

ORWELL ASTRONOMICAL

SOCIETY IPSWICH

Charity No 271313

JANUARY 2002



Society News

1 AGM 12th January 2002

The 2002 AGM will be held on Saturday 12th January 2002, from 20:00. One of the classrooms in the courtyard will be used. Every member is welcome.

As usual the agenda of the AGM will include a review of this years activities, and a look forward to those of the new year.

The principle items covered will be:

- Report on last year's society activities
- Election of the new committee for 2002
- A provisional list of events for the 2002.
- Part of the meeting will be set aside for a discussion on the future of the 19" telescope now under construction.
- Members will also be able air any ideas they may have on society activities

2 Membership Subscription for 2002

Subscriptions for 2001 are due from 1st of January. If you have already paid please ignore this request.

The rates for 2001 are:

Junior & Concessionary	£11.00
Adult	£15.00
Family	£17.00

A renewal form is included with the January newsletter. Return this form with your 2001 subscription, so that the society membership records can kept up to date.

Please make cheques & P.O.'s payable to the: -

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

Please return all subscriptions **with the renewal form** to

Martin Cook

Ipswich
IP4 5PZ

Event	Details	Date
Astronomy Workshop	School science room 19:45 to 21:00 Yet More Astro Photography Neil Morley	Wednesday 2 nd January
AGM	Orwell Park School 20:00	12 th January
AstroFest	Kensington Town Hall Hornton Street London	1 st & 2 nd February
Astronomy Workshop	School science room 19:45 to 21:00 Hubble Telescope Paul Whiting	Wednesday 6 th February
Astronomy Workshop	School science room 19:45 to 21:00 Aurora Pete Richards	Wednesday 6 th March
Astronomy Workshop	School science room 19:45 to 21:00 Time Ted Sampson & others	Wednesday 3 rd April
BAA Winchester Weekend		6 th to 8 th April
Astronomy Workshop	School science room 19:45 to 21:00 Computer Packages Paddy O' Sullivan	Wednesday 1 st May
BAA Exhibition Meeting	Venue not fixed	Date not yet fixed
Summer Barbecue	Venue to be fixed	Date to be fixed.
Summer Excursion	Nothing arranged yet. If you have any ideas, please contact any committee member	Date to be fixed.
FAS Convention		5 th October?
Open Weekend		Date to be fixed.
Equinox Star Party	Thetford Organiser; Loughton A.S	6 th to 13 th September
Christmas Meal	Provisional date	11 th December

This events list, is open to modification throughout the year, so watch this space.
For other East Anglian Astronomical Society meetings. see separate page.

4 Telescope Review Articles (Old and New)

Society members own a verity of telescopes, both old and new. I would like to request a series of review articles, from members on their telescopes.

The eventual aim would be to product a booklet on member's equipment that can be given to prospective new members, who ask for advice on telescopes.

The first of these articles was recently written by Neil Morley. Neil reviewed his short focal length 80mm refractor.

Sun

The sun will be rising approximately between 08:10 to 07:50
The sun will be setting approximately between 16:00 to 16:40

Moon

Moon

3 rd Quarter	New Moon	1 st Quarter	Full Moon
6 th	13 th	21 st	28 th

Mercury Mercury will be at greatest eastern elongation on the 11th. The planet will be visible low down in the SW after sunset. Towards the end of the month it moves rapidly into the sun's glare, reaching inferior conjunction on the 27th.

Venus Venus will not be visible this month, as it is lost in the sun's glare.

Mars Mars moves into Pisces is month. It will be setting at about 22:00 in mid month. Magnitude 0.0

Jupiter Jupiter will be at opposition on the 1st, in the constellation of Gemini. The planet will be observable throughout the night. Magnitude -2.6.

Saturn Saturn remains will placed for observation this month, in Taurus. Magnitude -0.2

Uranus Uranus is in Capricornus, it will be setting at about 19:00 in mid month. Magnitude 5.9

Neptune Neptune will be in conjunction with the sun on the 28th.

Meteor Showers

Name	Limits	Max	ZHR
Quadrantids	January 1 st to 6 th	January 3 rd 16:00	100?

Meteor source is the BAA Handbook

Other East Anglian Astronomical Society's Meetings

There is an open invitation to our members to attend any of the following local society meetings. If you do attend any of these meetings, please introduce yourself.

Norwich Astronomical Society

They meet ever Friday at the Seething observatory.

Directions to the Observatory

- 1 Leaving Ipswich along the A140
- 2 Turn right on the B1135 for Bungay
- 3 Turn left at Woodton to the B1332
- 4 Turn 1st right

- 5 Turn 1st right again. You should now be in Harveys Lane. It is sign posted to SEETHING OBSERVATORY, SEETHING INDUSTRIAL ESTATE.
- 6 Continue down this twisty and rather narrow road for just over 1 mile. You come to a crossroads. Go straight over, into Toad Lane.

You will pass the old USAF Airfield control tower on the left. The observatory entrance is on the left, about 200 yards further down the lane.



Lecture Programme for 2002

A Voyagers Tale A visit to the Gas Giant	By Stuart Edge	Friday 25 th & Saturday 26 th January 2002
The Light of a Thousand Suns	By Mark Lawrik-Thompson	Friday 22 nd & Saturday 23 rd February
Galaxies Galore	By Philip Young	Friday 22 nd & Saturday 23 rd March 2002
The Space Race From Sputnik to Apollo	By David Balcombe	Friday 26 th & Saturday 27 th April 2002

Lecture admission £2.00 adults. Under 16 £1.00 Other Fridays are observing nights.

Cambridge Astronomical Association

The Cambridge AA meet in the Institute of Astronomy, Madingley Road Cambridge every 3rd Friday of the month.

North Essex Astronomical Society

The North Essex Astronomical Society meets every 3rd Thursday at the BT Social Club hall Witham Telephone Exchange. They charge £2.00 per person. At the time of writing I had not received an events programme for this group.

Society Contacts

Norwich Astronomical Society	Mr. Frank Lawlor	
North Essex Astronomical Society	Mr. Iain Manning	
Cambridge Astronomical Association	Mr. S. Trafford	

LUNAR OCCULTATIONS DURING 2002

by James Appleton

This article provides a summary of lunar occultations of stars and planets visible from East Anglia during 2002. The Orwell Park Observatory holds a comprehensive listing, containing full observational details.

There are many hundreds of stellar occultations which are potentially observable from East Anglia during the year, although many involve very faint stars. There is one grazing occultation of a star visible from East Anglia. The Moon occults Jupiter once and Saturn once during the year as seen from the region.

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

OCCULTATION PREDICTIONS

The Moon and major planets (Pluto excluded) occupy a band within $\pm 6.75^\circ$ of the ecliptic. This band therefore defines the area of the sky within which to search for occultations involving the Moon and major planets. I use a complex suite of computer software to search for occultations. The software models the motion of the Moon and planets in detail, and by comparing the position of the Moon at each instant with the co-ordinates of planets and stars, it evaluates the precise time at which lunar occultation events occur. Once the time of an event is known, the software runs additional algorithms to calculate other observational details.

The software is based on the algorithm *Occult* in *Astronomy On The Personal Computer*, 2nd edition by O.Montenbruck and T.Pfleger, Springer-Verlag, 1994. However, I have added numerous enhancements to improve accuracy and to filter out predictions occurring under unfavourable circumstances. The software uses the NASA Jet Propulsion Laboratories' ephemeris DE-405 to provide the position of the Moon and planets and the Hipparcos, Tycho2 and PPM star catalogues to provide stellar positions. DE-405 and Hipparcos/Tycho2 represent the latest and most accurate sources of astrometric data currently available. The PPM catalogue provides coverage in areas of the sky that Hipparcos/Tycho2 do not cover in depth. The software uses IOTA's electronic Watts charts to correct predicted timings for the local lunar limb profile. (This typically makes a difference of several seconds.)

BRIGHT STELLAR OCCULTATIONS

The Moon can occult four first magnitude stars: Aldebaran, Spica, Antares and Regulus. Unfortunately, during 2002 there are no occultations of these stars. However, there are 13 occultations during the year involving other stars brighter than magnitude 4.5, and these should be readily visible in binoculars or small telescopes. Table 1 lists the circumstances of these occultations.

The first column of table 1 denotes the phenomenon: 'D' denotes a disappearance and 'R' a reappearance. Both D and R times are listed for all occultations except where one or the other would occur at too low an altitude to be easily visible. Column two gives the date and time (UT) of the occultation. Column three details the lunar phase as a fraction of unity ('+' denoting waxing and '-' denoting waning). Columns four and five give the altitude of the Sun and the star, both in degrees. (A negative solar altitude implies that the sun is below the horizon.) Column six gives the minimum distance, in lunar radii, of the star from the centre of the Moon, at the time of closest approach (midway between D and R events). Here 'N' indicates a North passage of the star and 'S' a South passage. Columns seven and eight provide the star's name or catalogue number and magnitude.

D / R	Date & Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Min Dist rad	Star	Mag
D	31 Jan 21:29	0.87-	-43	10	0.28S	nu Vir	4.0
R	22:25		-50	19			
D	05 Mar 02:06	0.60-	-38	8	0.06N	beta 1 Sco	2.6
R	03:15		-30	14			
D	27 Mar 19:15	0.99+	-9	23	0.22N	nu Vir	4.0
R	20:16		-18	31			
D	26 Apr 22:13	1.00+	-21	24	0.31N	kappa Vir	4.2
D	31 Jul 23:25	0.54-	-19	6	0.20N	ksi 1 Cet	4.4
R	01 Aug 00:24		-20	15			
D	13 Sep 19:10	0.50+	-9	11	0.49S	theta Oph	3.3
R	20:15		-18	6			

/... Table continued overleaf

D / R	Date & Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Min Dist rad	Star	Mag
D	19 Sep 22:30	0.97+	-34	24	0.33N	tau 2 Aqr	4.1
D	18 Oct 18:38	0.94+	-17	17	0.03S	30 Psc	4.4
D	27 Nov 01:22	0.56-	-54	29	0.36N	eta Leo	3.5
R	02:24		-46	38			
D	10 Dec 19:41	0.41+	-35	18	0.99N	tau 2 Aqr	4.1
R	19:52		-37	17			
R	20 Dec 17:29	0.99-	-15	9	0.43N	epsilon Gem	3.1
R	21 Dec 18:36	0.96-	-25	10	0.25N	kappa Gem	3.6
D	26 Dec 05:00	0.59-	-27	44	0.69N	nu Vir	4.0
R	05:52		-19	44			

Table 1. Occultations of stars brighter than magnitude 4.5.

OCCULTATION SEASONS

The Moon's orbit is defined by a range of periodicities, both short and long term. The short term periodicities mean that the Moon's path through the sky tends to follow a pattern whereby it almost repeats itself every month. However, 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 some years, during which particular stars are repeatedly occulted. We are now in a season lasting until 2005 when no first magnitude stars are occulted.

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 more than 10 stars.

Date	No. occs.	Date	No. occs.	Date	No. occs.
Thu 17 Jan	11	Sat 16 Feb	14	Sun 17 Feb	12
Mon 18 Mar	14	Tue 19 Mar	17	Thu 21 Mar	21
Fri 22 Mar	18	Tue 16 Apr	16	Wed 17 Apr	54
Thu 18 Apr	21	Fri 19 Apr	21	Wed 15 May	35
Thu 16 May	30	Fri 17 May	16	Sun 08 Dec	12

Table 2. Evenings with more than 10 occultations.

The large numbers of occultations in mid-March, mid-April and mid-May are associated with the Moon's passage through rich star fields in Taurus, Orion and Gemini respectively. The precise number of occultations which an observer will record during any of the evenings listed in table 2 will depend in large part on their skill and observing conditions.

GRAZING OCCULTATION

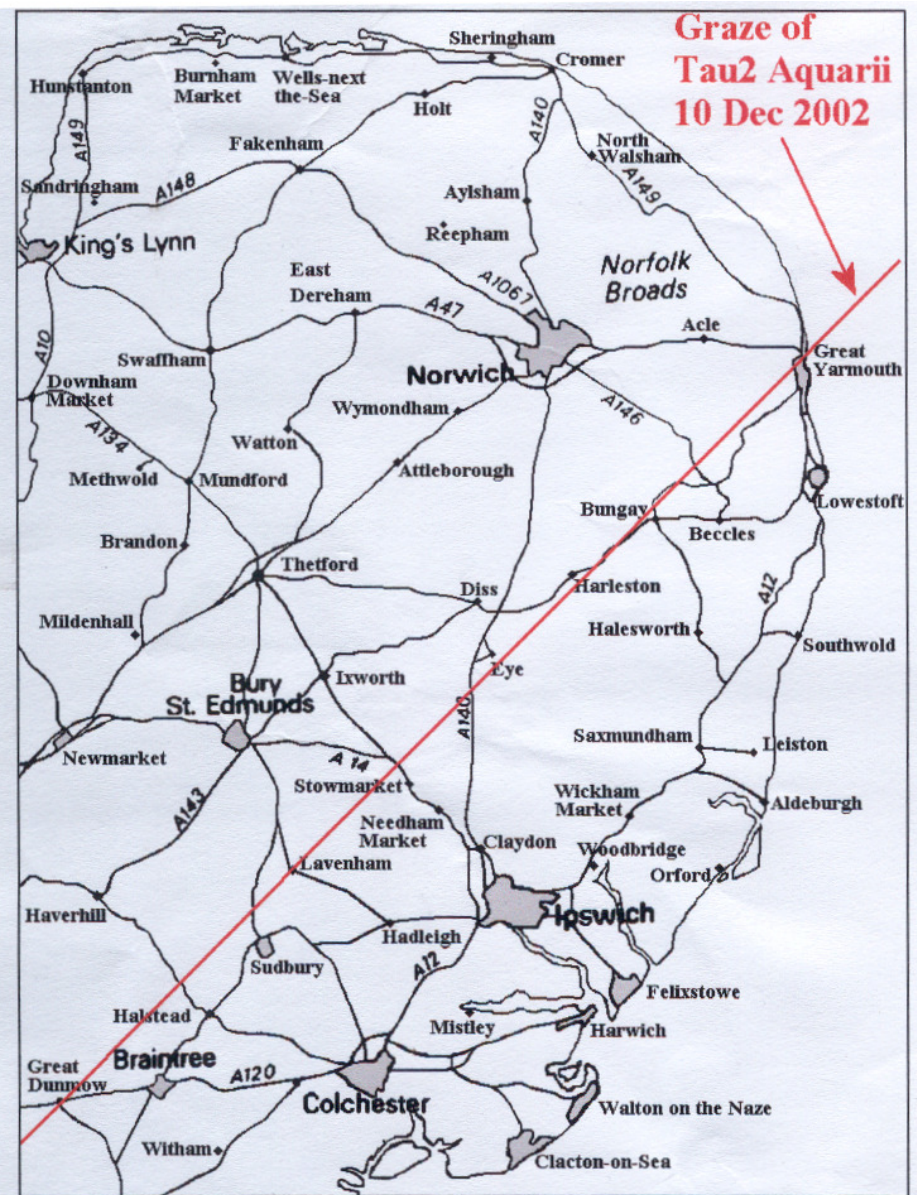
The path of only one grazing occultation passes through East Anglia during 2002. Table 3 summarises the circumstances.

Date	Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Star Azi (°)	Limb	Star	Mag
10 Dec	19:47	0.41+	-36	18	215	N	Tau2 Aqr	4.1

Table 3. Grazing occultation.

The first two columns of table 3 give the date and time of the graze. Column three gives the lunar phase (+ for waxing), while column four gives the altitude of the Sun (below the horizon). Columns five and six give the position of the star. Column seven details the lunar limb which grazes the star, while the final two columns detail the star and its visual magnitude.

The following map illustrates the graze track in outline.



The graze track crosses East Anglia through Harlow, Great Dunmow, Castle Hedingham, North of Sudbury, Long Melford, Lavenham, North of Stowmarket, Wickham Skeith, Eye, Harleston, North of Bungay, South of Loddon, Reedham and out to sea between Great Yarmouth and Caister. I will calculate a more detailed track later if there is interest in mounting an observing expedition.

PLANETARY OCCULTATIONS

Both Jupiter and Saturn are subject to lunar occultations during 2002. Table 4 below details the circumstances of the events as seen from Orwell Park Observatory. (The columns of table 4 have the same interpretation as the corresponding columns of table 1.)

D / R	Date and Time (UT)	Lunar Phase	Sun Alt (°)	Planet	Planet Alt (°)	Min Dist rad	Plan Mag
D	Sat 23 Feb 02:53	0.76+	-36	Jup	12	0.45S	-2.5
R	03:38		-30		6		
D	Tue 16 Apr 20:57	0.15+	-17	Sat	16	0.86S	0.2
R	21:27		-20		12		

Table 4. Lunar occultations of planets during 2002.

The occultation of Saturn will be seen as a graze from locations to the far south of Orwell Park Observatory.

Planetary occultations occur only every few years on average, so it is well worth attempting to observe the events detailed in table 4 if observing conditions permit. The next night time occultations of Jupiter and Saturn occur in 2012 and 2007 respectively.

Annular Solar Eclipse from Costa Rica on 14th December 2001

By Mike Harlow and Sue Brown

Once again the NASA holiday guide (also known as the "50 year Canon of Solar Eclipses"⁽¹⁾) directed us to a previously unexplored part of the planet to see the Sun, Moon and Earth come into alignment. Six months previously, on the other side of the Earth's orbit, we had seen the spectacular total solar eclipse from Zambia. This time however the Moon was further out in its orbit and the Earth was nearer to the Sun so the Moon failed to completely cover the Sun and the eclipse was annular.

Fred Espenak's maps of the eclipse path showed just one small region where the eclipse was visible from land. The eclipse track traversed most of the Pacific, only hitting Costa Rica near sunset.

The only dedicated eclipse trips we could find were very expensive and originated in the USA. As a result we scoured the holiday brochures for package tours to the area and Kuoni had one that put us just a few miles north of the centre line on eclipse day, in Tamarindo, on the Pacific coast of Costa Rica.

As soon as we arrived we realised that things weren't as we expected. Instead of the clear blue skies of the dry season we were greeted by grey clouds and rain. Only the day trip to the rainforest lived up to expectations with a torrential downpour as we pulled up to the visitor centre! The excursion to see the spectacular volcanic crater of mount Irazu was more like standing on Dartmoor in thick fog.

All this was during our three day stay in the capital, San Jose but spirits rose as we flew to Tamarindo for the eclipse where the local weather forecast predicted wall to wall sunshine. Hope were soon dashed however as we flew through wall to wall rain cloud for 95% of the journey.

On our first day there it was generally cloudy and it rained. On our second day there it was generally cloudy and it rained(!). Day three was eclipse day. Yes it was cloudy but not quite as bad, until midday when it became completely overcast again. The partial eclipse started at 3.15pm and up to 2 hours before it started we had come to terms with the fact that we probably wouldn't see anything. By 2.30pm however, as we left the hotel for our observing site on the beach, large patches of blue sky appeared as

did the Sun. By first contact the Sun was clear of the cloud and we were much happier.

Parts of the partial phase were lost as some cloud drifted in front of the Sun, but most of the slow progress of the Moon across the disc was visible. With less than 30 minutes to go a rather menacing lump of thick grey cloud drifted across the Sun and we nervously looked at our watches. Minutes went by and the cloud barely moved. 10 minutes to go and still no Sun. 5 minutes to go...no Sun. With just a couple of minutes to go before annularity started the Sun did start to reappear as a nearly complete ring of light but still with the Moon touching one side of the solar limb.

The annular phase began with the Sun clearly visible to the eye without a solar filter; it was still shining through high cloud. A frantic series of pictures were taken over the next few minutes, some with a filter and some without. Most of the three minutes of annularity were visible before once again the Sun started to slide behind thicker, obscuring cloud. Most of the three minutes of the annular eclipse were visible and we felt lucky to have seen it on what turned out to be the best day of the week for eclipse viewing.

We felt all the more lucky when we met up with some friends who had observed from a hotel at the other end of the beach less than a mile away. From there the cloud had completely obscured the view of annularity. A group of Americans who travelled from our hotel to the centre line about 30 miles south also lost the eclipse to cloud cover, just glimpsing it for a few seconds.

At the time of writing it isn't known if the photos we took during the eclipse have worked. The varying cloud cover meant that exposures times were just guess work. If some images do come out they will be published in next month's newsletter. They will also appear on the society web site at www.ast.cam.ac.uk/~ipswich.

[1] "Fifty Year Canon of Solar Eclipses: 1986-2035" NASA Reference Publication 1178 Revised, Fred Espenak.

See also Fred Espenak's eclipse web site at:
<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

ETX-125EC

First Light at The Observatory.

The small telescopes night held on Monday December 10th had a more literal meaning this time when six members took the opportunity to have a first look at the society's recent purchase of a Meade ETX-125EC and Autostar computer controller, mounted on a Meade field tripod. It was tested first in manual mode, using the tripod head to set the telescope at the 52degree equatorial angle, and using the smaller 'electronic controller' handbox for slewing in RA and DEC. This mastered, attention turned to the more challenging functions of the Autostar computer controller with 'Go To' commands. Alt Az mode was chosen for the trials, and with not bad accuracy for a first attempt, found all our favourite objects ie Saturn, Jupiter, and the Trapezium – all from the south facing balcony. Optical results were very pleasing, although the telescope is sensitive to vibration, and has to settle after touching to adjust focus. There was also evident some 'backlash' and 'forward lash' when slewing. But doubtless time and attention will resolve these matters as combined experience is applied.

The telescope now stands on its tripod, covered with a plastic protector, along with the Dobsonian, and the 4 and 6 inch, available for members use. The two handboxes – the Electronic Controller and the Autostar computer controller – are housed in the red box with the eyepieces, and the instruction manuals will be housed in one of the plastic wall mounted holders. The telescope has been initialized for our location, and the two motors have been 'trained' to enable Autostar to collect data about the motors' gearing systems.

Although there is no substitute for reading the instructions, the limited experiences of the trial last week may be worth noting as follows:-
For all modes of operation, the telescope needs to be placed in the 'HOME

POSITION', ie: with the telescope tube facing north, and level. The tripod also has to be level – a circular spirit level is built in – and one tripod leg is marked with an 'N', and has to face north. Because our balconies deny sight of the pole star a compass is necessary initially (magnetic north is 6deg west of true north), but marks or lines can be made later. **Very important** is the correct horizontal position of the telescope to take account of 'Hard Stops'. These prevent the body being continually turned in any one direction, which would wind up the wiring. Once positioned as described above, you simply release the horizontal lock, turn the telescope counterclockwise until it stops, then clockwise until the fork arm is directly over the computer control panel, then lock the axis. I don't think the North positioning is critical in manual equatorial mode, but may be

more so when using Autostar. But the hard stop positioning, as above, is **crucial** in all modes.

The Electronic Controller, the smaller of the two handboxes, and used for manual equatorial mode has been set for northern hemisphere operation, and tracks automatically at the sidereal rate. Not too good for looking at upsidedown ships (right way up in fact due to 90 degree mirror, as is the finder), but you can't have everything. A tiny screw has been taken out to set this mode: it is easily lost – but of little consequence.

The Autostar controller requires several initializing functions every time it is switched on. These can be done before it is positioned outside, and are as follows:- Read the 'Sun Warning' and act as instructed by Autostar. Read, or not the tutorial, (reject by pressing 'enter'). Date and time are then entered. As long as the Autostar is kept on, these initializations remain. Once set outside in the 'Home Position', Autostar selects two stars for position alignment. The display tells which it has chosen. If obscured by trees, buildings etc, press 'scroll', and another is selected

The trials only used Alt Az mode, in which it tracked at the sidereal rate once the 'Go-To' had found the object. The menu plan has a logic to it, and probably similar to others. Its just a matter of correct use of 'scroll' and 'enter' keys, and remembering that the 'arrow' keys to slew the telescope for minor adjustments receive their slewing speed command by pressing the number keys.

It may be helpful to have copies of the menu mounted on the wall by the balconies. We have some copies of the Autostar manual, thanks due to Gerry.

One thing is for certain, it is more user friendly, tripod and all, for those with bad backs or hernia problems. Ted Sampson.

OCCULTATIONS DURING JANUARY

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

D	Date & Time	Lunar	Sun	Star	Min	Star	Mag
R	(UT)	Phase	Alt	Alt	Dist		
		(°)	(°)	(°)	rad		
D	21 Jan 18:33	0.50+	-20	45	0.57N	ZC 303	6.4
D	21 Jan 23:01	0.51+	-55	16	0.76N	64 Cet	5.6
D	24 Jan 01:03	0.72+	-55	18	0.01S	ZC 577	6.0
D	24 Jan 18:30	0.79+	-19	52	0.44S	ZC 691	6.3
D	25 Jan 23:20	0.88+	-56	52	0.64S	ZC 861	6.3
D	27 Jan 03:01	0.95+	-42	31	0.03S	ZC 1050	5.7
D	27 Jan 20:07	0.98+	-33	45	0.83S	ZC 1161	5.9
D	31 Jan 21:29	0.87-	-43	10	0.28S	nu Vir	4.0
R	22:25		-50	19			

James Appleton

2001 COMMITTEE

CHAIRMAN D Payne
 SECRETARY & WORK PARTY ORGANISER R Gooding
 TREASURER & PUBLICITY K Goward
 MECHANICS M Cook
 NEWSLETTER CO-ORDINATOR E Sims
 BEGINNERS MEETING CO-ORD & VISIT CO-ORD T Sampson
 EQUIPMENT CURATOR G Coleman
 LIBRARIAN J Walsh
 J Appleton

CO-OPTED MEMBER
 LECTURE CO-ORDINATOR & DARK SKIES P Richards

JOURNAL ARTICLES TO CORRESPONDENCE ADDRESS E Sims [redacted] Ipswich Suffolk IP1 4HA
 R Gooding OASI Secretary [redacted] Ipswich Suffolk IP1 6AE
 MEMBERSHIP M. Cook [redacted] Ipswich IP4 5PZ

Observing Programme For January

Dates	Observing Director	Activities
Monday		Nothing Booked
Tuesday		Nothing Booked
Wednesdays 2nd 9th 16th 23rd 30th from 8.00pm	M Cook D Payne	Nebular & Faint Objects
Thursday 24th	1st Samford Scouts	Group Visit
Friday		Nothing Booked

All members are welcome on any night, but on nights other than Wednesday please check with the appropriate director that the observatory will be open.

Special Events

1. ANNUAL GENERAL MEETING

The Annual General Meeting is to be held on Saturday 12th of January at 8pm in a room near the library at Orwell Park School. All members are welcome to attend.

2. ASTRONOMY WORKSHOP January 2nd.

Yet more Astrophotography. Neil Morley.

Society Contact Details

	Home Phone	Work Phone
Chairman	D Payne	[redacted]
Secretary	R Gooding	[redacted]

Contact details for the full committee are inside the back page.

e-mail queries: ipswich@ast.cam.ac.uk
 WWW address: http://www.ast.cam.ac.uk/~ipswich/