Journal of the

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

March 1976.

Editor: Mr. J. Deans,
[redacted],
Capel St. Mary,
Ipswich.
'Phone GT. WENHAM [redacted]

Assitant Editor: Mr. M. Howe,
[redacted],
BURY ST. EDMUNDS,
Suffolk.
'Phone Bury St. Edmunds [redacted]

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

SOLAR SECTION:

The Sun moves into the constellation of Aquarius/Pisces this month traversing the equinoctial colure or first point of Aries on March 20th at 11hrs 50m U.T. Sunrise at the start of the month will be around 06hrs 40m U.T. and sunset at 17hrs 40ms. U.T.

Synodic Rotation No 1638 commenced Feb 8.63
" " No 1639 commences Mar 6.96

Heliographic CO-ordinates as at noon U.T.

	P.o	Bo	Lo		P	Bo	Lo
March 3rd	-22.1°	-7.2°	52.2°	March 18th	-25.0°	-7.1°	214.5°
" 8th	-23.2°	-7.3°	346.3°	" 23rd	-25.6°	-6.9°	148.6°
" 13th	-24.2°	-7.2°	280.4°	" 28th	-26.0°	-6.7°	82.7°

MERCURY will not be visible this month owing to it's close proximity to the Sun.

VENUS is still a morning object very low in altitude rising about 06hrs U.T. at the start of the month.

MARS is very prominent in the constellation of Taurus moving into Gemini at the latter part of the month, magnitude +0.8. The Moon will be near Mars on the 9th.

EARTH as previously mentioned the Vernal Equinox occurs on the 20th at 11hrs 50mU.T.

JUPITER is still in Pices visible in the western sky. It will be setting around 20hrs 30m U.T. towards the end on the month, magnitude -1.6. The Moon will be near Jupiter on the 4th.

SATURN is retrograding in Gemini reaching its stationary point of orbit on the 27th at 18hrs U.T., thereafter assuming a direct motion. The Moon will be near Saturn on the night of the 11th - 12th.

COMET WEST 1975n. reached perihelion towards the latter part of February, all predictions indicate that the comet could be favourable for observation. If calculations prove corredt, the comet could be visible in daylight with limited optical aid. The comet should first become accessible in a reasonably dark sky about March 3rd and might be brighter than Jupiter.

The following Geocentric Co-ordinates may be used in locating the Comet.

March 3rd	R.A. 22hrs 04.1m	Dec. +4°09'	Mag-2.5	Mag+0.1 *	
" 5th	" 21hrs 51.2m	" +5°51'	" -1.5	" +0.8	
" 7th	" 21hrs 40.8m	" +7°08'	" -0.6	" +1.5	
" 9th	" 21hrs 32.3m	" +8°08'	" +0.2	" +2.1	
" 11th	" 21hrs 25.3m	" +8°57'	" +o.9	" +2.6	
" 13th	" 21hrs 19.5m	" +9°37'	" +1.5	" +3.1	
" 15th	" 21hrs 14 6m	" +10°12'	" +2.1	+3.5	

* The magnitudes were computed from two different formulae.

Acknowledgement to THE ASTRONOMER for the information

LUNAR SECTION. Moon Phases for Lunation 658

New Moon	Feb 29th	23hrs 25m U.T.
First Quarter	Mar 9th	04hrs 38m U.T.
Full Moon	Mar 16th	02hrs 53m U.T.
Last Quarter	Mar 22nd	18hrs 54m U.T.

Perigee March 16th 19hrs U.T. Apogee March 31st 10hrs U.T.

OCCULTATIONS.

March 3rd	ZC 103	Mag 6.1	19hrs 09m U.T.	
" 3rd	ZC 105	" 4.6	19hrs 26m U.T.	
" 8th	ZC 736	" 6.2	20hrs 29m U.T.	
" 10th	1040d	" 6.2	22hrs 26m U.T.	
" 17th	1815	" 4.8	05hrs 01m U.T.	

Watch out for T.L.Ps.

The latter part of February and early March of 1975 saw floods of T.L.P. reports streaming in from up and down the country. Some of our members, Charles Radley, Tom Cardot and David Barnard actually saw what they believed to be s suspect T.L.P. in the region of Aristarchus. Charles Radley shortly after the incident put forward what I believe to be a very constructive hypotheses which might account for the T.L.P. activity.

It so happened that Full Moon and Perigee occurred on the same date and within hours of each other a situation giving rise to the combined gravitational influences of the Sun and Earth upon the Moon.

It is worth noting that Perigee and Full Moon occur again within hours of one another on March 16th so it would be worthwhile keeping a wartchful eye on the Moon around this time just in case of any suspect T.L.P. activity.

LECTURE ON THE SUN.

On March 12th at 8p.m. at the Friends Meeting House, Fonnereau Road, Ipswich we have Mr. P. Gill coming from London to give us a talk on the Sun. Please make a note of this date in your diary and come along with your friends.

TEACH IN - JUPITER.

On March 20th starting at 7.30p.m. in the Assembly Rooms, Norwich, the Norwich Astronomical Society is holding a meeting and they hope to show the latest N.A.S.A. slides of Jupiter.

If you are interested in going to this meeting please contact Mr. R.M. Cheesman, 3 Tasmania Road, Ipswich who is arranging cars to go. The admission to the meeting is free so apart from buying the driver of the car a cup of coffee? on the way home it will not only be a cheap night out but also a very educational evening.

ANNUAL SUBSCRIPTIONS.

Just a reminder to those members who have not paid their subs this year that all subs became due on 1st January, 1976 and are at the following rates.

Junior Membership (and those still in full time education)	£1.00
Full Membership (over 18 years of age)	£1.75
Family Membership	£2.50

Cheques/postal orders should be made out to 'Orwell Astronomical Society (Ipswich) and sent to:

Mrs. R. Markham,
Hon. Treasurer,
[redacted],
IPSWICH
IP3 8HB

METEOR SECTION by Mr. D. Barnard, Director.

There are no Main Meteor Shower streams this month but we will be holding a Sporadic Meteor Count on Foxhall Heath on Saturday 27th March.

Please meet at the entrance to Foxhall Stadium at 9p.m. irrespective of weather conditions

PHOTOGRAPHY AND ITS APPLICATIONS IN ASTRONOMY (part 1)

By Mark Howe, assistant editor O.A.S.I.

To the astronomer the most important part of his equipment apart from his telescope is his camera. The camera has many advantages over the human eye, viz:

1. It produces a permanent image which can be recorded and stored for perusal at leisure.
2. The pictures it 'draws' are accurate and not subject to human error.
3. It does not tire and therefore can sustain prolonged observing sessions.
4. Light entering the camera has a cumulative effect (i.e. the longer a photographic plate is exposed to light the brighter is the image recorded thereon).
5. A sole observer can use it to make many observations at the same time.

At first it may seem that I have erred in pointing out (3) as an advantage because, after all, it is not as if a camera sits up all night recording observations in a note-book. But this, in effect, is what happens when a camera is used for meteor photography. Even over a short observing period of, say half a hour, an observer might, perhaps without knowing it, become weary and close his eyes (I second is enough to miss a meteor), whereas the camera will faithfully record everything that passes in front of its lens.

(5) could be more useful when the observer is concentrating on a transient phenomenon and wishes to record a static one at the same time (for instance, at a total solar eclipse astronomers set up a camera to begin its exposure just after second contact, leave the camera lens open during totality and promptly forget about it while they make observations of more important phenomena connected with the eclipse).

On the other hand, the camera has the disadvantage that it is not selective (i,e. it records everything passing infront of the lens.) Thus, when the sky begins to cloud over, a human observer will finish observations rather than try to make them through the clouds; but a camera goes on to record the clouds as well, thus wasting the exposure that has already been made.

Having weighed up the pros and cons, what is a camera? Basically, its a light-tight box with a lens at one end and a light sensitive material at the other (add some form of shutter and you have the basis of every home-made camera). Light passes into the box through the lens and is brought to a focus by it. The light fallingon the plate precipitates a chemical reaction involving the light-sensitive halide silver cloride. A diaphragmcontrols the amount of light entering the camera, and a shutter controls the length of time for which it enters.

When changing subject from a distant one to one nearby, the distance between lens and plate has to be increased, and vice-versa. When changing from a brightly-lit subject to a dimly-lit one, the amount of light reaching the film has to be kept constant for correct exposure, so we either increase the aperture (open up the diaphragm) or decrease the shutter speed (keep the film exposed for a longer time). In photography, apertures are seemingly incongruous sequence f2, f2.8, f4, f5,6 f8 f11, f16, f22; f2 is the largest aperture); shutter speeds are in frations of a second (for everyday use at least).

Each aperture in the sequence is twice as large as the next one, and the shutter speeds vary in the same way (the science of optics is such that brightness of image in photography is decided by the f-ratio <u>not</u> the lens diameter; therefore an aperture of f2 in one camera gives the same amount of light as one of f2 in any other, no matter what the diameter of the lens is). Thus an exposure of 1/125 sec. at f5.6 will give basically the same results as 1/125 sec at f4. In everyday practice the speed used is usually faster than 1/125 sec. because this means you are less likely to blur the image should you accidentally jog the camera. However, in astronomy, the available light is usually so low that it is desirable to use as large an aperature as possible; even so, exposure times are still, by necessity, much longer than in normal use. So you will realise the need for using great care when taking an astronomical photograph, otherwise you will marr the result.

My next article will deal in greater detail with the specific applications of photography in astronomy.

THE CONTRIBUTION OF THE AMATEUR TO ASTRONOMICAL RESEARCH.

by Charles [illegible]dley.

In my last article I made some comments on the role of the amateur astronomer in science and society. I would now like to expand on that theme by writing a few articles about particular aspects of amateur astronomy. I have previously mentioned comet sweeping, and if you would like to know more about comet sweeping or any other aspect of amateur astronomical research methods I refer the reader to a leaflet published by the B.A.A. entitled "British Astronomical Association, Nature, Aims and Methods." The cover is printed dark blue or white and I believe there is a copy in the O.A.S.I. library. I have a copy and a few other O.A.S.I. members have copies.

This part of the article will concentrate on:

THE SUN.

There is more to solar work than just counting sunspots, although that on its own is a useful occupation. As well as straight solar astronomy, optical (and radio) observations of aurorae compliment standard optical solar observation, and radio observations of the Sun are very interesting when compared with simultaneous optical observation. Radio observation can often predict optical solar events by a day or so.

Why we observe the Sun.

The Sun is unique in astronomy, being the only star in the universe really well situated for Earth based astronomers (amateur and professional) to obtain a good deal of meaningful data at all wavelengths, and is therefore one of the most studied of all objects in the sky. Solar astronomy and astrophysics, in fact, are huge fields. The more we understand about the Sun the more we will be able to understand about all other stars in the universe which are too distant, in general, to present observable disks.

The Optical Appearance of the Sun.

The visible Sun is divided basically into three spheres. The Corona (only visible at total eclipses), the chromosphere (needs fairly sophisticated equipment to be observed) and the photosphere. The latter is simply "that yellow ball we see almost every day in the sky" as Roy would say. The amateur is mostly interested in the photosphere, Several interesting features are visible on the photosphere. The first thing one notices on an image projected onto a white card (the only safe meathod of solar observation, barring photography) are the little black dots called sunspots. With an image projected with the ten inch quite a lot of detailed structure is visible in the sunspots. Their appearance is basically as shown in figure 1.

Sunspots.

Any telescope can be used to observe sunspots. If the number visible on the disk is counted each day some interesting frequency graphs can be plotted. John Deans organised a sunspot project last summer but the support for it was disappointing. I hope that his summer there will be more interest. It is easy, an 'it's fun, so why not do it? It is interesting to watch the movement of the spots across the solar disk. It takes a fortnight for them to emerge round one limb and disappear around the other side. A fortnight later they may re-emerge, and it is interesting to compare your recorded observations and note how they change in appearance. I won't dwell on sunppots here, but if you want to know more look up some back numbers of the O.A.S.I. Journals and borrow some books from the O.A.S.I. or other libraries. Look up: The Wilson Effect, Faculae, photosphere, granulation, solar absorbtion spectrum, the Zeeman Effect and the 11 year cycle, in the indexes of the books you obtain.

Solar Flares and Prominences.

This is probably the most interesting aspect of solar astronomy. It is the Sun's answer to the Moon's T.L.P.s.

A special instrument called a spectrohelioscope is needed to observe these. If a few people express interest I am sure the committee will see to the construction or purchase of one to put in the observatory. It is basically a spectroscope which can be used with filters and with which an observer can observe flares, prominences and the photosphere is one colour (one wavelength or monocromatic light) usually Lymman Hydrogen, Alpha Red, often abbreiviated to H-alpha, or the H-alpha line.

Flares; Quiescent and Eruptive Prominences.

These three phenomena are exciting to watch.

1. FLARES, are small and short lived (a matter of minutes, usually from seconds to about an hour) but very bright. They occur over sunspots and stay close to the photosphere. Flares emit much radio noise and causes the aurorae, not often seen from Ipswich. I would dearly love to have a spectohelioscope to observe them, I love watching celestial objects change before my very eyes.

2. Quiescent Prominences. This is not a very good name. They are huge arches of gas which fly up off the Sun and can last for months, best seen with a prominence telescope or spectrohelioscope.

3. ERUPTIVE PROMINENCES are similar to flares in some ways. They too are short lived. However they do not stay close to the photosphere moving horizontally (which is a charateristic of solar flares) but shoot up vertically and disappear into deep space.

Solar flares can be seen anywhere on the photosphere, but prominences are usually only seen on the solar limb or edge

The Value of a Spectrohelioscope.

The value has been outlined previously. With a spectrohelioscope some marvellous photographs and observations could be obtained, We could impress daytime visitors such as on the Open Days. We could also amuse ourselves on these Sunday mornings up the dome when we do repairs. It could be built as a seperate instrument or an attachment onto the existing 10" reducing the aperture (to say 4") by putting a cardboard stop with a hole over the big end.

In Conclusion.

1. If you see a word in the above article which you do not understand - get a book and look it up in the index.

2. Never look at the Sun through a telescope or binoculars, project the image onto a white card. I was up the dome one Sunday morning with Roy and a few other people and was lining the the 10" up on the Sun when I smelled smoke and felt a stabbing pain in my left shoulder. I nearly fell off the chair. The Sun's image from the 10" was focused on my shoulder. It burnt a hole right through my shirt, I'm glad it was not by eyeball.

3. I hope you found this article has converted you to solar astronomy, and shown you that it can be more interesting than just sunspotting.

***ON FRIDAY 12th MARCH at the Friends Meeting House at 8p.m. we have Mr. P. Gill, F.R.A.S. coming to give us a talk on Solar Observing so make a point to be there.

Fig 1.
A sunspot

Fig 2,
Solar Features.

1. Dark Sky
2. Very bright region
3. Bright Region = photosphere

ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

Programme for March, 1976.

MONDAYS from 7p.m. General Observations Section
Directors Mr. N. Gage, [redacted], Felixstowe, 'Phone Felixstowe [redacted]
and Mr. S. Flory, [redacted], Ipswich, 'Phone Ipswich [redacted]

1st March
8th "
14th "
21st "
29th "

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

3rd March
10th "
17th "
24th "

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

11th March
25th "

FRIDAYS from 8.30p.m. Lunar & Planetary Section
Directors Mr. J. Deans, [redacted], Capel St. Mary 'Phone GT. WENHAM [redacted]
and Mr. K. Dye, [redacted], Ipswich, 'Phone Ipswich [redacted]

26th March

FRIDAYS from 7.30p.m. Nebula and Faint Objects Section.
Directors. Mr. M. Stow, [redacted], Ipswich
and Mr. R. Hazelwood, [redacted] Ipswich, 'Phone [redacted]

5th March
19th "

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FRIDAY 12th March at 8p.m.
Lecture at The Friends Meeting House,
Fonnereau Road,
Ipswich

by Mr. P. Gill on 'THE SUN'

Admission Free.

SATURDAY 20th March at 7.30p.m.
The Norwich Astronomical Society are holding a meeting called
'TELCH IN - JUPITER'
at the Assembly Rooms, Norwich. It is hoped that the latest N.A.S.A. slids of Jupiter will be shown at the meeting.

Any member wishing to go to this meeting should contact Mr. R.M. Cheesman, [redacted], IPSWICH who is organising transport.

SATURDAY 27th March at 9p.m. METEOR SECTION.
Director Mr. D. Barnard, [redacted], Ipswich 'Phone [redacted]

We will be holding a Sporadic Meteor Count on Foxhall Heath on Sat. 27th Meet at entrance to Foxhall Stadium at 9p.m. sharp irrespective of weather conditions

Johannes Kepler (cont.)

In 1600 Kepler was forced to leave Gratz due to Catholic persecution. He went to Prague with his family. The previous year saw the arrival of Tycho Brahe in Prague, having been forced out of Denmark through differences of opinion with the Danish Court and Noblemen. Tycho Brahe was accompanied by his chief assistant Longomontanus. During the last year of Brahe's life (1601) Kepler became assistant to him. After Brahe's death, Kepler started to work out the orbit of Mars. This problem had completely baffled Longomontanus.

Kepler started a new train of thought on the way people viewed the heavens. Previously people had asked, "What does it mean?" Kepler asked, "What is it and what causes it?" This was the start of modern astronomical approach.

It took Kepler about five years to reach any conclusion as to the nature of Mars' orbit. The accuracy of Brahe's observations here proved invaluable to Kepler. After his work on Mars was complete Kepler discovered three laws governing planetary motion:-

1. The planets orbit the sun in elliptical orbits, with the sun being at one of the focal points.

   This discovery ousted the belief that the planets' orbits were circular. This was initiated by the Greeks, who knowing that the circle was the perfect shape, believed that the planets must have a circular orbit.

   Kepler now knew that the planets' orbits were elliptically shaped and that their speed around the orbits was not regular. He was still looking for a motion that would give some form of constant relationship. When found this became law 2.

2. The radius vector of any planet to the sun will produce an equal area in an equal time interval.

3. The ratio of the square of the time taken for a planet to orbit the sun, to the cube of the planet's average distance from the sun, is the same for all planets.

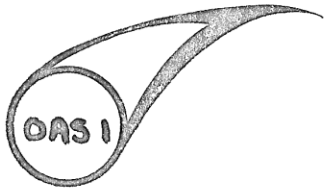
Galileo Galilei

Galileo was born in Italy in 1564. He studied mathematics at University and became a Professor at Pisa University at the age of 25 years. His experimental mathematical basis to problems made him one of the founders of modern scientific approach.

At the beginning of the seventeenth century, a spectacle- maker Hans Lippershey of Middleburg, found that when two lenses were held up in line, distant objects were brought nearer. This was discovered more or less by accident. The news of this discovery soon passed across Europe. When Galileo heard about it, he proceeded to make a small telescope for himself. He was possibly the first person to view the sky with a telescope. Even though his instrument was not powerful, Galileo made many discoveries which produced more evidence in support of a heliocentric solar system.

Galileo discovered the four largest moons of Jupiter, the craters on the moon, the phases of Mercury and Venus, Sunspots, and finally that the Milky Way was made up of individual stars. None of these things could be seen with the naked eye.

These new discoveries were not liked by all sections of the community at the time, especially the Church. For his views, Galileo was imprisoned and forced to disrepute his discoveries which eventually paved the way for a much greater use of telescopes in all subsequent years.



ORWELL ASTRONOMICAL SOCIETY (IPSWICH)

PRESENTS A TALK ON

THE SUN

BY

MR. PETER GILL

ON

FRIDAY, 12TH MARCH 1976

AT 8 P.M.

AT THE

FRIENDS MEETING HOUSE

FONNEREAU ROAD

IPSWICH

ADMISSION FREE

REFRESHMENTS

SECRETARY:-

MR M.W. STOW

13 LADYWOOD ROAD

IPSWICH.