

ORWELL ASTRONOMICAL

SOCIETY IPSWICH

Charity No 271313

JANUARY 1999

HAPPY NEW YEAR

"YOU'LL BE O.K., IT'S THEIR WAY OF WELCOMING YOU."



Society News

1999 Annual General Meeting

The 1999 AGM will be held on Saturday 16th January form 20:00. The venue will be in the class room behind the School library. If you are not sure where this is, please meet initially in the club room.

All members are invited to this meeting. The agenda will be the same as in previous years, with a review of the societies activities in 1998 and look forward to those in 1999.

2 Events List for 1999

A list of events for 1999 will be compiled for next months newsletter.

3 Membership subscription for 1999

Subscriptions for 1999 will be due from 1st of January, for members who have not already paid. The rates for 1999. The rates for the new year will be:-

Junior & OAP	£9.00
Adult	£13.00
Family	£15.00

A renewal form is included with the January newsletter. It would be appreciated if you could return this 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 to

Martin Cook

Ipswich
IP4 5PZ

Committee Meeting Summary

The last committee meeting for the year was held on Saturday 21st November

- 1 It was decided to increase the membership subscription rate for 1999. This is the first increase for 3 years.

The rates for the 199 will be:-

Junior & OAP	£9.00
Adult	£13.00
Family	£15.00

LUNAR OCCULTATIONS DURING 1999

by James Appleton

- 2 The three Beginners Workshops have been very successful, and all have been well attended. Thanks was given to Ted Samson for organising these meetings. A long discussion was held on the future of these meetings once the present set have been completed. Options could be:
- a To repeat the programme again next autumn.
 - b To have new topics.
 - c To repeat and extent the present range of topics
- 3 As an extension to the workshops it was decided to give telescope training to members who are interested. This should encourage more members to use the telescope, with the ultimate aim to have new observing evenings.

Night Sky

All times GMT

Sun

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

Moon

Full Moon	3 rd Quarter	New Moon	1 st Quarter	Full Moon
2 nd	9 th	17 th	24 th	31 st

- Mercury** Mercury will be visible in the morning sky for most of this month. It will be best placed for observing during the first half of the month., magnitude -0.4
- Venus** Venus will be visible in the evening sky this month. Magnitude -3.8
- Mars** Mars will be rising a little before 01:00 in mid month. Magnitude 0.9
- Jupiter** Jupiter will be visible in the evening sky. By mid month it will be setting by 21:30 at the end of the month. Magnitude -2.2
- Saturn** Saturn will be setting by about 00:30 in mid month. Magnitude 0.6
- Uranus** Uranus will be visible in the early evening sky, setting a about 17:50 in mid month. Magnitude 5.7
- Neptune** Neptune will be setting at about 40 minutes before Uranus in mid month. Magnitude 7.8

Meteor Showers

Name	Limits	Max	ZHR
Quadrantids	January 1 st to 6 th	January 3rd 22:00	100?

Meteor source is the BAA Handbook

Roy Gooding

This article provides a summary of the lunar occultations visible from East Anglia during 1999. The Orwell Park Observatory holds a comprehensive listing, containing full observational details.

There are some 772 lunar occultations which are potentially observable from East Anglia during the year. Unfortunately, during the year there are no good grazing occultations visible from East Anglia, and neither does the Moon occult any planets as seen from the region.

The remainder of this article summarises the circumstances of the best occultations during 1999. 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 occultation events. The software models the motion of the Moon through the sky in great detail, and by comparing the position of the Moon at each instant of time with the co-ordinates of all stars within a narrow band of the ecliptic, it evaluates the precise time at which occultation events occur. Once the time of an event is known, the software runs additional algorithms to calculate other key astronomical details.

The software is based on an algorithm in a recent astronomy textbook[¶]. However, I have added numerous enhancements to improve accuracy and to filter out predictions occurring under unfavourable circumstances. The software now uses the ephemeris DE-405 to provide the position of the Moon and the Hipparcos star catalogue to provide stellar positions. DE-405 is the latest high-accuracy reference ephemeris created by the NASA Jet Propulsion Laboratories. The European Space Agency used data from the Hipparcos stellar mapping mission to create the Hipparcos star catalogue; at the present time, it represents the last word in astrometric accuracy.

[¶] Algorithm *Occult in Astronomy On The Personal Computer*, 2nd edition by O.Montenbruck and T.Pfleger, Springer-Verlag, ISBN 0-387-57700-9.

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 TOTAL OCCULTATIONS

Seven of the favourable occultations during 1999 are brighter than magnitude 4.0, and so should be readily visible in small telescopes or binoculars. Table 1 lists the circumstances of these events.

D OR R	Date and Time dd mmm hh:mm:ss	Lunar Phase	Sun Alt (d)	Star Alt (d)	Min Dist (rad)	Star	mag
D	27 Jan 00:57:13	.74+	-55	21	.06S	gamma Tau	3.7
R	01:53:58		-51	12			
D	22 Mar 18:29:31	.31+	-4	48	.09S	Aldebaran	0.9
R	19:38:40		-14	39			
D	18 Apr 20:53:08	.10+	-16	9	.85S	gamma Tau	3.7
D	24 Apr 21:24:13	.71+	-18	46	.79N	Regulus	1.4
R	22:10:12		-21	41	.79N		
D	25 Jul 20:57:23	.94+	-8	16	.68S	mu Sgr	3.8
R	21:57:33		-13	17	.68S		
D	26 Jul 23:01:52	.98+	-17	17	.28S	pi Sgr	2.9
R	27 Jul 00:19:25		-19	14	.28S		
R	13 Dec 16:55:47	.27+	-10	21	.30S	delta Cap	2.8

Table 1. Occultations of stars brighter than magnitude 4.0.

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 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 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 currently leaving an occultation season of Aldebaran (α Tauri) and entering one of Regulus (α Leonis). This is reflected by a single occultation of Aldebaran during the year (three during 1998), and by a single occultation of Regulus (none during 1998).

NIGHTS WITH MANY OCCULTATION EVENTS

During the year, the Moon traverses many 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 15 or more stars; many of these evenings are associated with the passage of the Moon through the rich star fields of Taurus.

Date	No. occs.	Date	No. occs.	Date	No. occs.
Sat 23 Jan	20	Sat 20 Feb	16	Sun 21 Feb	16
Sun 21 Mar	15	Mon 22 Mar	20	Tue 23 Mar	54
Mon 19 Apr	27	Tue 20 Apr	36	Wed 21 Apr	37
Mon 17 May	20	Tue 18 May	17	Wed 19 May	15
Sat 13 Nov	15	Sun 14 Nov	22	Mon 15 Nov	17
Wed 15 Dec	15				

Table 2. Evenings with 15 or more occultations.

OCCULTATIONS DURING JANUARY 1999

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

D or R	Date & Time (UT)	Lunar Phase	Sun Alt (d)	Star Alt (d)	Min Dist (rad)	Star	Mag
D	22 Jan 17:05	.27+	-6	35	.86S	ZC 49	6.1
D	22 Jan 20:36	.28+	-38	14	.81N	11 Cet	7.5
D	23 Jan 21:14	.39+	-43	20	.56S	Hip 6614	7.4
D	23 Jan 22:14	.39+	-51	11	.52S	ZC 210	6.6
D	24 Jan 21:26	.50+	-45	29	.74N	Hip 10776	6.8
D	25 Jan 19:11	.61+	-25	50	.54N	ZC 462	6.0
D	26 Jan 00:10	.63+	-57	17	.12S	Hip 15565	7.3
D	26 Jan 18:47	.72+	-21	52	.34N	ZC 608	6.0
D	26 Jan 23:04	.73+	-54	37	.39S	48 Tau	6.3
D	27 Jan 00:57	.74+	-55	21	.06S	gamma Tau	3.7
R	01:53		-51	12			
D	28 Jan 23:08	.91+	-54	53	.97N	71 Ori	5.2
D	30 Jan 21:28	.99+	-43	48	.50N	zeta Cnc	4.7

James Appleton

The January Workshop.

Just a reminder that the next astronomy Workshop on January 13th is a hands on evening using small telescopes, and weather permitting will be outside. So come equipped with warm clothing, and also with planispheres, star charts, a January astronomy magazine etc, if you have such things, to enable us to plan our observing before we venture outside. If cloudy we will stay inside and just do the planning.

Ted Sampson.

The Great Leonid Shower of 1998

by Mike Harlow

Like most people I was only seriously going to observe the Leonids on 17th-18th November, Tuesday night and Wednesday morning. However, on the Monday night, Sue was going out to make a visual count and Nigel Evans was coming round to try some photography so I decided I really should make the effort and get out myself. And besides, it was such a perfect night, very cold, down to -4°C and completely clear.

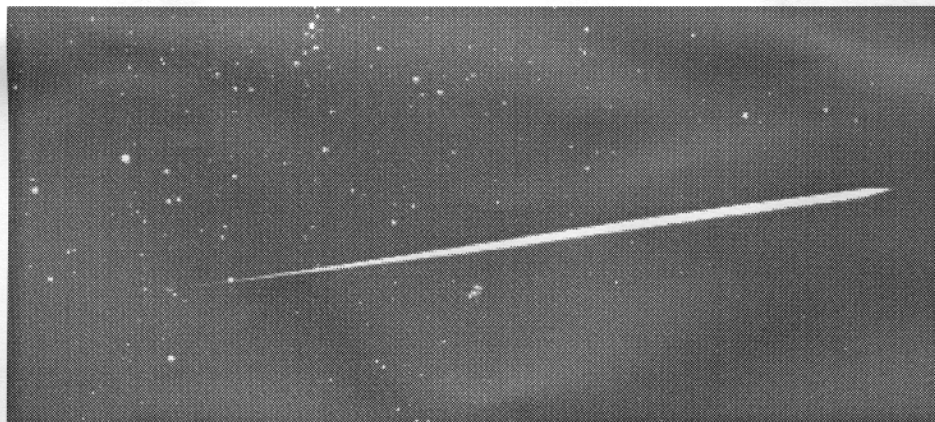
With Sue counting and noting times, positions and magnitudes, my aim was to get some photos. I had two cameras mounted on my driven 14 inch telescope; both used 35mm slide film, one with a 24mm lens and 400ASA film the other with a 17mm lens and 1600ASA film. The 24mm camera had a rotating shutter system which gave 17 breaks per second and I used 10 minute exposures with the 24mm and 5 minute exposures with the 17mm.

Initially, at about 11pm, Nigel and I went up the hill opposite the house to get a better view of the eastern horizon. Even with the sickle of Leo on the horizon and Regulus not yet visible meteors started appearing in the sky so we knew something special was taking place. I left Nigel to take some pictures on the hill while I went back to my cameras in the garden and began the nights exposures.

What a night!! This was easily the best shower I had ever seen; there were so many bright meteors. Then at about 00:45 there was a tremendous streak of light almost overhead. I wasn't looking up at the time but the garden lit up and I just looked up in time to see a dazzling fireball. And after the initial shock the eerie green glow of the train could be seen hanging in the sky. I rapidly finished one exposure and started another to capture the train. I had a third camera in reserve, mounted on a tripod, to aim at any trains that appeared. I fired off some shots with this camera over the next 15 minutes that the train was visible as it twisted and distorted in the high atmosphere.

Luckily the fireball was captured on both driven cameras. Instead of clean breaks from the rotating shutter the gaps were filled in with the green glow from the train. The dazzling path of the meteor started in

Auriga, passed just north of the Pleiades and ended in Aries near Saturn. After about 10 minutes the train had spread out so much it covered an area the size of the W of Cassiopeia.



The magnitude -10 fireball stretching from Auriga to Aries

As the night progressed many more bright meteors were seen and some were captured on film. As the radiant rose I turned the 24mm lens towards it and began to capture 2, 3, 4 and even 5 meteors on a single 10 minute exposure! By now, several meteors per minute were visible and many had terminal flares that lit up the sky. Sometimes the meteor itself wasn't visible because of trees but the terminal flash could easily be seen. Even after 5 hours out in freezing temperatures I wanted to carry on observing but knew that I wouldn't survive a day at work if I did. So reluctantly I packed up and grabbed a couple of hour's sleep. Had I thought about what I had been witnessing I would have stayed up till dawn. The best photo I had was the very last one I took, showing 5 meteors in 10 minutes. With hindsight it was clear that the shower was becoming more intense as the night went on. But the combination of tiredness and cold obviously clouded my judgement and the extra couple of hours before twilight were lost forever!

The second night, 17th to 18th, was totally different!! We all set-up expectantly at 11pm and then...nothing! The contrast in activity was amazing; virtually no meteors where 24 hours earlier there had been

maybe one or two bright ones a minute. Clearly something was very wrong and after about an hour and a half we decided that a second night out in the cold wasn't necessary, the Leonids were over!

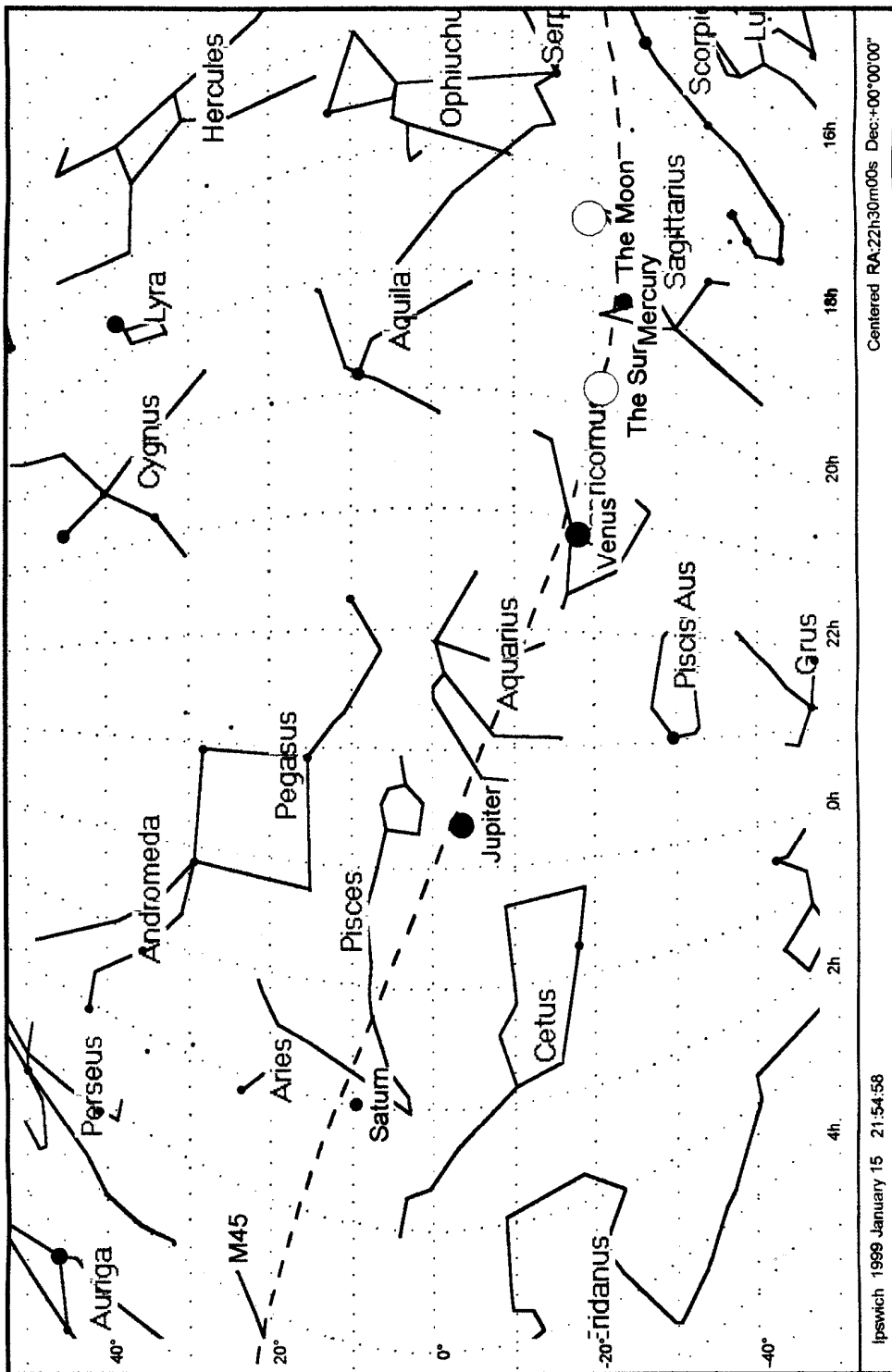
Of course there were some Leonids but after the spectacle of the night before the normal background level seemed very dull. But at least I caught up on some sleep and could start planning for the Geminids!!!"



Leonid streaking away from the radiant in the sickle

Conclusion

So the predictions were way out! The peak on 17th November was near dawn in the UK and not in the late afternoon as expected and there was no 'storm'. The lesson that I learnt was...go out and observe whenever possible, you never know what you'll see and the 'experts' aren't always right.



PROGRAMME FOR JANUARY

Mondays from 7.30pm Mr N Gage	GENERAL OBSERVATION SECTION
Tuesdays from 7.30pm Mr P Richards	OBSERVATORY VISITS FROM OUTSIDE GROUPS
Wednesdays from 8.00pm Mr M Cook	NEBULA & FAINT OBJECTS SECTION Mr D Payne
Thursdays from 7.30pm Mr P Richards	OBSERVATORY VISITS FROM OUTSIDE GROUPS
Fridays from 7.30pm 15th - 29th Mr J Hood	DOUBLE STARS

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

Lectures and other events:

Annual General Meeting

The A.G.M. is to be held on Saturday 16th of January at 8.00pm in the room behind the school library. All members are welcome to attend.

VISIT

28th January - Country Ranger Hosts D Payne & M Cook

e-mail enquires to oasieng@btbcs.bt.co.uk

WWW url <http://www.ast.cam.ac.uk/80/~ipswich/>

1998 COMMITTEE

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