

ORWELL ASTRONOMICAL SOCIETY IPSWICH

SOCIETY NEWS

1 1993 ANNUAL SUBSCRIPTIONS

The annual subscriptions are due on January 1st 1993. The rates for the new year will remain at the 1992 levels.

Rates for 1993-

JUNIOR & OAP	£7.50	(under 18 or in full time education)
ADULT	£10.50	
FAMILY	£12.00	

Cheques & P.O.'s made payable to the ORWELL ASTRONOMICAL SOCIETY (IPSWICH) together with this form to Membership Secretary:-

Mr. D. Barnard

IPSWICH
IP3 8RN

2 BAA WINCHESTER WEEKEND

This years BAA Winchester Weekend will be held from 26th to 28th March. As always intrepid Orwell team will venture south for the event. If you want to go can you either contact the BAA directly or alternatively contact Pete Richards for more information. Transport will be organised if necessary. the cost is £65 for BAA members and £75 for non members.

NIGHT SKY

All times GMT

SUN

Rises approximately between 07.50 to 07.00
Sets approximately between 16.40 to 17.30

MOON



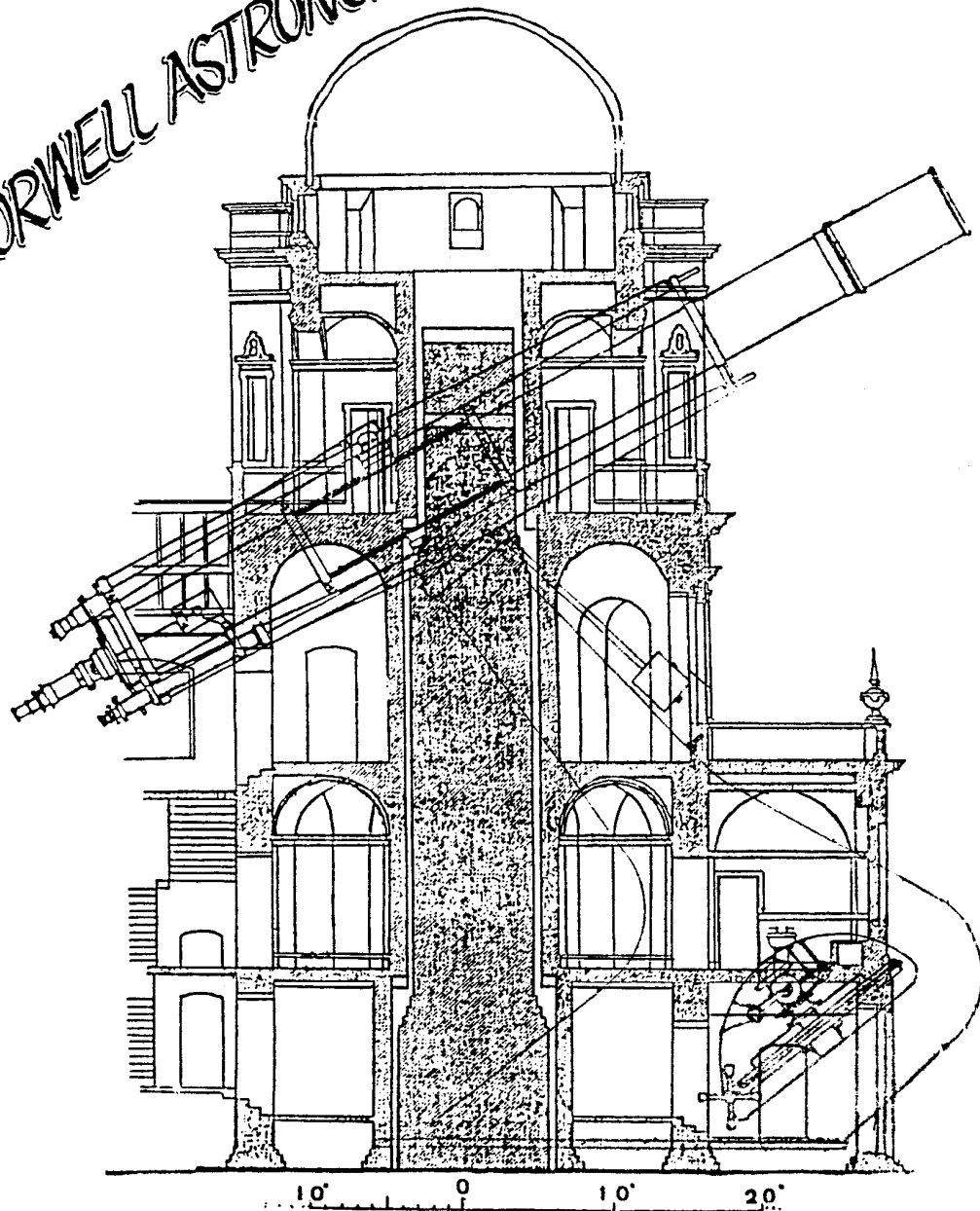
7th



13th



21st



MERCURY Greatest eastern elongation occurs on the 21st (18°). It will be very low down in the western sky after sunset, the best time to see it will be between the 13th to 25th. After this date the planet will quickly move towards the sun again.

VENUS Venus is still well placed in the evening sky this month. It will reach its greatest brightness this month, mag. -4.6.

MARS Mars is remains well observable this month. It magnitude decreases to -0.1.

JUPITER Jupiter will be rising by 20.30 by the end of the month.

SATURN Saturn is in conjunction with the sun on the 9th. It will not be observable this month.

URANUS & NEPTUNE These two planets will be very low down the the predawn sky. On the 1st they will be about 1° apart. This will be the first conjunction of these planets every observed.

R. Gooding

A RAINY DAY

The 26 of November dawned to the sound of heavy rain (rain that was to flood South Wales and the West a few days later). Obviously there was going to be no chance of any astronomy that day !

However, by early evening, the weather had changed completely. The rain appeared to have washed all the various pollutants out of the atmosphere, with very transparent skies being the result. A phone call from Ian Swann (a relatively new member) with a request for assistance, meant that re-laying some floorboards in my living room was deferred for yet another evening !

Ian has spent the last few months designing and building a Charge Coupled Device (CCD) camera. With some helpful ? comments from a number of the Wednesday night crew, he was now in position to test the latest modifications.

For the uninitiated, a CCD camera is a very sensitive device, controlled by computer, that stores image information electronically. An unfortunate drawback of CCD's is that they require a fair amount of ancillary equipment to be set up near to the telescope (including a water filled, pumped cooling system). Anyone who has visited the observatory will know that the climb up the 104 steps to the equatorial room is hard enough, without having to carry up several crates of gear.

On this occasion we were also to use a video camera connected to the telescope for guiding (more gear !)

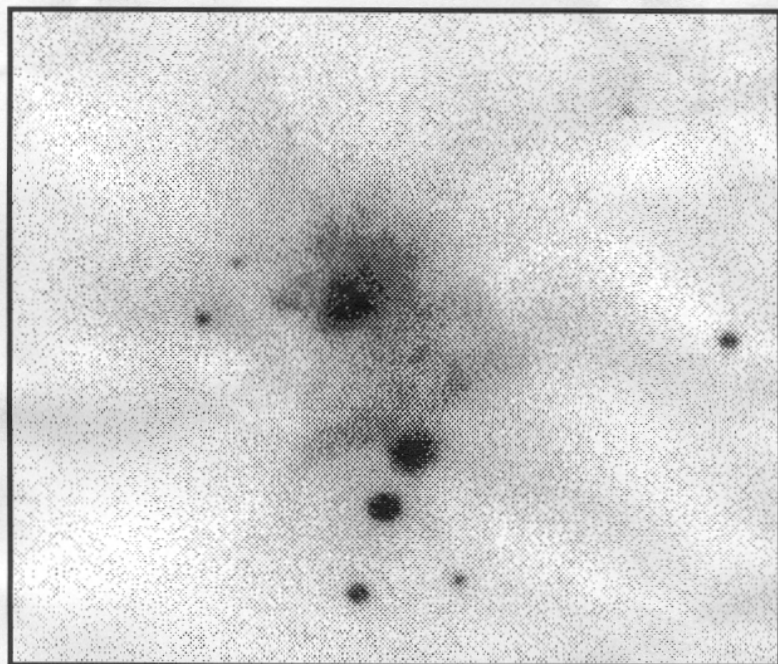
By 2130hrs everything was ready. Even the obligatory band of cloud had disappeared, and we decided to test the setup on a fairly bright object. Both CCD and video cameras have a VERY small field of view, so we decided to use the Pleiades for initial calibration. This gave us plenty of stars to chose from without having to move to the telescope too far (our main target for the evening, Orion, was still too low to make sensible observations).

Initial setup complete, we decided to give M42 a "go" despite it still being somewhat unfavourable. To our amazement we found that we were able to use the 4 stars of the trapezium to guide the CCD camera (attached to the 4 inch refractor), using the video camera fixed to the 10 inch.

A 10 min exposure gave spectacular results ! and brought to our attention a fault with the 10 inch refractor. The video camera attached to the 10 inch gave a field of view of about "10 trapezium diameters" as viewed on the monitor screen. Even the smallest RA drive correction showed very easily and RA control, despite the known worm errors, was very simple. However, during the 10 min exposure, a drift in declination of at least 1 "trapezium diameter" has brought to light a previously unsuspected problem. The monitor was moved close to the declination adjustment hand wheel, and after a few minutes break another attempt was made to capture part of M42. This time a 15 minute exposure was tried. Using both RA and dec adjustments to keep the image of one of the stars in the trapezium firmly centred in a circle of a ¼ inch drawn on the video monitor was quite a challenge but easily achievable.

The resulting image was STUNNING. (Hopefully, a processed image will appear alongside this article, but obviously the printed image will not be as good as that displayed on the computer display.)

M42 in Orion



CCD image of the central region of the Orion nebula

By this time it was past midnight and very cold. We decided to try our luck on a new object. Mars ! By now we were accustomed to the setup of the various instruments, and an image of Mars was soon captured. After our previous success with Orion, Mars was a washout ! We could see no detail at all. Despite all our efforts we could get nothing other than a bland featureless ball. We decided to swap the CCD and video cameras, with the 10 inch being connected to the CCD. A combination that should hve been ideal for capturing planetary detail (on previous occasions Saturn had given some very promising images).. Still no good !

It was time to use the telescope in its original mode: with actual eyes instead of electronic ones.

Mars was indeed a washout ! Nothing wrong with the CCD after all ! M42 however was revealed in a glory that I had never seen ! Strands of wispy nebulosity were "drifting" all over the place. It was the most spectacular image I have ever observed. I was immediately reminded of those amazing photographs taken by David Malin

By now the time was nearing 0200hrs, and we still had to remove all the gear from the telescope and take it down the stairs to the car park. We decided that despite the near perfect conditions we would reluctantly have to close the session.

Apart from the problem with the declination adjustment the session had been a complete success. Orion was absolutely incredible !

A. SMITH

Famous Astronomers (5)
William Herschel 1738-1822
By J. Walsh.

William Herschel was born in Germany, the son of a Hanoverian bandsman. He entered the Guards as an oboe player, and in 1757 left Germany for England, where he settled in Leeds as a music teacher. He later became an organist in Halifax, and in 1766 became organist at the Octagon Chapel in Bath.

It was about this time that an early interest in astronomy was reawakened when he read Fergusons book of Astronomy, and soon all his spare time was being devoted to reading and studying astronomy and mathematics. Not being able to afford a telescope, he made one A Newtonian Reflector, and in 1774 began serious astronomical observations. On the 13th March 1781 while he was observing the night sky, he found an object which showed a definite disk. At first he thought it to be a Comet, but later it was found to be a Planet, the first to be discovered in historic times. At first he called it Georgium Sidus in honour of George III. But now we know it today as Uranus. Herschel was elected a Fellow of the Royal Society and awarded the Copley Medal. Not long after he was appointed the Kings Astronomer with a salary of £200 a year, now he was able to live quite comfortably he gave up music altogether and went to Slough where he was a full time astronomer and telescope maker. In 1788 he married Mary Pitt, a lady of considerable wealth and was now able to devote his life to astronomy as a man of his own means.

Herschel did indeed make many more discoveries, in 1787 he found two of the moons of Uranus, Oberon and Titania and in 1789 he discovered two moons of Saturn, Enceladus and Mimas, in fact the huge crater on Mimas is named after him. In 1816, five years before he died, he was knighted

After he died in 1822, his work carried on through his sister Caroline Lucretia (1750-1848), who had for several years before been his assistant. She constructed a catalogue of Star Clusters and Nebula that had been discovered by him throughout the years before his death. Herschel was also outlived by his son Sir John Herschel (1792-1871), who went on examining, and where possible updating his father's catalogue work and went on himself to discover even more Clusters and Nebula than his father had done, though most of his work was done in the Southern Hemisphere.

1993 SOCIETY EVENTS

This is a list of possible society events for the coming year.

- 1 Astrofest 5th & 6th February.
Details in February's Astronomy Now
- 2 London Planetarium 5th March
£4 tickets dead line before 15th February
Lectures by Patrick Moore and Teresa Graffton
Starts at 7.30pm
- 3 BAA/JAS Solar section meeting Cambridge 6-3-93
- 4 BAA Winchester Weekend 26-3-93. See Society news.
- 5 Open Weekend 2,3,4th April?
This date has to be confirmed
- 6 BAA exhibition meeting 8-6-93
Hawkstone Exhibition Hall Lamberth London, 1.00 pm.
- 7 Astro camp from 8-8-93.
- 8 FAS Cambridge Convention 25-9-93
- 9 Old Greenwich Observatory Late Autumn.

OBSERVABILITY OF LUNAR OCCULTATIONS

by James Appleton

INTRODUCTION

An article appears in January 1993's *Sky & Telescope* (pp. 89-91) by B.E.Schaefer concerning the visibility of lunar occultations. The article contains a BASIC computer program for predicting the visibility of occultations under various conditions. The program has two modes of operation, and can calculate either the minimum telescope aperture needed to observe a given lunar occultation, or the limiting magnitude of occultation which can be observed with a given telescope. The program has been coded and used to predict the limiting magnitude of occultation visible using OASI telescopes under various conditions.

The program takes account of the following parameters of an occultation: lunar phase, altitude of star, altitude of Sun, cusp angle of star, telescope aperture or magnitude of star (depending on mode of operation), colour index of star, magnification of telescope, light pollution, observer's experience, etc. (16 parameters in total.) The first five of these parameters are the most important, and their effect is examined below while the other parameters are held constant at "typical" values.

RESULTS FOR 10.5" REFRACTOR

Graph 1 shows key results for the OASI 10.5" refractor. It shows how the limiting magnitude of an occultation varies as a function of the lunar phase (percentage of the Moon's disc which is illuminated). Two curves are shown, one corresponding to an occultation at a cusp angle of 90° on the bright limb, and the other corresponding to an occultation at a cusp angle of 90° on the dark limb.

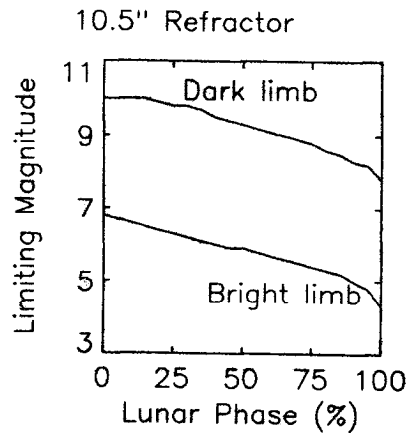
For a dark limb graze, the graph shows that the 10.5" refractor should be suitable for observing occultations down to approximately magnitude 8.0 even under least favourable phase (Full Moon). Under favourable phase (New Moon), observation should be possible down to magnitude 10.0.

A bright limb occultation is seen to have a limiting magnitude approximately 3 magnitudes worse than that of a corresponding dark limb occultation.

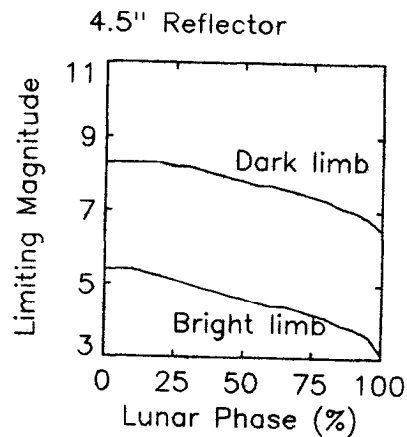
RESULTS FOR 4.5" REFLECTOR

Graph 2 shows key results for the OASI 4.5" reflector. (This instrument has been taken on several field trips to observe occultations in 1992.) The interpretation of graph 2 is similar to that of graph 1, ie. two curves illustrate the limiting magnitude of an occultation versus the lunar phase, one for a cusp angle of 90° on the dark limb and the other for a cusp angle of 90° on the bright limb.

For a dark limb occultation, the predicted limiting magnitude varies between 8.3 at a New Moon and 6.5 at a Full Moon. A bright limb occultation has a limiting magnitude approximately 3 magnitudes worse than the corresponding dark limb occultation.



Graph 1



Graph 2

CONCLUSION

Schaefer's article promises to be very useful for determining the visibility of occultations and grazes. For example, the graze of SAO 77178, which members of OASI attempted to observe on 23rd August 1992, is predicted by Schaefer's program as being unobservable in a 4.5" reflector. In the field, this indeed turned out to be true, much to my annoyance!

Some further work is required to calibrate Schaefer's program, but as the above example illustrates, it has the potential to avoid some wasted journeys. It will be used to assess the visibility of grazing occultations in 1993 before field trips are arranged.

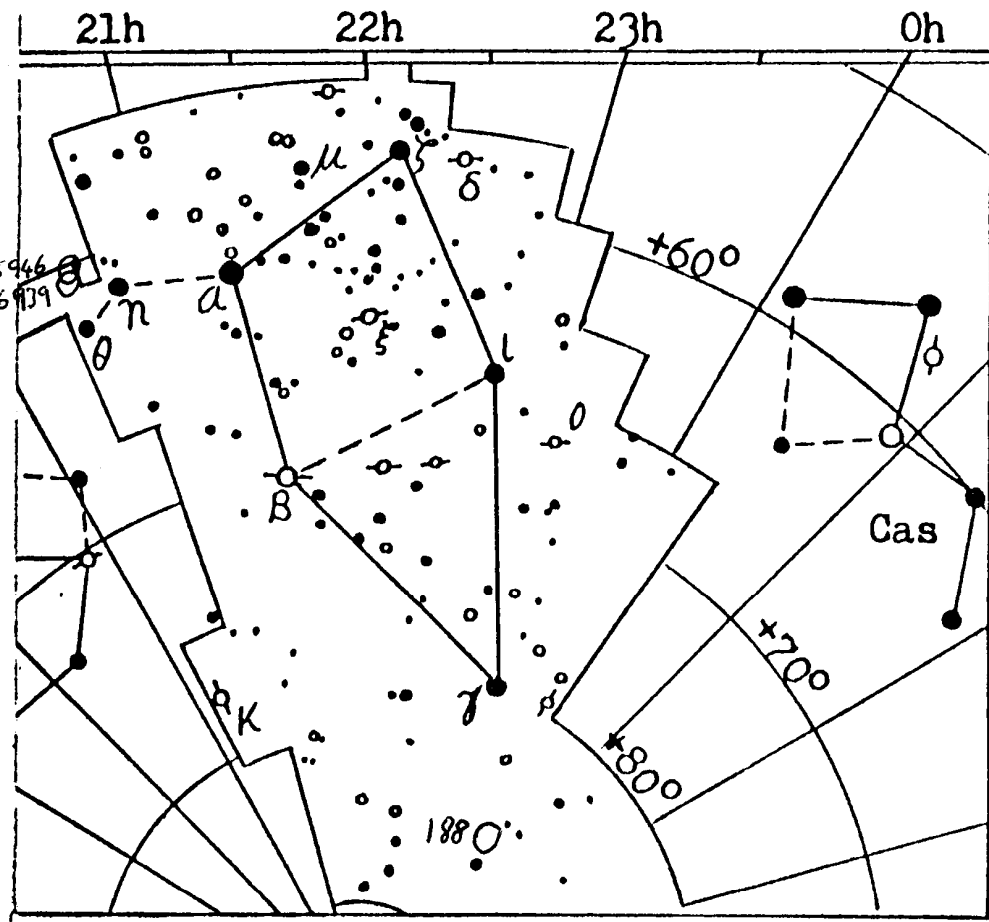
CEPHEUS

A constellation of the northern region of the sky, representing a mythical king of Ethiopia, who was the husband of Queen Cassiopeia and father of Andromeda. It contains several fairly bright stars, also a good cross section of other interesting things to observe like star clusters planetary nebula, nebulous patches, galaxies and a fine selection of double and multiple stars.

δ (delta) Cephei one of the most important type of variable stars known to astronomers. Thanks to the so-called period-luminosity law, astronomers can derive a Cepheids absolute magnitude by observing its period of variation giving them a standard by which to measure distances in space.

A rather faint but interesting open cluster is NGC188, known to be very old. Its stars are evolved yellow giants which are at least 12 billion years old. But its real claim to fame is it is the nearest star cluster to the north celestial pole.

NGC6939 is a rich but rather faint galactic cluster situated on the edge of the Milky Way and is overlaid by NGC 6946 which is a nearby low-surface brightness spiral galaxy. When seen through a telescope it appears as a soft glowing round haze with a visibly brighter nucleus.



Double Stars

Pos.	l	m	2	D	d"	P	A	No.
001376	6.9-7.1	b	0.9	63	E13			
025979	5.6-9.0	b	4.8	231	E320			
201077	4.4-8.2	b	7.4	122	K			
212870	3.3-8.0	f	13.7	250	B			
5055	7.2-5.5	c	19.8	197	E2840			
220264	6.6-4.5	b	7.2	280	ξ _{1,2}			
0969	5.5-8.6	c	14.7	254	E2883			
1273	6.1-8.4	c	29.1	348	E2893			
2758	7.5-Var	c	41.0	192	δ			
231667	5.0-7.3	b	2.7	208	ο			

K White, blue. B White, blue.
 E2840 Green, blue. ξ Both blue.
 E2893 Yellow, white.
 δ Orange, blue. Prototype of
 Cepheid variables. Range
 4.3 to 5.4 mag. in 5.4 days.
 μ Herschels "Garnet Star."

PROGRAMME FOR FEBRUARY

DAYS & DATES	DIRECTORS	SECTION & ADDRESSES	PHONE INC. STD CODE
Monday from 7.30pm GENERAL OBSERVATION SECTION			
1-8-15	Mr R Newman	[redacted], Felixstowe, IP11 9DY	[redacted]
22	Mr J King	[redacted], Felixstowe, IP11 9LQ	[redacted]
Tuesday form 7.30pm GENERAL OBSERVATION SECTION			
2-9-16	Mr R Newman	(Address above.)	(Number above)
23	Mr J King	(Address above.)	(Number above)
Wednesday from 8.00pm NEBULA & FAINT OBJECTS SECTION			
3-10-17	Mr M Cook	[redacted], Ipswich, IP4 5PZ	[redacted]
24	Mr D Payne	[redacted], Wickham Market, IP13 0SD	[redacted]
Thursday from 7.30pm OBSERVATORY VISITS FROM OUTSIDE GROUPS			
4-11-18	Mr P Richards	[redacted], Nacton, Ipswich, IP10 0HS	[redacted]
25	Mr G Marriott	[redacted], Ipswich, IP4 4JB	[redacted]
Friday from 7.30pm (may be postponed to Saturday) PLANETARY & LUNAR SECTION			
5-12-19	Mr P Richards	(Address above.)	(Number above)
26	Mr R A Lobbett	[redacted], Felixstowe, IP11 8UJ	[redacted]
	Mr G Marriott	(Address above.)	(Number above)

All members are welcome to come but, on nights other than Wednesdays please check with directors that the observatory will be open. Directors will also be able to tell you if a group visit is taking place. All of the sections observe anything of interest but the title of each section suggests a popular subject.

Lectures and other events:

1992 COMMITTEE

		Home Phone:	Work Phone:
CHAIRMAN	D Payne	(Address above)	
VICE CHAIRMAN & MEMBERSHIP SECRETARY	D Barnard	[redacted], Ipswich, IP3 8RN	
SECRETARY	R Gooding	[redacted], Ipswich, IP1 6AE	
TREASURER	M Nicholls	[redacted] Capel St Mary, Ipswich, IP9 2EX	
MAINTENANCE CO-ORD	M Cook	(Address above)	
JOURNAL CO-ORDINATOR	E Sims	[redacted], Ipswich, IP1 4HA	
PUBLICITY & VISIT CO-ORD	P Richards	(Address above)	
EQUIPMENT CURATOR	J King	(Address above)	
SPECIAL EVENTS CO-ORD	A Smith	[redacted] Ipswich, IP4 5RZ	