ORWELL ASTRONOMICAL SOCIETY IPSWICH

Charity No 271313

JANUARY 2001

Society News

Annual General Meeting

The AGM will be held on Saturday 13th January 2001, with a 20:00 start. All members are invited to attend.

The principle items covered will be:

- Report on last year's society activities
- Election of the new committee for 2001
- A provisional list of events for the 2001.
- Members will also be able air any ideas they may have on society activities.

The meeting will be help either in the classroom behind the school library or in one of the rooms around the courtyard.

2 Membership Subscription for 2001

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	£10.00
Adult	£14.00
Family	£16.00

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
[redacted]
Ipswich
IP4 5PZ

Events for 2001

Event	Details	Date
Astro Fest	Kensington Town Hall Hornton Street London	2nd, 3rd February
Visit the Norwich AS Observatory		April
Summer Excursion	Visit to the Space Centre on Leicester	To be arranged
Allan Chapman Talk on Airy	Orwell Park School	18th May 2001
Christmas Meal		December

A new list will be updated through the year.

Night Sky

All times GMT

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

1st Quarter	Full Moon	3rd Quarter	New Moon
2nd	9th	16th	24th

Mercury Mercury moves back into the evening sky this month. It will be at greatest eastern elongation on the 28th (18°)

Venus Venus remains very prominent in the evening sky this month. The planet reaches greatest eastern elongation this month at 47° Magnitude –4.3

Mars Mars will be rising at about 02:00 this month. Magnitude 1.1

Jupiter Jupiter will observable most of the night. It sets about 04:00 in mid month. Magnitude –2.6

Saturn Saturn will observable most of the night as well. Setting at about 40 minutes before Jupiter at the end of the month. Magnitude -0.2

Uranus Uranus will be setting at about 17:30 by the end of the month. Magnitude 5.7

Neptune Neptune will not be observable this month . The planet will be above the horizon during the hours of daylight

Name	Limits	Max	ZHR
Quadrantids	January 1st to 6th	January 3th 10:00	100?

Meteor source is the BAA Handbook

Roy Gooding

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 R G	Date & Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Min Dist (rad)	Star	Mag
D	01 Jan 19:02	0.38+	-27	27	0.29S	30 Psc	4.4
R	20:13	0.39+	-38	20			
D	01 Jan 21:20	0.39+	-48	12	0.77S	33 Psc	4.6
D	04 Jan 21:55	0.70+	-52	37	0.24S	Hip 11602	6.9
D	06 Jan 17:16	0.87+	-11	34	0.40S	Hip 19529	7.0
D	06 Jan 23:43	0.88+	-60	44	0.58S	delta 1 Tau	3.8
R	07 Jan 00:38	0.88+	-60	37			
D	07 Jan 01:02	0.88+	-58	34	0.36N	delta 3 Tau	4.3
D	07 Jan 02:46	0.89+	-47	19	0.44S	Hip 20948	6.9
G	09 Jan 17:34	1.00+	-13	14	1.02N	delta Gem	3.5
G	14 Jan 03:33	0.75-	-40	44	1.02N	nu Vir	4.0
D	20 Jan 06:40	0.15-	-11	12	0.72N	ZC 2425	5.9
D	31 Jan 18:01	0.41+	-12	44	0.79N	ZC 306	6.8

Note the two northern limb close grazes, on 9th and 14th January. Unfortunately, the graze tracks pass far south of East Anglia.

James Appleton

LUNAR OCCULTATIONS DURING 2001

by James Appleton

This article provides a summary of the stellar and planetary occultations visible from East Anglia during 2001. 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 Saturn twice 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

I use a complex suite of computer software to predict occultations. The software models the motion of the Moon and planets in the sky in detail, and by comparing the position of the Moon at each instant with the co-ordinates of planets and stars within a narrow band of the ecliptic, 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 astronomical 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 2001 there are no occultations of these stars. However, there are 15 occultations during the year involving stars brighter than magnitude 5.0, and these should be readily visible in binoculars or small telescopes. Table 1 lists the circumstances of these occultations.

D or R	Date & Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Min Dist (rad)	Star	Mag
D	01 Jan 19:01	0.38+	-27	27	0.29S	30 Psc	4.4
R	20:13	0.39+	-38	20			
D	01 Jan 21:20	0.39+	-48	12	0.77S	33 Psc	4.6
D	06 Jan 23:43	0.88+	-60	44	0.58S	delta 1 Tau	3.8
R	07 Jan 00:38	0.88+	-59	37			
D	07 Jan 01:02	0.88+	-58	34	0.36N	delta 3 Tau	4.3
D	04 Mar 00:04	0.60+	-44	23	0.30N	zeta Tau	3.0
R	00:58	0.60+	-43	15			
D	01 Apr 22:54	0.55+	-31	32	0.72S	delta Gem	3.5
R	23:35	0.56+	-33	26			
D	29 Jul 23:05	0.75+	-18	6	0.23S	psi Oph	4.5
D	12 Sep 00:06	0.36-	-34	11	0.90S	mu Gem	2.9
R	00:29	0.36-	-33	14			
D	25 Oct 17:52	0.65+	-12	16	0.59S	epsilon Cap	4.5
R	18:59	0.65+	-22	18			
D	25 Oct 21:45	0.66+	-44	12	0.49S	kappa Cap	4.7
D	28 Oct 22:54	0.89+	-50	29	0.17S	30 Psc	4.4
D	29 Oct 01:19	0.90+	-46	15	0.80S	33 Psc	4.6
D	11 Nov 02:20	0.21-	-43	5	0.39S	nu Vir	4.0
R	03:12	0.21-	-36	13			
D	30 Nov 19:11	1.00+	-30	28	0.58S	epsilon Tau	3.5
R	20:01	1.00-	-38	36			
D	29 Dec 20:06	1.00+	-38	43	0.16N	1 Gem	4.2

Table 1. Occultations of stars brighter than magnitude 5.0.

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.

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 repitition 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 have recently left an occultation season of Aldebaran (α Tauri) and 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.
Tue 02 Jan	11	Mon 29 Jan	19	Tue 30 Jan	25
Mon 26 Feb	15	Tue 27 Feb	16	Wed 28 Feb	17
Wed 28 Mar	13	Thu 29 Mar	19	Fri 30 Mar	21
Sat 31 Mar	25	Fri 27 Apr	79 (!!)	Sat 28 Apr	97 (!!)
Sun 27 May	15	Tue 20 Nov	23	Thu 20 Dec	21

Table 2. Evenings with more than 10 occultations.

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 the skill of the observer.

GRAZING OCCULTATION

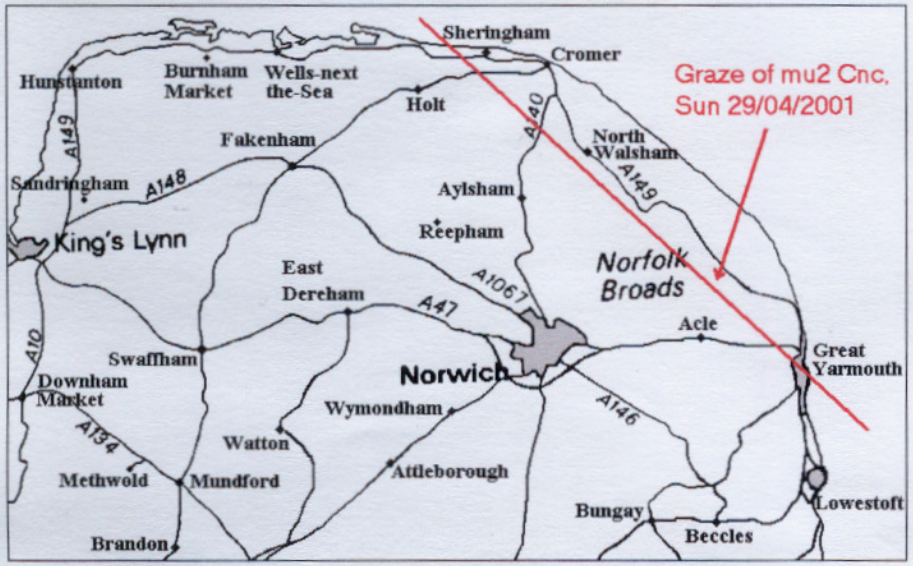
The path of only one grazing occultation passes through East Anglia during 2001. Table 3 summarises the circumstances.

Date	Time (UT)	Lunar Phase	Sun Alt (°)	Star Alt (°)	Star Azi (°)	Limb	Star	Mag
29 Apr	23:15	0.42+	-22	20	280	N	mu2 Cancri	5.3

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 from sea onto land at Weybourne on the North Norfolk coast, then passes north of Aldborough, south of North Walsham, through Ludham, Burgh St. Margaret and out to sea at Great Yarmouth. I will calculate a more detailed track later if there is interest in mounting an observing expedition.

PLANETARY OCCULTATIONS

Saturn is subject to two lunar occultations during 2001. 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.)

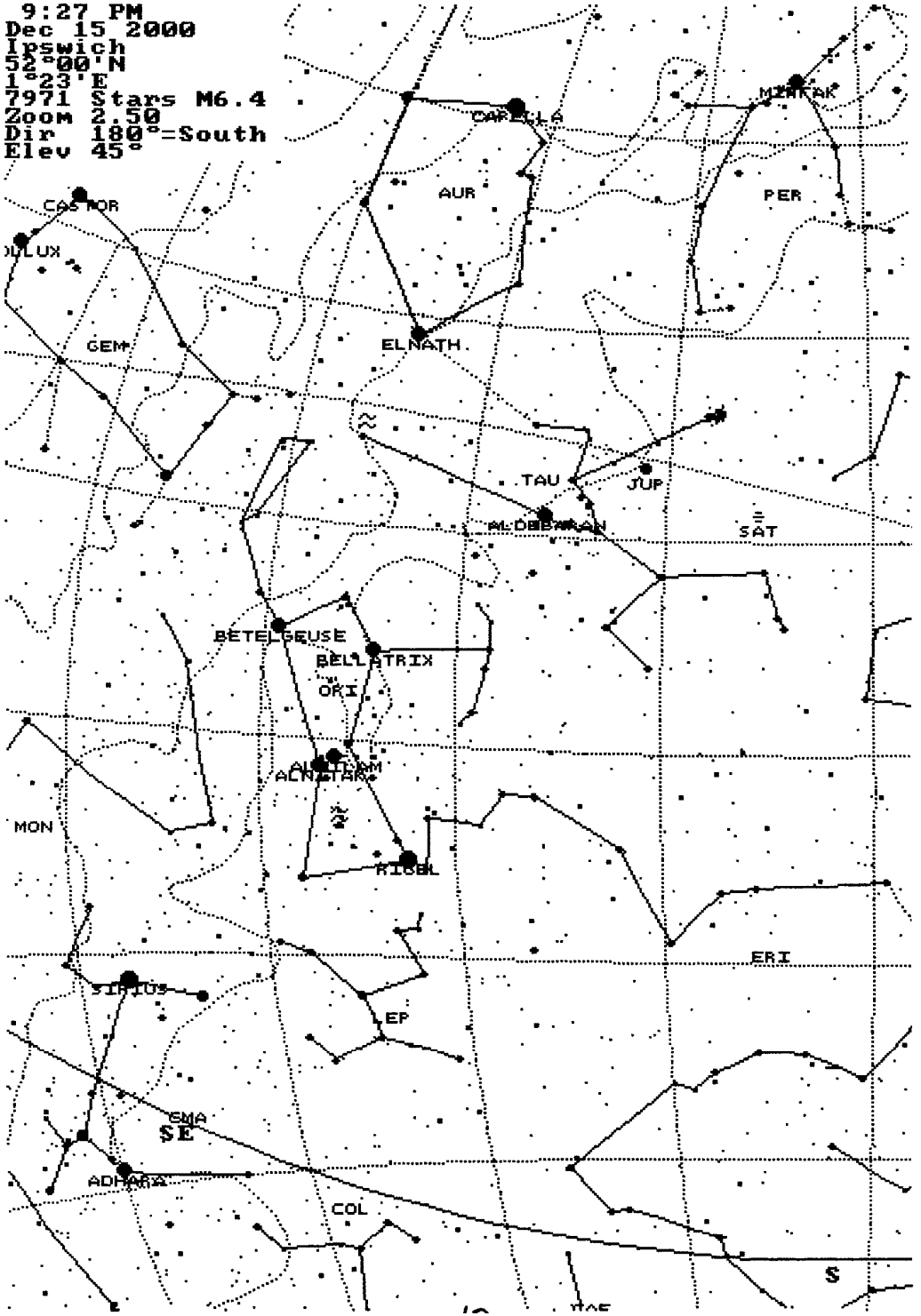
D or R	Date and Time (UT)		Lunar Phase	Sun Alt (°)	Saturn Alt (°)	Min Dist rad	Saturn Mag
D	Sat 03 Nov	21:06	0.92-	-42	27	0.36N	-0.3
R		22:04		-49	36		
D	Sat 01 Dec	02:26	1.00-	-47	47	.05S	-0.4
R		03:35		-37	37		

Table 4. Lunar occultations of Saturn.

Despite the fact that there are two occultations of Saturn in two consecutive months this year, on average less than one occultation of any planet is visible per year from any given location on Earth. It is therefore well worth making a special effort to observe these occultations if weather conditions permit.

The last lunar occultation of Saturn visible from East Anglia occurred in the early hours of the morning of 12/11/1997. Several members of OASI observed the event†, and all found it most interesting.

† Les Lamb marked the event with one of his inimitable front page cartoons for the Newsletter of that month.



ORWELL ASTRONOMICAL SOCIETY (IPSWICH) TALKS TWOTHOUSAND AND ONE (AN ORWELL SPACE ODDESSY)

For 2001 an extended programme of talks have been planned, presented by leading amateur and professionals in the fields. Check future newsletters for details of venues and dates.

- HISTORY OF ASTRONOMY - GEORGE BIDDLE AIRY
- PLANETARY GEOLOGY - METOERITES AND PLANETS
- COSMOLOGY AND ASTROPHYISICS - THE NEW COSOMOLOGY
- CLUB SHOWCASE – MEMBER'S TALKS
- SPACE EXPLORATION - SPACE PROPULSION SYSTEMS FOR 21ST CENTURY

2000 COMMITTEE

		Home Phone	Work Phone
CHAIRMAN	D Payne		
SECRETARY & WORK PARTY ORGANISER	R Gooding		
TREASURER & PUBLICITY			
MECHANICS	M Cook		
NEWSLETTER CO-ORDINATOR	E Sims		
BEGINNERS MEETING CO-ORD & VISIT CO-ORD	T Sampson G Coleman		
EQUIPMENT CURATOR	J Walsh		
LIBRARIAN	J Appleton		
CO-OPTED MEMBER			
LECTURE CO-ORDINATOR & DARK SKIES	P Richards		

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

Observing Programme For January

Dates	Observing Director	Activities
Mondays from 7.30pm	T Sampson	General Observation
Tuesdays from 7.30pm	G Coleman	Group Visits
Wednesdays from 8.00pm	M Cook D Payne	Nebular & Faint Objects
Thursdays from 7.30pm	G Coleman	Group Visits
Fridays from 7.30pm		Miscellaneous

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 13th of January at 8pm in a room near the library. All members are welcome to attend.

Society Contact Details

		Home Phone	Work Phone
Chairman	**D Payne**		
Secretary	**R Gooding**		

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/**