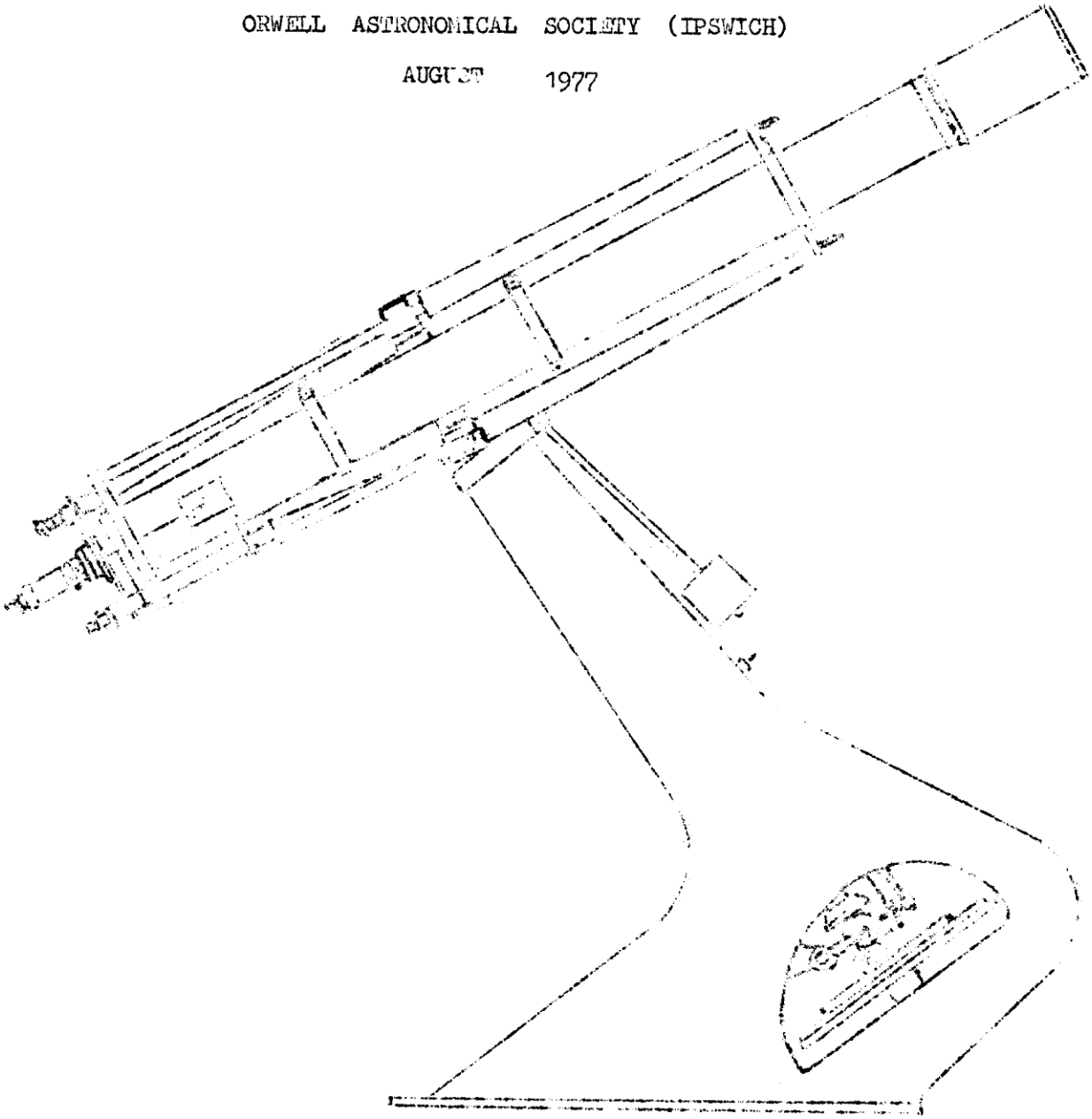
O.A.S.I.

Journal

of the

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

AUGUST 1977



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THE NIGHT SKY as seen from Orwell Park this m...

August is one of the best times of the year for just going outside when it's dark and revelling in the cool and the splendour of the Summer Milky Way. The Great Square of Pegasus is visible to the East after Sunset and is in the South after midnight. One of the stars of the Great Square - Alpheratz - in fact belongs to Andromeda rather than Pegasus. Apart from Cygnus, however, there is not very much of interest; Delta Cephei (of "Cepheids" fame), directly to the North of Pegasus, is a double with a separation of 40".

THE SUN

The Sun rises at 04h20m at the beginning and 0510 at the end of the month, setting at 2000 and 1850 respectively. The Sun goes through Cancer and Leo in August.

THE MOON - Phases

Last Quarter	Aug.	6d20h40m
New Moon	Aug.	14d21h31m
First Quarter	Aug.	22d01h04m
Full Moon	Aug.	28d20h10m

Occultations

Star	Phase	Mag.	Time
*3362	R	5.9	2d23h57.4m
*1106	D	3.6	12d03h49.2m
2092	D	7.2	20d20h00.4m
2391	D	7.1	22d20h32.9m

D=disappearance, R=reappearance, *denotes double star. Stars listed according to Zodiacal Catalog(ZC) numbers.

THE PLANETS

Mercury this month is an evening star, reaching elongation of 27° on the 8th. when its magnitude will be +0.6.
Venus is at mag. -3.6 at the beginning of August, when it may be seen on the border of Taurus and Orion with an angular diameter of 16" (morning star).
Mars will be 5° North f Aldebaran on the first of the month, and the comparison should be interesting: both are at mag. 1.1 and both are red, although the colour of Mars should be much more pronounced. Mars stays in Taurus for much of the rest of the month.
Jupiter is a morning star in Aquarius at mag. -1.7.
Saturn is in conjunction with the Sun on Aug. 13 and should be visible again as a morning star towards the end of the month.

Source: BAA Handbook 1977. Please note all times UT (=BST-1h).

Keep, a telescopic eye out for comet Schwassmann-Wachmann this month. This comet has been known to flare up to 1600 times it's usual btightness of mag. 18. It is in the following positions:

Aug.	5	5h09m, +30°
	15	5h15m, +31°
	25	5h21m, +31°

FROM OTHER JOURNALS

Uranus' Rings - According to Dr. B.A.Smith of Arizona University, the rings around Uranus are essentially dissimilar to Saturn's Rings. The basic difference is that the particlesin those of Saturn are small and ice-coated (giving them their great brilliancy) whilst the Uranian rings consist of dull meteorite-like material. This conclusion is based on the fact that the rings are invisible even when the glare of the planet is reduced by observing in the infra-red (in that part of the spectrum Uranus emits hardly any radiation). If the rings were coated with ice they would be bright enough to be seen (Nature -Times News Service).

Jupiter is not a Small Star - Scientists in the West regard as unlikely the recent Russian claims that Jupiter is in fact a small star with a core temperature of 300 000 K (that of the Sun isc. 14 million). They say Jupiter is too light (one thousandth of the Sun's mass) for it to be using deuterium - heavy hydrogen, $^{2}_{1}H$ - as a nuclear fuel. The Russians believe it will be as bright as the Sun in 3 billion years time because of accretion of inter-planetary dust which will increase its mass. But in that time it could only collect another 10^{-5} % of its present mass, which makes it still too light.

Birth Of A Solar System - Researchers from the University of Arizona and NASA have discovered a solar system in the making. A "flat, disc-shaped, highly luminous object" in Cygnus may be only about 1000 years old. Its nature was revealed through infra-red telescopes and observations of its spectrum, and it is thought to be due to the gradual build-up of a young star, with planets which may already have partly formed. It is about 30 times as massive as the Sun, and hence when it eventually'lights up' and nuclear fusion begins it will be very bright, lasting only about 100 million years.

Stellar Sizes - A new technique has been developed for finding the size of stars. Kitt Peak astronomers are using the scintillations of stars to give them data about them (the reason that planets do not twinkle is because they have a definite angular size, and the method used depends on this property of light sources). Objects measured so far include stars with angular diameters from 0.018-0.054", as well as a compact object inside quasar 3C 273 and the gas shell emitted by Nova Cygni 1975.

Gamma-Ray Successes - The gamma-ray satellite COS B, which is operated by the European Space Agency, has identified 13 point-like sources of radiation in the Galactic plane. Two of them have been identified with the Crab and Vela pulsars.

(All New Scientist)

CHARLIE'S COLUMN

International Space Programme

You may remember Apollo-Soyuz in July 1975, the first meeting between Russian and American Astronauts in space. According to "Flight" magazine another joint mission is planned. In 1981 an American Space Shuttle will dock with a Russian Salyut space station. This event should be visible in our sky since the orbit (usually 52° inclination) passes over Britain. It is good that Apollo-Soyuz was not a one-off. Detente in orbit seems to be herr to stay.

There seems to be a 'race'to get the first non-superpower astronaut into space. The USSR are training East European astronauts, and an East German may be soon in orbit. Similarly, the European Space Agency (ESA) are to supply NASA with two European astronauts (possibly British) to fly on the first Spacelab mission. Spacelab is being built by ESA, and will be launched by a Space Shuttle in July 1980. It is a smaller version of Skylab and Salyut, i.e. a small space station/laboratory.

NASA News - Several planetary probes are in the pipeline. Two "Voyager" probes will be launched later this year. In 1979 they reach Jupiter, 1981 Saturn, 1986 Uranus and 1989 Neptune. Pioneer 11 will reach Saturn in 1979, but its cameras will probably fail before then.

A Pioneer will also be launched to Venus soon, and a Lunar Polar Orbiter is planned to spend a year mapping the entire Moon.

There are no plans to visit Mars again. However, the orbiters and landers of Vikings 1&2 are still working. There is some concern that the Viking 2 lander may not survive the Martian winter which has just started.

Two long-term projects have run into financial trouble: a Jupiter orbiter probe, and the Large Space Telescope (LST). The LST is a plan to put a 100-inch reflector into Earth orbit by a Space Shuttle. ESA will participate in the LST. However NASA's budget has been cut, and either the Jupiter orbiter or the LST must be axed.

The LST would be of great benefit to astronomy. It woul be above the atmosphere, free from the hazards of weather, seeing and streetlights, pollution, etc. with which we are all too familiar. It will be able to take clearer pictures than ever before imagined. I feel an LST would be more useful than a Jupiter orbiter. Let us hope that NASA and Congress make the right decision.

Charlie Radley

RADIO ORWELL

The 'Talking Point' programme which was re-scheduled by Radio Orwell to go out on July 12 has once againbeen postponed till a later date, due to the fact that the programme's chairman has been taken ill. When the programme, which is called 'Is there Anybody Out There?' and is about extra-terrestrial life, exo-biology, etc.,eventually goes out, Charlie Radley and myself will take part in the discussion which should be quite interesting.

RADIO ORWELL - 'Anybody out there' by Charles Radley.

If you had your finger poised on that red button marked 'record' on July 12th you would have been dissapointed because the programme 'Anyone out there?'. was postponed and they told us too late to cancel it in our Journal.

The programme is to be re-arranged and we hope that we will be given enough notice so that we can put it in our Journal so that you do not miss it.

TRIPS TO MARS AND HALLEY'S COMET by Charles Radley.

N.A.S.A. has revealed more interesting plans for space probes. It looks like both the Jupiter Orbiter and the Space Telescope (see article) have escaped the axe.

In the Mars programme two spacecraft should be launched in December 1983 and January 1984. Each is to consist of an orbiter (like Viking) and three hard landing penetrators, but most important each is to have a soft landing mobile roving vehicle. The rover will carry experiments to study Martian soil chemistry. Significantly there will be no biology experiments on this mission.

Incidently, Viking 1 and 2 landers are still going! They are in semi-hibernation because winter has started on Mar's northerm hemisphere. Only the mini-weather station is still operating, all the remaining electricity is being used to keep the landers warm. The biology experiments have been switched off for good.

In 1990 it is hoped to launch a probe to land on Mars, collect a sample of soil and rock, and return it to Earth.

Finally, a mission to Halley's Comet is planned for the 1980's. It will be driven either by a solar wind sail or by an ion rocket. Both these exotic forms of propolsion have until now have been confined to science fiction. The probe is to go through the tail of the comet; then spiral into the nucleus. Unless the dust damages the instruments the probe will actually land on the comet's nucleus.

All these spacecraft are to be launches by the Space Shuttle with an 'Interim Upper Stage' rocket.

The U.S. Government has jet to approve funding for these two ambitious and expensive but very exciting projects.

NEW RESOLUTION WITH THE SPACE TELESCOPE by Charles Radley.

In the early 1980's N.A.S.A. plans to launch a 95inch (2.4 metre) aperture reflector called 'The Space Telescope' or 'S.T.' S.T. will be free from handicaps that earth based observers face. No streetlights up there, no dust, no clouds and no 'Spode'. S.T. will be able to make (non-solar) observations all day (and all night) every day.

But most important it will have perfect seeing all the time, being above the Earth's atmosphere. Perfect seeing means that S.T. would have perfect seeing a tenfold improvement in angular resolution compared with the best ground based telescopes. For example, our ten inch refractor has a theoretical (diffraction-limit) resolution of 0.46". However even in good seeing this is reduced to 1", and in poor seeing 5".

If the 200" at Palomar were above the atmosphere it would distinguish objects 0.023" apart, but in reality seeing gives it a working resolution of 0.5" to 2". S.T. will resolve 0.05", over ten times better than Palomar! For many reasons this previously unobtainable resolution will have a great impact on astronomy.

Much sharper photographs of Quasars and ecploding galaxies will give astro-physisicists a great deal of new and useful data. The outer planets of our Solar System and their satellites, could be intensivelly photographed to reveal details previously invisible, being too distant for extensive observation by space probes as yet.

But to me the most interesting observations will be those (if any) of stellar astronomy, e.g. positional and spectral. Consider that the parallax of the closest neighbour to the Solar System (Proxima Centauri 4.3 light years away) is only 0.762, theoretically resolvable by a six inch telescope; but in practice telescopes like the Palomar are needed.

New Resolution with the Space Telescope, continued

Surprisingly little work has been done cataloguing stars by parrallax/distance. The list of stars is only complete out to fifty light years. Beyound that only stars like Rigel and Betelgeuse have had their vital statistics (distance, mass, luminosity, etc.) measured accurately.

Using S.T. it will be much easier to map the Galaxy, measuring stellar parrallax of stars as much as 500 light years away. Completing the catalogue in this way would yield fruit for astrophysicists. For example, the Hertsprung-Russell diagram was drawn originally up using only a few scorestars as random sample. It has not been thoroughly revised for some time and could still be unrepresentative.

With a full catalogue of several thousand ty es and luminosities the Hertzsprung-Russell diagram could be replotted, allowing astrophysisicists to improve their models of stella evolution. At the same time a comprehensive catalogue would supply Radio Astronomers with about 10,000 target stars to listen to in their search for radio-transmissions from other civilisations, anyway, a thought provoking idea.

S.T. would improve measurement of stellar positions (Right Ascention and Declination). Small changes in these positions, known as proper motions, could be monitored better than ever before possible. Changes in the proper motion of Barnard's Star revealed that it had planets, too dim to be seen directly.

Barnard's Star is very close to us, only six light years away, and has a very large proper motion. These, together with it's small mass, (one-tenth the mass of our Sun) mean that perturbations by it's orbiting planets are observably by ground based telescopes. Sadly no other star fulfills those conditions.

However, S.T. could make proper motion studies of other stars, having sufficiennt resolution to cope with their tiny changes in position. Consider the stars in Table 1, a list of some of our nearest neighbours in the Galaxy. If the S.T. were todetect any tiny perturbations in their proper motion we may have discovered Earth-like planets capable of originating life!

CONCLUSION

Until we have the Space Telescope studies of proper motions will be severely restricted. However, parallax studies and cataloguing of stars by distance could be completed with existing ground-based observatories. S.T would free these conventional observatories to resume the long neglected parallax measurements. Once the catalogue is completed S.T. could extend it by returning parallax data on more distant stars. This would be an essential prerequisite for any meaningful search for extraterrestial intelligence.

TABLE 1. Vital Statistics of some nearby Stars:

NAME	Distance light years	Spectral type	Mass (Sun =1)	Apparent mag.	Absolute mag.	Comments
The Sun	-	G2	1	-26	+4.9	Home Sweet Home
Alpha Centauri (Proxima)	4.3	M5	1/20	+10.7	+15.1	The Closest star to the Sun but a Red Dwarf.
(A)	4.3	G2	1.2	0.0	+4.4	Alpha Cen A & B are both very similar to the Sun. These three stars form a triple system
(B)	4.3	K1	0.9	+1.4	+5.8	
Barnard's Star	6.0	M5	1/10	+9.5	+15.1	Only star (other than the Sun) known to have at least one planet (was not discovered by the O.A.S.I. Meteor Section Director!)
Epsilon Eridani	10.8	K2	0.75	+3.7	+6.1	Similar to Sun, candidate for Earth-like planet
Epsilon Indi	11.2	K3	0.7	+4.7	+7.0	rather cool, but still sufficiently sun-like to be a candidate for Earth-like planet.
Tau Ceti	11.9	G9 (approx)	0.85	+3.5 (approx)	+5.5 (approx)	Very similar to Sun, Candidate for an Earth-like planet.

SOCIETY'S NEWS.

VISIT TO LONDON.

A visit to London to the Science Museum and other places of astronomical interest is being arranged for SATURDAY 1st OCTOBER, 1977 in conjunction with the Ipswich Geological Society. If you would like to come, even if it is only for the ride, please contact Mr. R.M. Cheesman, [redacted], Ipswich as soon as possible please so that all the arrangements can be made. The cost is unknown at the moment but, according to numbers, should be under £2 per head.

COMMITTEE MEETING

We are holding another Open Committee Meeting at the Observatory on WEDNESDAY 10th AUGUST at 7.30p.m. The final arrangements for the Open Day will be made at this meeting which will be followed by a slide show. If you have any slides which you think might be of interest please bring them along. This meeting is open to ALL members.

OPEN DAY

The Open Day this year will be on SATURDAY 24th SEPTEMBER, 1977. A poster to advertise this event will be in September's Journal. If you can help on this day and perhaps help before the day in getting the Observatory ready please come to the Open Committee Meeting or contact Mr. R.M. Cheesman.

DRAW ON THE OPEN DAY.

We hope to enclose with this month's Journal some draw tickets for you to sell. If you have not got any, or would like some more, please contact Mrs. Long, [redacted], Ipswich or Mr. R.M. Cheesman, [redacted], Ipswich.

THE FIRST PRIZE will be a Liquid Quartz Digital Watch which in the main Jewlers in the Town retails at about £85. I hope to give a write up of the watch later in this Journal if the full details of it comes in before we go to press.

SLIDES REQUIRED FOR THE OPEN DAY.

Members of our Society will be giving little lectures at the Open Day and we would like to borrow from members slides on the following subjects:-

U.F.O.s
PLANETS
THE GALAXY
RADIO TELESCOPES

If you have any slides on the above and would like to lend them to us please contact Mr. R.M. Cheesman, [redacted] as soon as possible so that the various lecturers can work their talk out.

DOME WHEEL ON NORTH SIDE OF THE OBSERVATORY

After a lot of problems we have managed to adjust the above wheel so that it supports the Observatory Dome, which we hope will make the dome turn a lot easier.

AUGUST JOURNAL

This month's Journal has gone to print earlier than usual this month because so many of our Journal distributors are on holiday so many of you will get your Journals early.

DAILY NEWSPAPERS.

From time to time various peices of news with astronomical interest appears in the newspapers. As there are so many daily newspapers I wondered if members saw anything in their papers about astronomy whether they would cut the item out, make a note of the paper and the date and send them to Mr. R.M. Cheesman, [redacted], Ipswich or leave them at the Observatory so that all mmmbers can read them.

ITEMS IN JOURNALS

As the Journal starts getting typed up right at the beginning of the month as information comes in, and as the information goes either to Mr. Howes or Mr. Cheesman some items of news might be duplicated in the Journal or one writer says that a certain project is planned while the other says that the project has been cancelled. Perhaps you would all bear with us and hope that the writers of the articles will clarify the position regarding their news item in the following month's Journal.

METEOR NOTES by D. Barnard.

The ALPHA CAPRICORNIDS meteor watch held on Saturday 16th July was again clouded out. The clouds did disperse however about 12.15 but by that time it was too late to start the count. Four members turned up.

ALL TIMES QUOTED ARE SUMMER TIME i.e. Central European Time.

SHOWERS THIS MONTH

There are four showers this month:

1. The Alpha Capricornids, see July Journal, max Aug 1st & 2nd.

2. The iota Aquarids, Max Aug 6th, rather unfavourable, normal limits July 15th - August 25th, Z.H.R. at max = 6. Double radiant, R.A. 22hrs 32min, & R.A. 22hrs 04m Dec -15°, -6° respectively. Age of Moon at max = 21days.

3. The Kappa Cygnids - the last shower this summer. Max Aug 20-21st, normal limits Aug 19-22nd, Z.H.R. = 4, flaring fireballs, well worth observing at the meteor count on SATURDAY 20th August the night of the Maximum. Radiant R.A. 19hrs 20m Dec $+55^{\circ}$. rather favourable, age of Moon at max = 5days. On August 20th twilight ends 20.2hours U.T. i.e. 12 minutes past 9

4. The Perseids, well known shower Max Aug 12th, ends Aug 18th, favourable Z.H.R.=68 radiant 03hrs 04min Dec $+58^{\circ}$, many bright fireballs, flaring meteors, fine trains. Age of moon on night of count = 27days, so no Moonlight will interfering at all this year. Twilight ends 12minutes to 10, summer time.

METEOR COUNTS THIS MONTH (August)

1. SATURDAY AUGUST 13th The Perseids shower, meet outside the Golf Hotel, Foxhall Rd. Ipswich at 10p.m.

2. SATURDAY AUGUST 20th The Kappa Cygnids, meet outside the gold Hotel, Foxhall Rd. Ipswich at 9p.m. (repeat, 9p.m.)

As usual everybody welcome to come along for a few hours, bring cameras if possible.

WHATEVER HAPPENED TO.....? by Charles Radley.

You may remember that all the six Apollo missions which successfully landed on the Moon left behind experiminets. People keep on asking me 'What happened to them?'. At last I can tell you! The Apollo 11 ALSEP (Apollo Lunar Surface Experiments Package) only operated a couple of weeks because it was solar powered.

ALSEP's - 1 to 5 (of Apollo 12 to 17 but not 13) are all still working to this day. ALSEP 1 has been operating for nearly eight years! They are developing gremlins however. From time to time they stop transmitting, then without warning they come back to life again.

Their small atomic generators which provides power are slowly fading necessitating turning off some of ALSEP instruments. All five Alsep seismometers are still giving good data on Moonquakes.

Now the sad news. It costs N.A.S.A. $1 million per year to collect ALSEP data. Since no more funds are available all the ALSEP stations will be turned off at the end of 1977 financial year. (information cribbed from "Aeospace Daily")

STOP PRESS

TOO MANY TELESCOPES? late item by Charles Radley.

Crafty planners at N.A.S.A. have changed the name of the "Spacelab Ultraviolet/ Optical Telescope' to 'Starlab'. This is to foil the U.S. Government, who, after funding the expensive 'Space Telescope' are likely to be suspicious of any new project with the word 'telescope' attached to it's name. (information from Aeorospace Daily').

JOURNAL PAPER THIS MONTH.

Sorry about the Journal sheets this month being printed on different sizes of paper but we have had problems.

(signed 'typist, printer & distributor')

DRAW TICKETS:

Please return to either Mrs. P. Long or Mr. Cheesman all counterfoils, cash and unsold draw tickets (if any) by SATURDAY 17th SEPTEMBER.

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

programme for August, 1977.

At Orwell Park Observatory, Nacton, Nr. Ipswich.

WEDNESDAYS from 7p.m. Solar, Lunar & Planetary Section
Director. Mr. R.M. Cheesman, [redacted], Ipswich.

10th August
17 "
24 "
31st "

WEDNESDAY 10th August. Open Committee Meeting from 7.30p.m.
Open Committee Meeting to which all members are invited to finalize arrangements for the Open Day. Slide Show afterwards if time permits.

THURSDAYS from 8p.m. Double Stars Section
Director Mr. D. Bearcroft, [redacted], Ipswich,'phone Ipswich [redacted]

4th August
18 "
1st September

FRIDAYS from 8p.m. Variable Stars Section
Director Mr. R.S. Manning, [redacted], Ipswich, 'phone [redacted]
and Mr. M. Siggers, [redacted], Ipswich

5th Augusts
19th "
2nd September

SATURDAY 24th SEPTEMBER from 2p.m. Open Day - please make a note of it in your diary.

METEOR SECTION Director Mr. D. Barnard, [redacted], Ipswich,'phone [redacted]

1. PERSEIDS METEOR COUNT on Saturday 13th August from 10p.m.

2. KAPPA CYGNIDS METEOR COUNT on Saturday 20th August from 9p.m.

Meet outside the Golf Hotel, Foxhall Road, Ipswich at the times given irrespective of weather conditions.

EVERY AND ANYBODY WELCOME TO COME ALONG