

Journal of the
ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

September, 1976.

Editor. Mr. J. Deans,
[REDACTED],
CAPEL ST. MARY.
Ipswich.
'Phone GT. WENHAM [REDACTED]

WHAT'S UP? The Solar System as seen from Ipswich, September, 1976.

SOLAR SECTION.

The Sun this month will move from the constellation of Leo into Virgo.

Heliographic Co-ordinates as at noon U.T.

		<u>P</u>	<u>Bo</u>	<u>Lo</u>		<u>P</u>	<u>Bo</u>	<u>Lo</u>
September	4th	+21.9°	+7.2°	127.1°	September	19th	+24.8°	+7.1° 289.0°
"	9th	+23.0°	+7.3°	61.1°	"	24th	+25.4°	+7.0° 223.1°
"	14th	+23.9°	+7.2°	355.1°	"	29th	+25.9°	+6.8° 157.1°

Synodic Rotation No 1645 commenced August 17.37d
" " No 1646 commences September 13.63d

MERCURY will not be visible this month owing to superior conjunction occurring on the 22nd at 01hrs U.T.

VENUS is a bright evening object magnitude -5.3 increasing to -3.4 by the latter part of the month. On the evening of the 25th the Moon will be seen near the planet just before it sets.

MARS is also an evening object not far from Venus and remaining at magnitude +1.9

JUPITER now at magnitude -2.1 and rising at 21hrs U.T. and is a splendid sight in the Eastern sky. Jupiter reaches a stationary point of it's motion across the sky on the 19th at 21hrs U.T. , thereafter moving in a retrograde motion. The Moon will be near Jupiter on the 14th.

SATURN rises in the early hours of the morning and should be observable in the constellation of Cancer before dawn. The Moon will be near Saturn on the 20th.

LUNAR PHASES.

Moon Phases for Lunation 664/665

First Quarter	September	1st	03hrs 35m U.T.
Full Moon	"	8th	12hrs 52m U.T.
Last Quarter	"	16th	17hrs 20m U.T.

LUNAR OCCULTATIONS.

September	1st	ZC 2465	Mag 7.4	D	19hrs 42.4m U.T.
"	2nd	ZC 2629d	" 6.3	D	20hrs 36.7m U.T.
"	3rd	ZC 2787	" 6.4	D	19hrs 55.2m U.T.
"	11th	ZC 146	" 4.4	D	03hrs 00.7m U.T.
"	11th	ZC 146	" 4.4	R	04hrs 13.1m U.T.
"	16th	ZC 146d	" 5.0	R	04hrs 07.7m U.T.
"	30th	ZC 2745d	" 6.9	D	20hrs 09.0m U.T. *****

***** On Thursday 30th September we will be observing this occultation in preparation of the grazing occultation which is on Saturday 27th November. The site for observing this will be just north of Bury St. Edmunds near Timworth Green. Timworth Green is near the main track of the grazing occultation and those members wishing to come on the dummy run and on the grazing occultation should contact Mr. R.M. Cheesman, [redacted], Ipswich who is arranging these two meetings and the transport.

These lines were written by Dorothy of the Loughton Astronomical Society.
What is it about? - I will tell you in next month's Journal.

'Long, long ago, in the utmost depths of the past, there was in existence a Document of such beauty, that those who once gazed upon it, carried the vision with them until the end of their days. It was not wrought from any material substance neither wood nor stone, nor hide nor bone, nor any manner of metal, yet it was the colour of sapphire, ranging from the lightest to the deepest of bluss, and studded with gems of light, more beautiful and powerful than any diamond or ruby found on Earth. It was the work of the Almighty Creator of the Universe, at the dawn of time, and it is recorded amongst other things, the creation and evolution of life and the Heavens, beyond the wisdom and comprehension of man.

This 'book' had many 'mystical' properties, in that it could not be destroyed by earthquake, fire or water, and would not decay or suffer from erosion. It would not shatter into a hundred fragments as the result of tribal or national conflict, or lay buried deep in the ground, remaining inaccessible for centuries, as is the fate of so many ancient stone tablets. The events recorded were in a universal language, and were free to all to read, providing they had the intelligence to do so, as it was impossible for it to be locked away in any private library. What is more, the Original Copy was never more than a day's journey, a journey of time, in which the 'Book' remained in it's appointed place, the reader remained on his own homestead, and yet at the end of each day, the two would be brought together, even though almost indescribable distances remained between them.

As it existed then so early in time, so it continues to exist today, in all it's beauty and glory.'

Charles Radley.

NEW MEMBERS.

We welcome to our Society two new members who have joined us during August:-
Mr. M. Guest, [REDACTED], Ipswich.
Mr. G. Clark, [REDACTED], Ipswich.

Please note that Mr. A. Betts lives at [REDACTED] (not [REDACTED] as reported in July's list of members) [REDACTED], Ipswich.

OPEN DAY.

There still is a great deal of work to be done in the Observatory before the Open Day so if you can come up on a Wednesday evening to help please do so.

We still have Draw Tickets if you want any more to sell. Unsold tickets, counterfoils and money should be returned to Mr. R.M. Cheesman, [REDACTED], by Saturday 11th September please.

If you have anything of astronomical interest which can be exhibited at the Open Day please advise us if it is too big to carry or bring it along yourself before the Open Day if possible. Pictures, maps, drawings models (astronomical ones!) etc will all help to put on a good show for the Open Day.

HELPERS on the Day are required, please be at the Observatory by 1.45p.m. and if possible help on the Friday evening before the Open Day to get things ready.

Don't forget to bring your telescope along to show.

POSTER at the back of the Journal is one of the best posters we have ever produced (well I hope it is as I have not yet seen it printed). Please put it in your front window or in a place where people will see it. If you want any more to put on the notice board in schools, factories, libraries etc. please contact Mr. Cheesman.

We hope that this years Open Day will be the best one we have ever had and your help will help to make it so.

WIVES, girlfriends, etc. please ask them to bake a few buns etc for sale at the refreshment counter.

OPEN DAY continued.

We are still trying to borrow slides of comets, meteors and anything astronomical so if you could lend us them for the day please contact Mr. D. Barnard, [REDACTED], Ipswich.

We will open at 2p.m. and close at approx 11p.m. and hope, weather permitting to use the 10" O.G. and the N.C.C. Barrell reflector for viewing the heavens during the evening.

OBSERVATORY FLOOR.

On Saturday a small band of members, after fusing the observatory lights, sanded the observatory wood floor. After the Caravan Club has visited us we will varnish it after killing off any woodworm which still might be in it.

COMMITTEE MEETING.

On Friday 10th September we are holding our committee meeting at the observatory at 8pm. to finalise the arrangements for the Open Day. This meeting is open to ALL MEMBERS so please come along.

NEW EYEPieces.

The Imperial College, London has given us six new eyepieces of very short focal length together with a barlow lens. We have not had the opportunity of trying these out yet but we hope that they will prove to be very useful to us.

N.C.C. BARRELL REFLECTOR.

We are still working on this telescope and hope now to erect it on Sunday 5th September. A large amount of wood has been donated to the Society by a person who wishes to remain anonymous. All this wood is brand new and Mr. Guest together with Mr. Miles have made a large portable observatory which we will erect on Sunday 5th September. The observatory is a fairly large one made of very strong wood and quite heavy. If you have four or more wheels which could be used to fix to the bottom of the observatory to make it a run off observatory Mr. D. Miles, [REDACTED] or Mr. M. Guest, [REDACTED] would be very pleased to hear from you A.S.A.P.

CARAVAN CLUB.

On 3rd, 4th and 5th September the Caravan Club of Gt. Britain is holding one of their rallies at Orwell Park School. The secretary has requested if we would be kind enough to open up the Observatory for them on Friday 3rd and Saturday 4th September from 8p.m.

We will open up the Observatory on these two nights so if you can come along to help out please do so. We might make a few bob on donations and also might be able to sell a few Draw Tickets to them! Also as they generally bring everything along to these rallies we might be able to join them in a jug of beer around the camp fire.

ELECTRIC METER in observatory.

On Sunday 15th August Mr. G. Collier and Mr. A. Smith installed an electric meter in the observatory so that we will now have to pay for the electric we use.

There is something on Mars, But is it life?

See "New Scientist" 12th August available from libraries on Request. The biology experiments on Viking 1 have given various results. A large volume of oxygen was released upon wetting some soil. Whether of chemical (peroxides locked in soil) or biological origin unexplained.

We will not know certainly for a few weeks, perhaps years. It seems there is no snap discovery of life, we will have to wait. In any case, there is an abundant oxygen supply locked up in the oil which could be used for colonists on Mars in future decades. On Sept 4th Viking 2 lands on Mars.

On Sept.9th Patrick Moore in his 'Sky at Night' will give us the latest news on Vikings 1 and 2.

Charles Radley.

FOR SALE. Good quality 6 inch mirror needs re-silvering/aluminising. Offers to Mr. Laurence Newall, [REDACTED], Newbourn, Nr. Ipswich, Tel. Waldringfield [REDACTED].

There will be no formal meeting of the Mirror and telescope making section during September due to my presence being required at R.A.F. Cardington for a fortnight, if any problems crop up during this period I feel sure that Mr. Cheesman will be happy to help solve them. The mirror blanks are now being cut to size but this may take sometime as it is not only proving to be a longer job than expected but also finding time to do them with so many other Society jobs to be done before the open day. As soon as they are ready I shall deliver them along with their respective cutting grits.

Recently I was given two stout cardboard tubes with an internal diameter of five inches and a length of six feet, not wishing to offend the person concerned I accepted them although secretly thinking that being made of cardboard they would be of little use. On closer inspection I discovered they were very strong, in fact I could stand on them without them collapsing so I postponed their destruction until I had looked into the possibilities further. Due to their diameter the size of the mirror would be limited to somewhere around four inches and at first glance this seems impracticable due to the very high focal length ration.

After a lot of clanking and whirring my brain came up with the idea of using each tube to make a solar reflecting telescope. All the disadvantages it seemed to have now turned in my favour. The high focal length was irrelevant as there is no shortage of light when observing the Sun, the fact that the tube was made of cardboard did not matter either as it would only be taken out of doors during daylight and could be protected anyway by a few coats of varnish or paint. Finally the mirror need only be ground and polished as a coating of aluminium is unnecessary in this case.

So the only decision left to be made was the focal length and after some deliberation I plumped for 60", this would give me an f15 telescope, anything longer would have made the figuring of the mirror too difficult.

When it came to the method of observation I decided against the projection method as I have never been too happy about it, I hasten to add this is not a criticism of the method but a criticism of my eyesight. I wondered if it would be possible to use a step wedge prism in a reflecting telescope, that is to say a prism which transmits only 50% of the light and heat of the image falling upon it, but I have seen no mention of them being used in reflectors. Until I have completed the mirror and made a few tests I will not know whether a step wedge is necessary as the mirror itself being uncoated will reflect only a percentage of the light and heat falling upon it. This in itself, coupled with the high focal ratio may cut down the intensity of the Sun's image sufficiently to permit the use of an ordinary diagonal with or without additional filters.

So there it is, initially I will build a 4" reflecting telescope with uncoated mirror and using a step wedge to transmit the image into the eyepiece.

This is purely an experiment on my part and may well turn out to be impracticable, indeed if anyone has any theories on this subject I would be glad to hear them.

David Miles.

METEOR NOTES.

Director Meteor Section, Mr. D. Barnard.

The Meteor Count on July 31st went very well, a crystal clear night and nine members attending enabled 46 meteors to be observed in just under two hours, of which 40 were sporadic and 6 were Alpha Capricornids.

The PERSEIDS METEOR count on 7th August was disasterously affected by a nearly full Moon. Eight members attended, and only 17 meteors were seen in 1½ hours. This was the sixth clear meteor count in successions.

The KAPPA CYGNIDS count will be reported in the October Journal. This month there are no major showers but there are three minor ones.

1. The Delta Piscids, normal limits Sept 5 - 11th, Max Sept 8th, Radiant $\alpha = 8$
 $\delta = +12$.

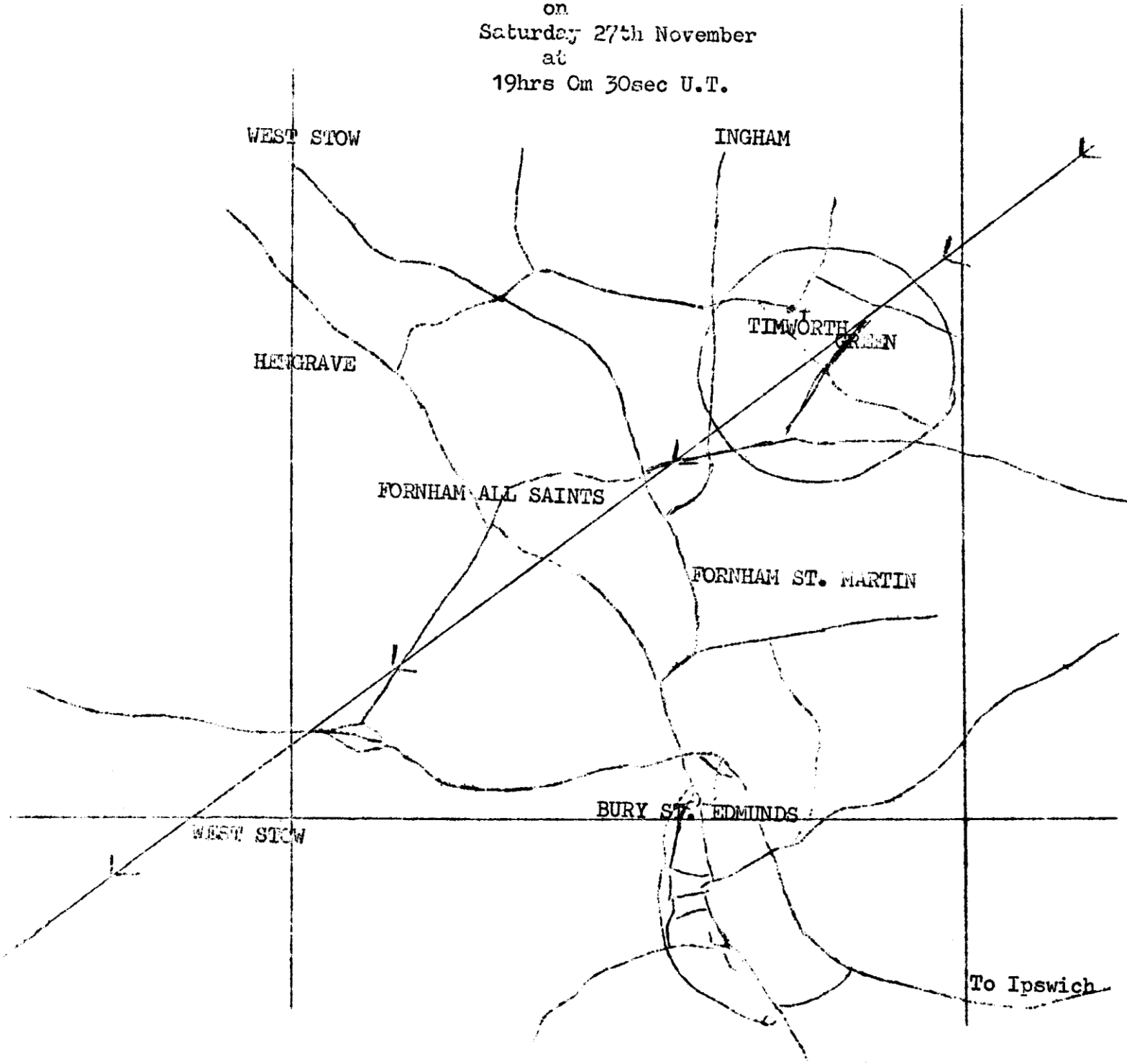
2. The Xi Piscids Max 30th Sept, Normal limits Sept 27 - Oct 3rd Radiant $\alpha = 23$
 $\delta = +2$

3. The Rho Cygnids, Max Sept 30th, Normal limits Sept 27th - Oct 2nd.
Radiant $\alpha = 325$ $\delta = +45$

These three minor meteor showers are very weak with a max of only one every 1 or 2 hrs.

METEOR COUNTS on Sept. ~~23~~ ~~24~~ 25th, ~~26th~~ SPORADIC, meet usual place at 10p.m.

site of grazing occultation of
star ZC 3199 Mag. 6.8
on
Saturday 27th November
at
19hrs Om 30sec U.T.



On Thursday 30th September we will do a dummy run on the site of the grazing occultation to observe the occultation of star ZC 2745d mag. 6.9 at 20hrs 09.0 mins U.T.

We propose meeting at Whitton Maypol public house at 7.p.m. B.S.T. which will allow us two hours to find the site and get set up. Please advise Mr. Cheesman, Ipswich if you would like to come and he will arrange transport.

If you have a small telescope or binoculars bring them along. Also a portable tape recorder, with blank tape and NEW UNUSED BATTERIES if you have one.

This dummy run will take place irrespective of weather conditions so bring a new pence along to buy some tea? or coffee? if Spode is about.

When I first inquired about the possibility of taking the 'O' level examination in Astronomy I was informed that the Cambridge University Local Examinations Syndicate only offer an 'O' level in Astronomy and Navigation, which is 75% navigation. My only other choice was to take the exam set by the London Board, which I duly took.

The assessment for this exam is based on 75% for a single Theory paper and 25% for a certain amount of practical work. This work, which I found not unduly difficult consists of three projects which have to be completed and sent in to Senate House in London by the date of the exam (which can only be taken in June). The choice is very wide, as there are 15 separate projects to choose from. However, these 15 are grouped into four sections, and not more than one project may be chosen from any one section.

The projects range in difficulty from meteor observations to spectroscopy. The following four are representative of the degree of difficulty:

- a. The planets: observations, drawing and description of Jupiter, Saturn, Venus or Mars;
- b. The Observation and recording of a variable star over a length of time sufficient to deduce the light curve;
- c. Construction of a simple refracting or reflecting telescope; measurement of it's angular magnification and field of view; testing it's quality in use;
- d. Preparation of photographs, prints or transparencies of various objects, such as Sun, Moon or planets; circumpolar stars or other constellations; Orion nebula, Pleiades.

Experienced amateurs will no doubt find the execution of such projects a simple task.

In the theoretical work there is a definite emphasis on the scientific rather than the descriptive side of astronomy, especially when it comes to astrophysics and gravitation. It is only necessary to be acquainted with elementary maths but parts of the syllabus are in fact of Advanced-level Physics! The syllabus is divided into the following eight sections:-

- A. The celestial Sphere and Time - celestial co-ordinates, GMT, sidereal time, circumpolar stars.
- B. Earth and Moon - comparison of size, surface conditions, etc. of Earth and Moon - aurorae, the Moon's orbit.
- C. Electromagnetic Radiation - optical and radio telescopes, black-body radiation, spectra, Doppler effect.
- D. Gravitation - Kepler's Laws, Newton's Law, escape velocity, binary star orbits.
- E. The Solar System - distances, orbits, appearances, size, surface conditions of Mercury, Venus, Mars, Jupiter, Saturn; comets, meteors, meteorites.
- F. The Sun - size, distance, surface conditions, sunspots, chromospheres, prominences, flares, composition, structure, energy source, evolution.
- G. The Stars - magnitude, distance, HR diagram, spectral classes, variables, red giants, white dwarfs, pulsars.
- H. Stellar Associations and Galaxies - clusters, nebulae, galaxies, the Galaxy, distribution of galaxies.

This is only a brief summary of the syllabus.

The written exam lasts $2\frac{1}{2}$ hours and consists of 10 compulsory questions (short answers) followed by eight essay questions (one on each section of the syllabus); 4 essay questions must be attempted. 35 marks out of 75 are awarded for the short answer questions; each essay question is worth 10 marks. The following questions have all appeared in the past 'O' level papers;

1. Explain with the aid of a diagram why the interval between successive transits of a star across an observer's meridian is about 23hrs 56 mins rather than 24hrs.
2. Explain how chromatic aberration is reduced in the object glasses of a telescope.
3. Explain two observations which show the Earth rotates on it's axis.
4. A star has an apparent magnitude of 6.3 and an absolute magnitude of 1.3. Calculate it's distance from the Earth.
5. How does the strength of the gravitational field at the surface of a planet depend on the two main factors which decide it.
3 or 4 marks each.
6. The Earth and the Moon are sometimes referred to as the 'double planet'. Discuss this, with particular reference to (a) the composition of each, (b) the structure of the surface and (c) atmosphere.

7. State Newton's Law of Gravitation.

Explain how the mass of a planet may be found from observations of one of its satellites. Indicate how the measurements required could be made.

8. Explain how the Sun generates energy, and how this energy is transferred to the surface and lost from it. (Details of the nuclear reaction are not required).

Outline briefly the various stages which a star like the Sun probably passes during its existence

10 marks each

I took my own examination through the school; but this does not mean that you cannot take it if you have already left school. I do not know the exact procedure, but it should be possible to take it through a College of Further Education. If you think you can handle the above questions then inquire at the Civic College. You will have to pay several fees, but it should not cost more than £10; perhaps a lot less, I really do not know.

The book which I used to find out about the parts of the syllabus I did not know about is called 'The Story of the Universe' by de Vaucouleurs, Menzel and some other bod whose name I've forgotten. Another book along similar lines is an American one called 'The Exploration of the Universe' by George Abell. Intending candidates should also practise answering questions from past 'O' level papers, which can be found in the Society's Library.

I hope this article has aroused an interest in some members; do not forget that qualifications like G.C.E.s are all important in today's society.

Chronological list of important Astronomical Discoveries & Events

- 1877 Giovanni Schiaparelli started the Martian Canals controversy. In fact he called the lines he saw "channels" but due to mistranslation into English this came to mean 'canals'!
- 1800-1900 Navigation has become a precise and important practical application of astronomy. The accurate observations of star positions show that annual parallax; due to the earth's orbital motion around the sun, confirming the Copernican idea and providing a method of measuring distances to the stars. Other small motions show that the stars are moving.
- 1850-1900 The laboratory study of light together with physical theory shows that spectrum analysis can be used to determine temperature and chemical composition of a light source.
- 1838 George Hale invented the spectroheliograph for observing the distribution of specific elements in the sun.
- 1872 George Hale initiated his idea for building a 40 inch refracting telescope.
- 1897 Hale's telescope was completed. This telescope was, and still is, the largest refracting telescope in the world. It was named after its chief financier, Charles Yerkes.
- 1903 Chamberlin and Moulton speculate that the planets were formed after another star passed close to the sun.
- 1904 Henrietta Leavitt discovered the period-luminosity Law for Cepheid variable stars. This law could be used to determine the distance of a Cepheid variable star.
- 1902-20 Einstein establishes the theory of relativity. Large refracting telescopes are built at the Mount Wilson Observatory in California.
- 1912 Vesto Slipher was the first to discover that the galaxy in Andromeda was approaching earth, whereas others were receding.
- 1914 Henry Russell published his discovery between a star's colour and luminosity. He had arrived at the same conclusion as Hertzsprung, but independently. The resulting Hertzsprung-Russell diagram has great significance in understanding stellar evolution.
- 1915-1920 Albert Einstein developed his general theory of relativity. Harlow Shapley by studying globular star clusters calculated their distance by discovering Cepheid variable stars in them. Shapley went on to work out the dimensions of our Galaxy. As Copernicus had placed the sun at the centre, instead of the earth, Shapley discovered that earth was a long way from the centre of the Galaxy. Since William Herschel's time it was thought that the earth was the galactic centre.
- 1930 Pluto discovered.
- 1910-40 Slipher and Hubble find that other galaxies are moving away from ours. De Sitter, Eddington, Lemaître and others explain this recession by application of relativity theory.
- 1930-60 Bethe, Gamow, and others in the U.S. apply the results of nuclear physics to explaining the source of stellar energy. This is followed by the work of many astrophysicists on evolution of the stars from large interstellar gas clouds. Von Weizsacker, Kuiper, Urey, and others develop a theory of the origin of the solar system from a large gas cloud.
- 1931 Karl Jansky discovered radio waves coming from various parts of the Galaxy.

Programme for September.

at

Orwell Park Observatory
NACTON.

MONDAY 27th September, from 7.30p.m.

Visit to observatory by Greyfriars Circle Club
arranged by Mr. R.M. Cheesman.

TUESDAY 28th September from 7p.m.

Visit to observatory by 9th Ipswich Cub pack
arranged by Mr. R.M. Cheesman.

WEDNESDAYS From 7p.m. Solar Lunar & Planetary Section.

Director Mr. R.M. Cheesman, [REDACTED], Ipswich.

8th September

15th "

22nd "

THURSDAYS. from 8p.m. Double Stars Section.

Director Mr. D. Bearcroft, [REDACTED], Ipswich, Tel. [REDACTED]

9th September

23rd "

THURSDAY 30th September.

Dummy run of grazing occultation from Timworth Green, Bury St. Edmunds.
Meet OUTSIDE WHITTON MAYPOLE PUB. at 7p.m.

FRIDAY and SATURDAY 3rd & 4th September from 8p.m.

Caravan Club Rally at Orwell Park. Members of the Caravan Club will
visit us at the Observatory on these two nights. Help from members of our
Society needed to help on these two nights please.

arranged by Mr. R.M. Cheesman.

FRIDAY 17th September from 7p.m. Help needed at Observatory to get it ready
for the Open Day.

SATURDAY 18th SEPTEMBER from 2p.m. until approx 11p.m. OPEN DAY

see poster in Journal.

as many members as possible please to help out on this day.

SATURDAY 25th September. Meteor Section.

Director Mr. D. Barnard, [REDACTED], Ipswich, Tel. [REDACTED]

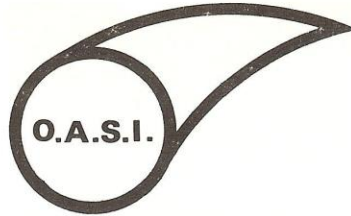
SPORADIC METEOR COUNT. Meet OUTSIDE the Golf Hotel, Foxhall Road, Ipswich
at 10p.m. irrespective of weather conditions.

SUNDAY MORNINGS from 10a.m. until noon.

5th and 12th September, getting the Observatory ready for the Open Day.

FRIDAY 24th September,

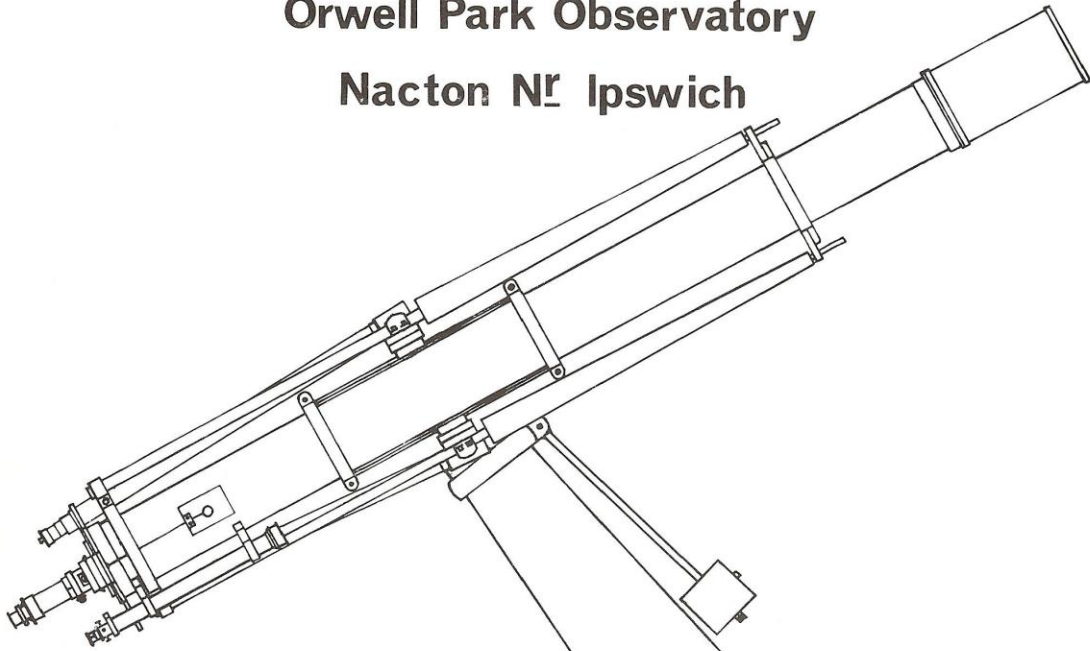
Visit to observatory by Stowmarket Rangers from 7.30p.m.
arranged by Mr. R.M. Cheesman.



Orwell Astronomical Society (Ipswich)

Orwell Park Observatory

Nacton Nr Ipswich



GIANT TELESCOPE OPEN DAY

On

Saturday 18th September 1976 from 2p.m.



**Illustrated talks during the
afternoon and evening**

REFRESHMENTS

Open during the evening for viewing the
heavens through the 10" O.G. telescope

(Weather Permitting)

**Admission Adults 15p
Children 5p**

Secretary: Mr. M. Stow,
13 Ladywood Road,
Ipswich.