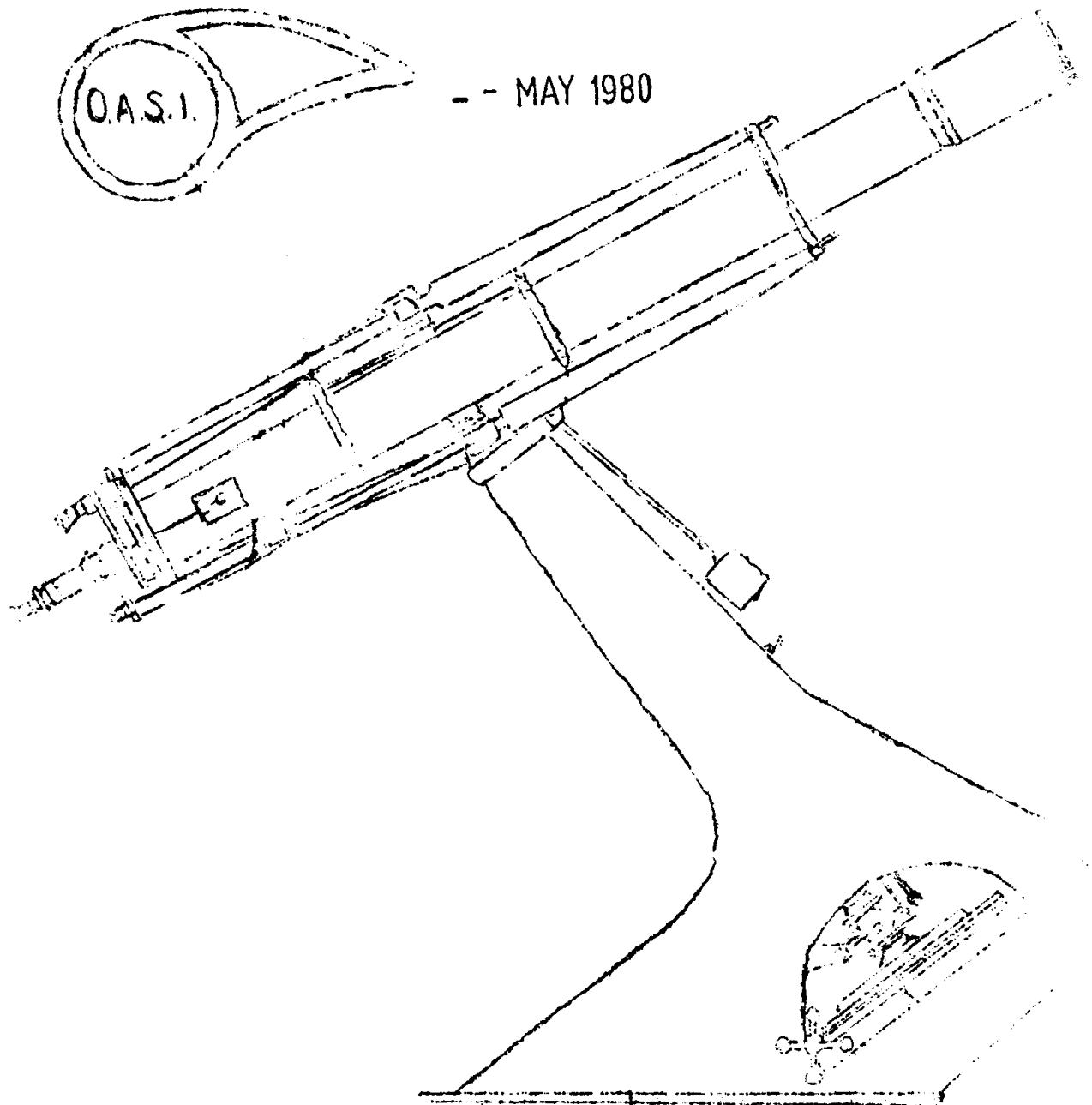


JOURNAL OF THE ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

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'phone Ipswich [redacted]

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WEST HANNINGFIELD, Chelmsford, Essex. CM2 8LQ



The Orwell Park 14 inch Astronomical Telescope
at Nacton near Ipswich

SOCIETY NEWS:

Over the Easter Week-end Orwell park was 'invaded' by the South East Essex Caravan Club on their yearly pilgrimage to Orwell Park. During their stay the Observatory was opened up so that their members would be able to use the telescope. The three nights which we opened up were excellent ones and all their members were able to observe for a few minutes.

The Caravan Club was very well organised and instead of over 500 people invading the Observatory at once the Rally Secretary organised times for them to visit us, and although things got hectic at times, the timed schedule went pretty well.

Although there was only half-a-dozen of our members in attendance at the Observatory at one time doing shifts with the various parties of people we could have done with more help. Even so during the three nights over £36 was donated to the Society's funds which is the most we have ever had and the money will go towards running the Society.

If you feel that you were 'left out' of this meeting for your diary I mention below the other 'Big' things which have been arranged at Orwell Park for which we will open the Observatory:-

1. May 26th to 31st. Thousands of Girl Guides will be camping at Orwell Park!
2. July 26th to approx 31st. The Salvation Army's annual get-to-gether.
3. August 22nd to 25/26th. Suffolk Caravan Club's annual visit to Orwell Park.
4. Saturday 20th September, 1980. Orwell Astronomical Society's OPEN DAY.

For all of these events, plus visits to the Observatory during the weeks by other groups and Societies, your help is needed as for the first three events these dates fall when our members who normally help might be on holiday. If you would like to give a hand please come along as these events are very enjoyable.

THIS MONTH'S LECTURE:

This month's lecture at Fonnereau Road is an illustrated talk on 'EXPLODING GALAXIES' given by, wait for it, Heather Couper, yes Heather Couper. The talk will start at 7.30p.m. sharp and finish about 9.30p.m. as she has to catch a train back to London. I have heard this talk three times and am looking forward to hearing it again. So make a note in your dairy so that you do not miss this great talk - Friday 2nd May, 1980 at 7.30p.m. at The Friends Meeting House, Fonnereau Road, Ipswich.

THE NIGHT SKY as seen from Orwell Park during May

The Plough still dominates the zenith during the evening hours this month, while Virgo and Bootes are crossing the meridian around mid-night during the early part of the month. To the south-east Ophiuchus and Libra are visible after mid-night, and further east Hercules and Lyra (with its unmistakable blue main star, Vega) are now well up into the night sky. The main feature in the western sky is Leo, still playing host to its three planetary visitors. Cancer is still visible above the western horizon, but Gemini will be slipping from view by the end of the month.


THE SUN: Sunrise is at 04h 40m at the beginning of the month changing to 03h 40m at month-end. Sunset changes from 19h30m to 20h 10m. The Sun moves from Aries to Taurus during the month.

THE MOON - PHASES

Last Quarter	7 d 20h 21m	First Quarter	21h 19h16m
New Moon	14d 12h 00m	Full Moon	29d 21h28m.

Occultations:

	<u>star</u>	<u>Phase</u>	<u>Mag.</u>	<u>Time</u>		
				<u>d.</u>	<u>h.</u>	<u>m.</u>
**	2291	R	5.5	1	23	57.1
*	692	D	1.1	15	13	50.0
*	692	R	1.1	15	14	58.6

<u>Star</u>	<u>Phase</u>	<u>Mag.</u>	 <u>Time</u>		
			<u>d.</u>	<u>h.</u>	<u>m.</u>
1921	D	5.9	26	00	09.7
1924	D	5.8	26	00	53.3
** 2666	R	5.0	31	23	36.2

D = Disappearance R = Reappearance

Stars listed according to Zodiacal Catalog (ZC) numbers

** denotes time is correct for latitude and longitude
of Greenwich

* denotes double star

THE PLANETS:

Mercury reaches superior conjunction on the 13th after which it will be an evening star, setting an hour and a half after the Sun by month-end.

Venus reaches greatest brilliancy this month of mag. 4.2 on the 9th, when it will be setting 4 hours after the Sun, but by month-end it will rapidly be closing in on the Sun.

Mars is still in Leo, and moving quite rapidly this month, passing $0^{\circ}8'N$ of Jupiter on the 4th. The Planet is still visible until the early hours, but it's magnitude decreases from +0.4 to +0.8 during the month.

Jupiter is at mag. -1.7, and also visible for most of the night in Leo.

Saturn, between Leo and Virgo, is stationary on the 23rd, at mag +1.1 (and of course also visible for most of the night).

Uranus reaches opposition on the 14th, at mag 5.7, in Libra.
R.A. 15hrs 20m, Dec. $-18^{\circ}7'$

Source: B.A.A. Handbook 1980, all times are

U.T. (B.S.T. minus 1 hour)

ARTICLES TO READ:

"Quasars in a new light" - New Scientist 20th March

A look at how far along the road astronomers are to understanding quasars, and problems they have yet to solve.

FROM OTHER JOURNALS by Paul Burt.

RADIO RESOLUTION RECORD - Radio astronomers at Mullard, Cambridge have recently produced maps of radio sources showing greater detail than ever before achieved. Using their 5 kilometer radio telescope, which consists of eight dishes spread along an east-west line, they have obtained a resolution of 0.32 seconds of arc, at a wavelength of 1cm (as opposed to a resolution of 1 sec. by the best optical telescopes). The normal radio observation wavelengths are 6 and 11 cm, but the Mullard astronomers opted for the 1cm wavelength to achieve the greater resolution, although this creates the problem of interference by water vapour in the atmosphere. The best conditions for observing are the cold still winter nights, so the recent mild weather was not welcomed by the Mullard team, although they still managed to attain their remarkable success.

The best maps shows a region called W3(OH) where new stars are forming. For the first time a hole can be seen in the hydrogen cloud, where the gas has been blown aside by the intense radiation from a young star. This achievement is equivalent to seeing the hole in a 'Polo Mint' from 3km.

New Scientist.

ON THE SPACE SHUTTLE MAIN ENGINE: by Simon Harvey

Now it would be wrong to admit that everything was OK with the Space Shuttle Main Engine in days gone by. Indeed, they certainly have not. One notable involved damage to an engine during shut down when excess pressure was measured in the oxygen turbo-pumps. But I think we are now seeing the 'fruits' of the last few years pay off. Only recently one engine underwent a 535 second, 100% RDP test and Columbia's engines are soon to be installed. Here is a little about the Space Shuttle Main Engine which should soon be putting into orbit man's first reusable manned space vehicle.

In the design stage it was recognised that in order to meet STS goals, one of which was to reduce the costs for space traffic, the SSME would have to be reusable. In addition, STS structure and flight profile meant it would have to be significantly throttleable.

After STS orbiter and integration had gone to Rockwell's Space Systems Group, N.A.S.A. locked round for a SSME contractor and found Rocketdyne suitable. Rocketdyne had come forward with a 2MN thrust liquid propellant engine. They are fired for approximately eight minutes in conjunction with two solid rocket boosters to place the 68 tonne orbiter about the earth.

Like Saturn-V, F1 engines, the SSME's use liquid oxygen and liquid hydrogen. These two propellants are not kept in the orbiter, but are stored in two very large tanks in the external tank. Just before lift-off the cryogenic propellants start pumping through a bulk head and into the three main engines. The SSME has quite thin proportions. It would measure 4.24m in length and the exit nozzle is 2.39m in diameter.

During count-down, fuel and oxidizer are prevented from entering the engine by pre valves located in the Orbiter. Near launch time, the pre valves are opened and propellants pass through low pressure turbo-pumps, high pressure turbo-pumps, and propellant valves in turn. During this time the engine feed lines are continually being cooled ready for a continuous flow of very cold propellants.

Besides those already mentioned, the SSME has one other very interesting characteristic. It contains a device called a 'pogo suppressor' to damp out any pulsing oscillations which can put undue strain on the Orbiter. The brain of the engine is the controller which controls valves, transmits sensor data to the orbiter, and generally ensures that the engine does just what the pilot needs of it without too much strain. To end, here is a fact which may seem surprising. Each SSME develops more power than 23 Hoover dams!!.

Many thanks to Rocketdyne division of Rockwell International for this information.

NEWS REVIEW, MAY 1980 by Simon Harvey

Circumstances permit only a very short News Review this month and next, but any other news may be obtained by writing to me.

Many thanks again to contractors and organisation for supplying news items.

APRIL 1st - IMPROVED ORBITER THERMAL PROTECTION SYSTEM.

N.A.S.A. is approaching private industry for the purpose of developing a new technology tile. If developed the new tile will not affect present Shuttle Orbiter's, but will be used mainly for any 'later applications'. The study contract will be managed by N.A.S.A.'s Langley Research Center. There are two aims; first to reduce the costs of tile production and two; to see if the present ceramic tiles are the best available. The study is expected to include evaluation of metallic and re-inforced carbon/carbon re-usable insulation.

N.A.S.A.

April - INTELSAT'S TO GET INSURED JUST IN CASE.

INTELSAT is for the first time taking out insurance against failure for the new INTELSAT-V series of communications satellites. It has only recently become possible for INTELSAT to do this, as insurance fees and conditions have come down to a sufficient level. Terms have been agreed on the launch of five satellites using Atlas Centaur launch vehicles. The insurance covers the launch and 180 days in orbit. Each launch is insured for \$65 million, that is \$325 million for the five. Third party insurance for the five INTELSATS, that is damage caused to the general public, is put at \$500 millions for the five.

- International Telecommunications Satellite Organisation.

March 31st - COLUMBIA'S SYSTEMS COME UNDER TEST

A series of tests to last two weeks beginning with testing of selected Columbia equipment began today.

The Orbital Maneuvering System and Reaction Control System Pods have been installed aboard Orbiter Columbia following checkout in Kennedy's Hypergol Maintenance Facility. The Auxiliary Power Units are now also installed and this has permitted active testing of aerodynamic control surfaces. During the middle of the month, Shuttle astronauts took part in tests to evaluate the shock caused to the orbiter by separation of the External Tank, once near Earth orbit. SSMEs have been installed (mid-month) following modifications.

Rockwell Space Systems Group

April 7th, INVESTIGATORS MAP JOVIAN SATELLITES:

A team from the Rand Corporation of Santa Monica have used many of the 33,000 Voyager pictures to map and chart the major Jovian Satellites. They have devised a system to compute the geographic co-ordinates of any feature at any time. In addition the researchers have produced new radii data for Io, Europa, Ganymede and Callisto:-

Io	=	1,816	±	5km
Europa	=	1,563	±	10km
Ganymede	=	2,638	±	10km
Callisto	=	2,410	±	10km

Voyager-2 is due to arrive at Saturn in November, and Voyager-1 in August 1981.

March. IUS SYSTEM COMPLETES SUCCESSFUL TESTS:

The Trust-Vector Control System (steering) for the Inertial Upper Stage was tested successfully recently. The test was conducted using a small IUS solid propellant motor at a development center in Tennessee. During the tests, the TVC system gimballed the IUS motor $\pm 7^\circ$ flawlessly according to an official. The TVC system takes commands from the IUS guidance and navigation subsystems to keep the upper stage right-on target. The tests used a 63 inch diameter motor which was fired for 108 seconds at 107,000N. The conditions simulated an altitude of 100,000 feet. This is the second time the motor has been tested, the first taking place on December 5th 1979 at the same development center.

- Chemical Systems Division of
United Technology Incorporated.

OTHER NEWS:-

- April 4th N.A.S.A. tests 55-65 year olds for evaluation as possible Shuttle Orbiter passengers (N.A.S.A.)
- April 1st Twentieth Anniversary of TIRO-1, worlds first weather satellite (R.C.A.)
- March 31st NAVSTAR V1 on Pad (Rockwell)
- March 31st MPS clocks 535 seconds at Mississippi test site (Rockwell)
- April 2nd Shuttle engine in sustained run of 109% rated power (N.A.S.A.)
- April 7th INTELSAT reaches ARABSAT understanding (Intelsat)
- April 9th INTELSAT to investigate radio deterioration in rain storms (Intelsat)
- April 14th Hughes/ITT team competing for development of U.S. Joint Tactical Communications System (Hughes)
- April 2nd M.P. strides for greater European activity in space (ESPO)
- April 7th LANDSAT-3 helps with forestry inventories (N.A.S.A.)
- April 17th British Aerospace makes record profits (B.A. & D)

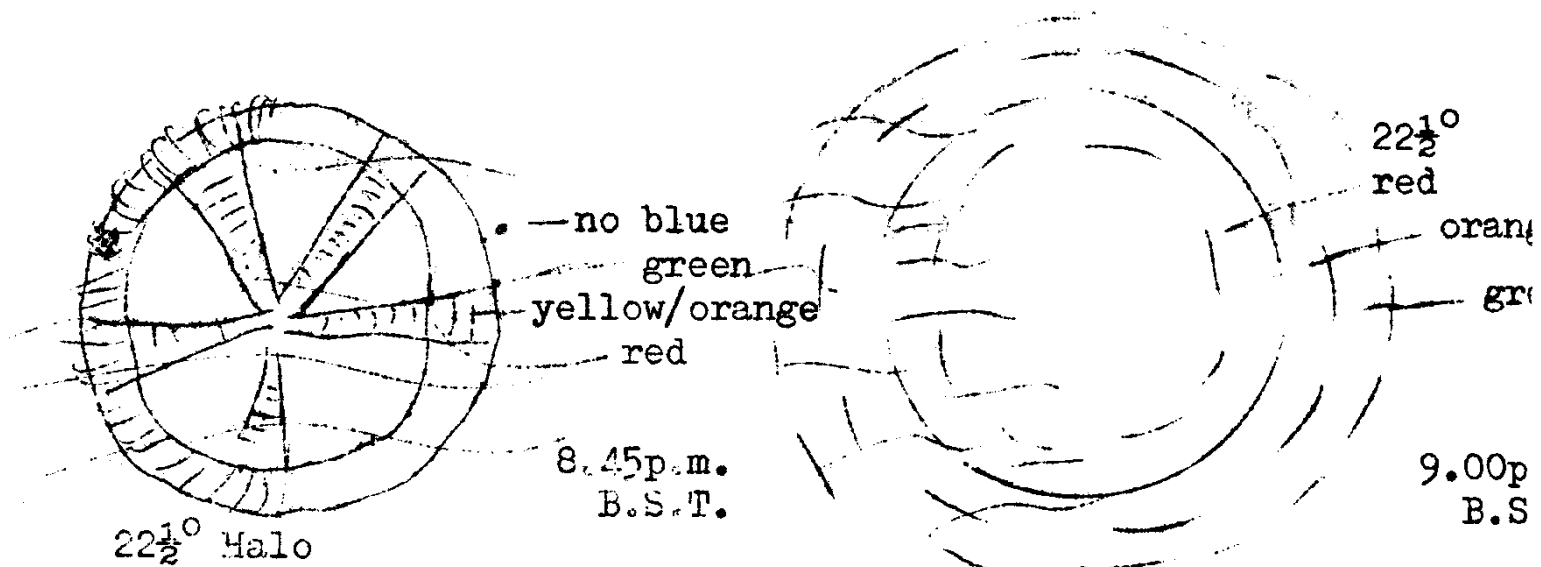
----- Simon Harvey

MOONBOW

On Sunday March 30th at 8.45p.m. B.S.T. several members saw a very rare Rainbow caused by the light from a full moon shining through high level Sirrus type clouds.

The first phenomenon was a '22½°' halo around the moon followed by several 'rays' that appeared to emanate from the moon. One of these rays struck a portion of cloud and caused a full rainbow type halo, again at 22½°. At first it was quite dim, but by 9.00p.m. B.S.T. it had brightened considerably over about 15° circumference, but by using averted vision it could be seen over a full 360° circle

If any other member saw this event please contact me as soon as possible please.



A.J. Smith,
[REDACTED], Ipswich

AURORA BOREALIS

During August 1980 several members of the Society are planing a trip to northern Scotland to (hopefully) observe the Aurora Borealis plus the Kappa Cygnids meteor shower.

If any members have seen the Aurora from the Ipswich area please contact me.

A.J. Smith,

[REDACTED], Ipswich.

OBSERVATIONS OF VENUS DURING DAYLIGHT

by Roy Gooding

With a little perseverance Venus can be observed during the day with the most modest of Equipment. Binoculars of any of the popular sizes are all that is required. I have found Venus during the day time with 8 x 40 and 10 x 50 binoculars. If you only have a pair of 8 x 30 binoculars these should be sufficient also.

The most difficult part is actually finding the planet, once it has been found there is no mistaking it. The method I have used was firstly to find the approximate time that Venus crossed the meridian and commenced sky sweeps to the south. A point to take note of here is that Venus being near the meridian will be at quite a high altitude, about 60° .

An important precautioning is to have the Sun obscured behind either a house or a wall. You can then conduct sky sweeps without the problem of unintentionally looking into the Sun.

On very clear days, and when Venus is at a suitable position it is possible to see the planet with the naked eye. Venus was seen with the naked eye just before its occultation on January 20th by myself and many other members of the Society. Since last January, I have seen Venus for the second time with

the naked eye.

The following table gives the approximate times when Venus is on the meridian during May. All times are B.S.T.

<u>Day</u>	<u>Time</u>
1	1550
11	1540
21	1450

Roy Gooding.

DEADLINE FOR JUNE'S JOURNAL:


Because I will be on holiday during the last week in May please send all items for the June's Journal in as soon as possible please, the final deadline is to be with me by Monday 19th May first post.

If you have any articles of astronomical interest which you would like to be included in our Journal please send them to me. Articles could be;- paper cuttings, jokes, cross-words a report on your observations, on what you might have built, etc. etc.

Remember when sending them in please write clearly, names, especially foreign ones should be in CAPITALS, and please do not abbreviate because although you might know what 'O.A.S.I.' stands for many people do not - perhaps a bad example but you know what I mean

All items should be sent to:

Mr. R.M. Cheesman,


WEST HANNINGFIELD, Chemsford,

OBJECTS TO LOOK FOR by David Barnard.

Just a quick note here on what to look out for in the night sky when up at the Observatory (or in the back garden).

Low in the east is the constellation Hercules and the famous M13 which we observed on 9th of April and was as magnificent as ever. Do not forget M92 nearby, although little known this object is nearly as impressive as the great M31 cluster itself. Lyra is also low in the east, the Ring (M57) nebula will be visible near Vega and also the multiple star Eta. Between Leo and Boötes is a very faint patch of about a dozen stars. This is Coma, a very rich region of the sky full of stars.

Between Virgo and Coma there are about twenty Messier objects mostly galaxies. It is well worth sweeping this area of the sky with a low power eyepiece. Above Coma is the small constellation Canes Venatici - The Hunting Dogs. This constellation contains M94, a bright galaxy, don't forget M3 to the left of Coma, find β Coma and then move in R.A. for 30 minutes towards Boötes to find this superb globular cluster of stars. Other objects include M66 and M65, M96 and M95. M66 and M65 are visible in the same low power field, as are the second pair. These four are all faint galaxies of around magnitude +10.

Make a point of finding the Owl Nebular this month in Ursa Major (M97) near β Ursa Majoris.

Keep a watch on the famous variable star R in Corona Borealis. The famous 'Beehive' in Cancer is easily visible to the naked eye. Use a low power for this open cluster.

That's all this month - happy hunting,
David Barnard.

METEOR NOTES FOR MAY by David Barnard.

The observations of the April Lyrids meteor shower from Levington and our correspondent in West Hanningfield plus reports from other members (We Hope) will be covered in the June Journal.

This month (May) we have a fairly strong shower, namely the eta Aquariids. ZHR = 20 with the maximum falling on 5th May while the normal limits of this shower fall between May 1st and the 8th. The Radiant is R.A. 22hrs 24mins with the Dec. being 0° . These meteors tend to be very fast and with persistent trains. Unfortunately the radiant does not rise until the early hours of the morning, however, it should be possible to see some eta Aquariids as the waning Moon does not rise until mid-night or so. There will be

will be a meteor count to observe this shower on MAY 3rd, please meet at 10p.m. OUTSIDE 'The Levington Ship' and hopefully we will be able to observe this shower for two or three hours. Bring warm clothing, hot drink and a deck chair.

Also this month there are two daylight streams:-

1. The Epsilon Piscids, max May 13th, normal limits May 12-13th
Transit H.R. = 16
2. The Omicron Cetids, max on May 15th, normal limits May 14-23
Transit HR = 25.

A Note on the ZHR of meteor showers:

The ZHR (Zenithal Hourly Rate) i.e. hourly rate if the radiant is overhead and with a skilled observer. The hourly rate depends critically on the altitude of the radiant at the time of the observation. To compute the Z.H.R. the observed rate should be multiplied by the Factor F corresponding of the altitude of the radiant

<u>Altitude</u>	<u>Factor</u>
0°	
2.6°	10
	5
8.6°	
14.5°	3.3
20.7°	2.5
27.4°	2.0
34.5°	1.7
42.5°	1.4
52.2°	1.3
65.8°	1.1
90.0°	1.0

In critical cases ascend.

Moonlight has a detrimental effect on observed rates, and during the 10 days around full Moon only the brighter meteors will be seen,

DO NOT FORGET THE ETA AQUARIDS METEOR COUNT
ON SATURDAY 3rd MAY FROM 10p.m.

Meet OUTSIDE 'The Ship Inn' Levington irrespective of weather conditions.

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

MEETINGS FOR MAY, 1980.

AT THE OBSERVATORY, ORWELL PARK SCHOOL, NACTON.

TUESDAYS: Solar, Lunar and Planetary Sections. from 7p.m.

Directors: Mr. J. Hood, [redacted], Ipswich
and Mr. J Ranson, [redacted], Ipswich
Tel. Ipswich [redacted]
and Mr. M. Barritt, [redacted], Ipswich.

May 6th 13th 20th and 27th

WEDNESDAYS: from 8p.m. Nebulae & Faint Objects Section.

Directors: Mr. D. Payne, [redacted] Wickham Market
tel: Wickham Market [redacted]
and Mr. M. Cook, [redacted], Ipswich
Tel. Ipswich [redacted]

May 7th and 21st.

SATURDAYS: from 8p.m. General Observations Section

Directors: Mr. M. Barriskill, [redacted], Ipswich
and Mr. R. Adams, [redacted], Ipswich
Tel. [redacted]

May 3rd 10th 24th and 31st.

SATURDAY 17th May 8p.m. Committee Meeting.

FROM Monday May 26th to Saturday 31st Girl Guides Camp at
Orwell Park. Thousands of Girl Guides will want to
look through the telescope so all members are asked
to help during the week to open up the Observatory.

OTHER SOCIETY MEETINGS:

FRIDAY 2nd May at 7.30 sharp an illustrated talk by Heather
Couper entitled 'Exploding Galaxies' will be held at
The Friends Meeting House, Fonnereau Road, Ipswich.

SATURDAY 3rd May from 10p.m. AQUARIDS METEOR COUNT.

Director Mr. D. Barnard, [redacted], Ipswich,
Meet OUTSIDE 'The Ship Inn' at Levington. All welcome.

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

presents

an illustrated talk

on

EXPLODING GALAXIES

GIVEN BY

HEATHER COUPER

of the Greenwich Observatory

on

FRIDAY 2nd MAY, 1980

at

The Friends Meeting House,
Fonnereau Road,
IPSWICH.

starting at 7.30p.m. sharp.

Admission Free - - - - - Everybody Welcome