rolled in and it was over.

The next morning, Sunday with more rain expected I decided to pack up. Gordon came over to see me and to exchange e mail addresses. 'See you next at the Autumn Party' he said shaking by hand. 'You bet' I replied.

The Equation of Time

Matthew Robertson

I recently read an entry in an old QI book about the rotation of the Earth and the length of the day, in which it was stated (nearly correctly) that the length of the day can vary by up to 50 seconds from the average of 24 hours. But it was also stated (quite wrongly) that this is a result of glitches in the Earth's rotation caused by earthquakes, tidal waves etc. Of course these things do have a tiny effect (the Japanese earthquake/tsunami has been estimated to have shortened the day by around 1.6 microseconds). But I think what they were referring to was an entirely different regular annual phenomenon described by the Equation of Time, which is itself quite interesting and worth detailing for those who might not be familiar with it.

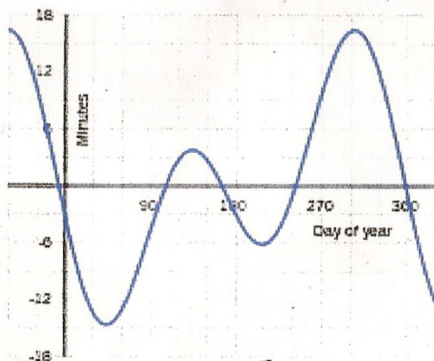
As you will all know, the actual period of rotation of the Earth is not 24 hours but about 23h 56m (the sidereal day) - the extra 4 minutes in the solar day arises because the Earth is moving around the sun while it rotates. If we start the solar day as the sun crosses the meridian, then slightly more than a full rotation is required before the next crossing, because the Earth has moved on in its orbit. The point here is that although the sidereal day is practically constant (apart from those microsecond glitches and a long term slowing of the rotation due to tidal friction), the extra 4 minutes does vary significantly through the year as a result of two factors.

The first of these relates to the eccentricity of the Earth's orbit. We are at our closest to the sun (perihelion) on 3 January, and at our furthest (aphelion) on 4 July; furthermore orbital theory tells us that the point of minimum orbital distance is also the point of maximum orbital speed, and vice-versa. This means that the direction of the sun as seen from the Earth changes more rapidly as a consequence of the earth's orbital motion near perihelion than it does near aphelion, when the distance is greater and the speed is smaller. And the consequence of this is that the difference between the sidereal and solar days, ie the extra bit of

rotation required to compensate for how the Earth has moved on round its orbit, is given an annual variation with a maximum around perihelion and a minimum around aphelion.

The second factor relates to the obliquity of the Earth's axis, and it happens to be similar in the size of its effect to the first. However in this case the periodicity is 6 months rather than a year, with maxima at the solstices and minima at the equinoxes. The effect arises because the perpendicular distance from the sun to the line of the Earth's axis is at a minimum at the solstices. This is slightly harder to visualise than the eccentricity effect; the simplest way is to imagine an extreme example of a planet whose axis of rotation is tipped over at an angle of almost 90 degrees (as is the case with Uranus). In this case, as the planet moves through its solstice the line of its axis sweeps past close to the sun, meaning that in this extreme case the planet might need almost an extra half rotation over and above the sidereal day before the sun gets back to the meridian.

These two simple periodic functions, one with a period of 6 months and one a year, combine to produce the slightly more complicated Equation of Time graph. I have so far talked in terms of the length of the apparent solar day, and how that changes through the year. However the equation of time is always given as a graph of (Apparent Solar Time - Mean Solar Time) against Time of Year, ie it represents the cumulative effect of these variations in day length.



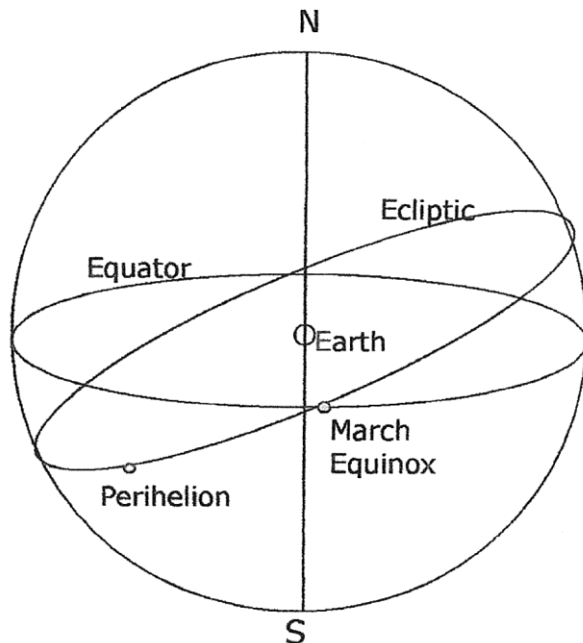
This is a copy of the graph from the Wikipedia article on the Equation of Time. The actual day length can be deduced from the slope of the graph - a downward slope implies longer than average days, with Apparent Solar Time (ie sundial time) dropping behind Mean Solar Time, while an upward slope implies shorter than average days. So we can see that the steepest part of the graph is the downward slope around December/January, when the two effects combine to increase the day length.

One of the curious side effects of this is on the times of sunrise and sunset around the December solstice. Normally we would expect sunrise (in the northern hemisphere) to get later through December, levelling off around the 21st, then begin to get earlier again, with sunset doing the opposite. In fact we find that in London the time of sunrise doesn't reach its latest until around 30 December, while sunset reaches its earliest around 12 December. The reason for this is that at that time of year the apparent solar day is close to its longest, meaning that events like sunrise and sunset are being pushed later day by day. Because the graphs of expected sunrise and sunset are very flat at this time, the extra day length is enough to skew the graphs and shift the maximum/minimum in the way we observe.

In theory we could choose any arbitrary time of the year as the point at which to set Apparent Solar Time to coincide with Mean Solar Time. It might be thought natural to choose something like the March Equinox as the zero point; but in fact if you look at the graph you see that at the equinox (about day 81 in the year) it is in the negative. And the zero points of the graph don't appear to match up with any significant moments in the year. This is because the alignment of Apparent Solar Time and Mean Solar Time is defined by a slightly more complicated two step process. The simplest way to see how we do it is to start from a geocentric viewpoint, as in the diagram below.

Imagine the Earth in the centre of the celestial sphere with its axis vertical and the equator in a horizontal plane. The sun then appears to move around the ecliptic, inclined at an

angle to the equator, during the course of the year. First we define an imaginary entity called the Dynamical Mean Sun (DMS). This coincides with the actual sun at the point of perihelion, but moves at a constant angular velocity round the ecliptic. Then we define a second imaginary entity just called the Mean Sun (MS). This coincides with the DMS at the point where that crosses the equatorial plane from South to North (the March equinox), but moves at a constant angular velocity round the equator. It is the position of the MS in the sky that defines Mean Solar Time. Because the actual angular velocity of the sun round the ecliptic is faster than average between perihelion and equinox, the DMS lags behind at this stage and is behind (ie west of) the real sun by the time they get close to the equinox. This means that the MS (which coincides with the DMS at the equinox) rises, crosses the meridian etc, *before* the real sun, so Mean Solar Time is ahead of Apparent Solar Time and the graph of the Equation of Time is negative at this time.



DIARY for JUNE

STONs	SMALL TELESCOPES OBSERVING NIGHTS AT THE OBSERVATORY As the British Summer Time starts at the end of March, there will be no formal arranged STONs until October 2012. If anybody has something special they wish to observe, then contact Gerry Pilling, Patrick O'Sullivan or Dave Robinson to discuss and see what can be arranged. ☎ Paddy O'Sullivan [REDACTED] ☎ Gerry Pilling [REDACTED]
Wednesdays From 8.00pm	OBSERVATORY CLUB NIGHTS Observing with the Tomline Refractor and other telescopes if skies are clear. ☎ Martin Cook [REDACTED] mobile [REDACTED] ☎ Roy Gooding [REDACTED] mobile [REDACTED]
Wednesday	OASI WORKSHOP At Nacton Village Hall Nothing Booked until later in the year. ☎ Mike Whybray [REDACTED]
	OBSERVATORY VISITS BY LOCAL COMMUNITY GROUPS No visits booked at time of printing. ☎ Paul Whiting FRAS [REDACTED]
Saturday 21st July 8.00pm	NEXT COMMITTEE MEETING Venue: The Methodist Church Hall Blackhorse Lane Ipswich

Summer Barbeque
Newbourne Village Hall
More information inside.

Society Contact Details

Observatory tel. no. (meeting nights only): [REDACTED]

Secretary: Roy Gooding [REDACTED] (day) [REDACTED] (evening)

E-mail queries: info@oasi.org.uk

Facebook.com/orwell astronomical

Chairman: Neil Morley [REDACTED]

Please send material for the OASI web site (e.g. observations, notices of events, general interest articles) to info@oasi.org.uk