



# Nebula

Newsletter of the Leeds Astronomical Society

February 2003

Volume 31 Number 1

## EUROPEAN ASTRO AMATEURS Fight to Safeguard the Night Sky

Leeds Astronomical Society's New Year started on an international note with the receipt of this message from fellow enthusiasts in Italy:

*"Dear Sir/ Madam*

*Please find attached an invitation to support the 'Appeal to the European Council' for the safeguard of the night sky to fight light pollution.*

*Your Association is strongly invited to sign the attached appeal form that should be returned to our postal address within February 15th, 2003. All participant Associations will be kept informed about the discussion with the European Parliament's officials on this specific theme.*

*Kind regards*

*Raffaello Braga  
Union of the Italian  
Amateur Astronomers"*

*The full text of the appeal is given on page 4 of this issue of Nebula*

## Recording Meteors with Low-Light Video Cameras

*Alex Pratt's article appeared in the December 2002 issue of the BAA Journal:*

I have been an active meteor observer for many years and have had some success in photographing them with 35mm and medium format cameras. The major annual meteor showers can produce significant numbers of naked-eye meteors and some of these can be captured on videotape by using relatively simple equipment. I was most impressed with Andrew Elliott's results using low-light video cameras and image intensifiers,

so in 1996 I decided to purchase a video camera for meteor videography.

### Video cameras

I bought an AstroVid 505E monochrome video camera with a C-mount 12mm f/1.2 lens. This combination is rated at 0.01 lux. Its 1/2-inch format chip (6.4mm x 4.8mm) gives a field of view some 29 degrees by 22 degrees and a stellar limiting magnitude of 4m on the TV monitor. The AstroVid's electronic shutter operates at speeds from 1/25th second to 1/10,000th second and

this can be adjusted manually. I set it to 1/25th second for meteor work. The AstroVid camera records meteors down to 3<sup>rd</sup> magnitude. The silica window of the camera's chip is kept relatively dust free by the use of a blower brush and the occasional delicate application of an isopropanol wipe.

Since 1999 I have also used a Hi8 Sony TR3200E camcorder, which was very successful in recording the 1999 Leonids meteor storm as seen from Cyprus. (*J.Brit.Astron.Assoc.*, **110**(5),232 (2000)) The camcorder is rated at 0.1 lux when operated at f/1.6 and 1/3rd second shutter speed, which records 6<sup>th</sup> magnitude stars at 20x optical zoom. For meteor work the camcorder's electronic shutter is set to 1/3rd second, the lens to f/1.6, the zoom setting to give a 'normal' field of view and the gain is adjusted to as high a setting as possible without introducing excessive electronic 'noise'. (Be wary of 'zero lux' camcorders.

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**Geminid meteor passing  
Orion: Dec 1007**

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## ROBERT HOOKE: A New Appreciation

### Report on Allan Chapman's Leeds Astromet 2002 lecture

Born 1635 in Freshwater, Isle of Wight, and passing away 3rd March 1703 Robert Hooke is the subject of a book under preparation by the speaker, Dr. Alan Chapman of Wadham College, Oxford University. Portraits do not exist so the speaker drew on personal descriptions made by his contemporaries who described him as a thin boned figure whose diet was small in food and drink. He may have suffered from diabetes.

With encouragement from his father Hooke took up painting and apprenticed under one of the greatest of the age, Peter Lely. At the age of about 13 years he attended Westminster School and then Oxford University where scientists like Robert Boyle were active. Effectively under the employ of Boyle at Oxford, he supported the experiments on gas pressure and both designed and created the air pump.

He became Gresham Professor of Geometry from 1665 for over 30 years, this is the same office as the previous speaker Prof. Colin Pillinger. Another role was Secretary of the Royal Society from 1677 to 1682, also its Curator of Instruments. The speaker said that like Prof. Pillinger Robert Hooke was interested in life on other worlds and had even conceived of a 20 inch glass objective and focal length 10,000 feet in order to see animals on the surface of other planets!

Gresham College, the forerunner of London University, formed by Sir Thomas Gresham, was where Hooke professed both Mathematics and Mechanics. Unlike both Cambridge and Oxford Universities there was a common atmosphere of endeavour, learning, public lectures and employment of scientific and technological pursuits which lead him to

publish numerous discoveries and revive theories from ancient and medieval times in particular those about light and planetary motions. Designing instrumentation and experiments his original work on springs, material elasticity and strain was the basis of important research into clock manufacture, thus navigation and structural mechanics. Hooke's Law states that a downward pull is balanced by the upwards tension of the spring. The advantage of the spring is that it could be used to produce periodic motions without a weight hanging vertically. This led to the production of spirally wound hairsprings for watches, the motion of which does not depend on gravity, and subsequently pendulum clocks became a secondary method for the measurement of time. An insufficient understanding of metal expansion caused too many errors and only Harrison's clocks half a century later provided the answer to accurate time and navigation at sea. The equatorial mounting had been designed earlier but Hooke made a clockwork motion which allowed it to follow celestial objects.

Hooke was capable of grinding and figuring glass into lenses and produced a 3.5inch 36-foot focal length refractor. Original optical theories were created by studying and counting stellar images in a particular field of view and by assessing light gathering power and resolution, the perception of fine detail. Further astronomical enquiries lead him to correspond closely with John Flamsteed the first Astronomer Royal and the Dutch astronomer Huyghens. Jupiter was observed in 1664 and possibly he was one of the first to see a shadow transit of a Galilean satellite, the Jovian period of rotation was also determined.

Hooke's attempt to find parallax

#### Leeds Astronomical Society *First Founded 1859*

Affiliated to British Astronomical Association  
Affiliated to the Federation of Astronomical Societies

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David Sellers

in nearby stars was cleverly done but the results were not convincing. Through lunar observations and practical experiments the origin and underlying "terra" of the Moon and its formations were fascinating this remarkable man. By modelling craters with simple analogies like blowing through a straw buried under a layer of cornflower and observing the umbrella precipitation of ejecta the nature of lunar features was refined. Another experiment involved dropping from a height half-inch diameter metal pistol balls into a non resilient surface. Observing the great comet of 1664, the greatest of its day since 1618, Hooke analysed its tail features and in the bright so called nucleus or central condensation of its head. He asked why a comet brightens in relation to the varying distance from the Sun and brought about a concept similar to the well known solar wind - describing it as a sort of dissolving agent in space which became "thicker" nearer the Sun. Hooke's occultation observation of a cometary "nucleus" by a nearby weathercock, as seen from Gresham College, was ingenious but simple. By counting pendulum seconds of its disappearance, then the next day from an accurate survey of the weathercock's diameter and distance he extended the triangle to find a 30" arc diameter for the nucleus, or central condensation. His work was published in a book titled "Cometa".

Hooke was fascinated by the composition of the World and Universe and how it was seen and experienced in terms of its light and motions. Work on developing high quality microscopes was also original and in "Micrographia" (1665) highlighted aspects of small creatures, tiny structures in the natural world and it contained a section about the theory of Light. One of the earliest serious students of geology he identified animal fossils and crystals with

the microscopes he built and devised plausible reasons of their creation, this was 250 years before Darwin's realisation of evolution in the animal kingdom. The fascination with studies of light was deep rooted, probably from philosophical or religious backgrounds. Associating light with a form of vibration it was the interaction of the Earth's atmosphere with white light which led Hooke to infer that red and blue light were due to the angle these came into the eye through the air. By taking a barometer up high buildings like the Monument to find the change in atmospheric pressure he inferred a relationship of air density in differing layers and perceived colours. Observations suggested that light would bend more or less as height in the atmosphere changed. Thus as a setting Sun was seen to be generally redder he reckoned that low level air bent more in comparison to a higher Sun when the air colour was bluer. Hooke called this effect Inflexion. An early interest in painting and appreciation of colours and the mixing of light was fuelling a scientific quest. By experimentation with light falling on to and through a still flask of water in order to assess the make up of sunlight's basic colours it probably stimulated Newton's later work and results (1672)

The internal matter of things - Gravitas - was another of Hooke's life long interests. Taking on the work of ancient thinkers - why do objects accelerate under gravity and appear to get heavier the higher they are dropped. In 1662 using the free height of Westminster Abbey he tried to find if Mass and Weight are location dependent but Hooke was very critical of experimental errors and the findings were inconclusive. One of his investigations was about the Earth's motion and interaction with the Sun, Earth and Moon which he attempted to prove by experimentation and application of Ke-

pler's laws. In 1664 Hooke's interest turned to the Earth's motion and how to prove it was rotating. In the Hall at Gresham College, which was 27ft tall, he took a plumb line and marked where it just touched the floor surface. Then, from the exact point of suspension, he dropped a heavy small weight and noticed that it contacted the floor about 1/10 inch to the west of that marker. The Earth had moved that distance in the time taken for the object to drop. Considering the forces as attractive like that of falling bodies he realised that allied forces decrease with increasing distance from body to body. Hooke published three vital 'Suppositions' with his book "Attempts to Prove the Motion of the Earth", these were in essence the precursor of Newton's work published in *Principia* thirteen years later.

Alan Chapman described how Hooke and Newton exchanged letters containing their ideas and workings about motion and gravity in January of 1680. One problem which interested both was what would happen to a body if it fell from an infinite height - would it eventually fall to the Earth's centre and what path would it take. Depending on the latitude the object was released from it would follow either elliptical or eccentric orbits, this work was published in conjunction with his Earth motions in January of 1680.

One of the great Men of Science the speaker had told of pioneering instrumentation, observation, experimentation and analysis - the ethos of Hooke's scientific work. Other noted fields were briefly mentioned; Meteorology, Microscopic Biology, Architecture, Palaeontology and Physiology but Dr. Chapman admitted he did not have the time to go into detail. In Architecture, for example, Hooke had assisted Sir Christopher Wren in rebuilding

## Leeds Astronomical Society Account 2002 Between 01/01/2002 and 31/12/2002

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>Credits</b>													
Astromeet											1051.93		1051.93
Collection Tin	34.90	33.91	38.50	41.64	40.86	40.90	42.37	32.26	38.38	35.25	42.18	13.50	434.65
Lottery	5000.00		13.00	6.00	9.50	4.50	5.00	16.50	9.00	16.00	16.50	7.50	5103.50
Miscellaneous											45.00		45.00
Subscriptions	365.00	140.00	50.00							5.00			560.00
<b>Total Income</b>	<b>5399.90</b>	<b>173.91</b>	<b>101.50</b>	<b>47.64</b>	<b>50.36</b>	<b>45.40</b>	<b>47.37</b>	<b>48.76</b>	<b>47.38</b>	<b>56.25</b>	<b>1155.61</b>	<b>21.00</b>	<b>7195.08</b>
<b>Expenses</b>													
Astromeet	30.00							7.03			370.90	75.00	482.93
Lottery	5549.35												5549.35
Misc.	27.19				39.79	15.00					35.80		117.78
Nebula		29.72				28.15				24.03			81.90
Room Location		300.00		80.00		150.00				150.00			680.00
Speaker			110.00	35.00	55.00	75.00	3.00		15.00	10.00			303.00
Station. + Stamps	2.29	4.56		23.50									30.35
Subscriptions		12.00				34.00			35.00				81.00
<b>Total Expenses</b>	<b>5608.83</b>	<b>346.28</b>	<b>110.00</b>	<b>138.50</b>	<b>94.79</b>	<b>302.15</b>	<b>3.00</b>	<b>7.03</b>	<b>50.00</b>	<b>184.03</b>	<b>406.70</b>	<b>75.00</b>	<b>7326.31</b>
<b>Income less Expenses</b>	<b>-208.93</b>	<b>-172.37</b>	<b>-8.50</b>	<b>-90.86</b>	<b>-44.43</b>	<b>-256.75</b>	<b>44.37</b>	<b>41.73</b>	<b>-2.62</b>	<b>-127.78</b>	<b>748.91</b>	<b>-54.00</b>	<b>-131.23</b>

parts of London after the Great Fire, and was credited with the building of the elegant looking Bethlehem (Bedlam) Hospital, he was a very rich man by virtue of this work. Dr. Alan Chapman also added that his subject's "image" was due in part to the feuding with his famous colleague Sir Isaac Newton. The two had clashed about Light, the dynamical motions of orbits and it was probably Newton whose influence hindered the modern appreciation of Robert Hooke.

*Melvyn Taylor*

**Editor's Note:** An excellent account of the talk by Prof F Richard Stephenson at Astromeet 2002 has also been received, but - due to space limitations - will be reserved for a future edition of Nebula.

Prof. Stephenson concentrated on two aspects of his work:

—Historical eclipses and the determination of Earth's rotation;

—Historical supernovae.

*Continued from Page 1*

### APPEAL TO THE EUROPEAN COUNCIL

Considering that the phenomenon of light pollution is by now a worldwide problem, and that it is particularly worrying within the European continent

Considering the positive initiatives that have been promoted in Italy and other countries of the European Community aimed at the establishing specific rules that would limit this severe alteration of the night sky

Considering that an earnest fight to the useless dispersion of light towards the sky would also elicit, as a consequence, undoubted advantages to the reduction of energetic waste - by the way also solicited by the Kyoto's Protocol to contain the greenhouse effect

Considering that UNESCO has already established a Declaration for the Rights of Future Generations where it is specifically stated

the right to the preservation of the sky in its intrinsic purity

Considering that specific requests in this sense have been transmitted to all world governments during the Conventions in Venice (May 2002) and Lucerne (September 2002)

#### **We appeal to the European Council:-**

To vote a specific proposal so that the night sky will be declared and considered as environmental heritage which need to be preserved by distinct legal rules.

This project will allow present and future generations to keep studying, understanding and admiring the starry sky and all its related phenomena. By doing so, we will significantly reduce the energetic waste and thereby obtain a decrease in the shrinkage of our planet's natural resources and an improvement in the atmosphere conservation.

*Name and signature of  
the President*

## 'LAS PUBLICATIONS'? New Opportunities Ahead

Only a few years ago, it would have been out of the question for an amateur astronomical society to consider publishing a book. The costs of professional typesetting, the making of metal plates and the printing process would have ensured that the venture would have cost thousands of pounds. Even then, for a small print run, the cost per book would have made it very unattractive to the prospective purchaser. With the advent of 'Publishing On Demand', however, all this has dramatically changed.

A very attractive book layout can be produced on home computers, using simple desktop publishing software, or even straightforward word-processing packages. Provided that care is taken to abide by the same conventions that professionals use for style, typography, punctuation, etc, there is no reason why the home-produced book should not look as good as anything you might find at Waterstones.

Many members have digital cameras or scanners, so photographic illustration should be easy. Freeware drawing programs allow simple diagrams to be included at will. Most LAS members will be aware of the existence of these tools for book design.

The form in which our own newsletter - Nebula - now appears on the web (as a PDF, or Portable Document Format, file) is cheap and cheerful example. Members are less likely to know that the professional printing end of the operation has recently seen major changes, which bring book publishing within reach of anyone.

Many printing companies can now take a book, as a PDF digital file on CDROM, from the publisher and churn out physical copies in very small print runs, as and when required. Even print runs as small as 20 can be catered for. The books have the complete look and feel of traditional books - including full-colour, laminated covers and internal illustrations (at least in black and white). What is more important, the cost per book is low enough to allow a cheap selling price (and even a modest profit). The advantage of small print runs is that the publisher does not need to risk a big outlay or find lots of storage space. For a small society, this process - known as Printing On Demand (POD) - means that books can be ordered from the printer as and when orders are received, or just in time for big events.

How can this benefit Leeds Astronomical Society?

Several times over recent years, we have discussed the possibility of producing a pamphlet on 'Places of Astronomical Interest in Yorkshire' or an 'Illustrated History of the Leeds AS'. The advent of POD means that this can now be done on a much more attractive basis and could produce a much more saleable product - not only of interest to other amateurs, but maybe also to the local public. Such publishing could be a modest means of raising funds and, more importantly, of raising interest in our society.

The whole point about POD is that you don't need large guaranteed sales. I recently purchased the charming little book 'Celebrating the Roundhays', by Lucy Evans. It is the history of a handful of streets in Harehills, called Roundhay Mount, Roundhay Avenue, etc. Clearly a book with a strictly limited readership. Nevertheless, it is a 'proper' book complete with 84 pages, lots of old pictures and a glossy cover. I logged onto the website of the printer and found that the rate (per book) for printing a book of approximately 100 pages would be: £3.61 for 20 copies, £2.75 for 50 copies, £2.46 for 100 copies, etc.

All that we need is enthusiasm and a desire to spread the word!

*David Sellers*

## ASTROMEET 2003

Saturday 8th November

Leeds Metropolitan University, Brunswick Building, Merrion Way

**Speakers include Allan Chapman (Oxford University) on 'The Transit of Venus' and Professor David Hughes (Sheffield University) on 'The Bombarded Earth'**

*Exhibitions, Stalls, Refreshments, etc*  
Doors open to public 9am. Admission Free

### 2003 Programme of Meetings

2<sup>nd</sup> Wednesday of every month  
Centenary House, North Street  
Doors open: 7.00pm

Feb 12	Gamma Rays: the Astronomy of Extremes <i>Dr Stella Bradbury (Leeds University)</i>
Mar 12	The Chemically Controlled Cosmos <i>Prof Tom Harquist (Leeds University)</i>
Apr 9	Songs of Distant Earth - A Voyager Retrospective <i>Peter Rea (Cleethorpes AS)</i>
May 14	Cassini's Planet <i>David Graham (Director, BAA Saturn Section)</i>
Jun 11	Black Holes: Fact or Fiction <i>Dr Chris Done (Durham University)</i>
Jul 9	35 Years of Pulsar Astronomy <i>Prof Anthony Hewish (Cambridge University)</i>
Aug 27	Life on Mars & the Beagle 2 Mission <i>Dr Monica Grady (Natural History Museum)</i>
Sep 10	The Theory and Practice of the Astrolabe <i>Harry Middleton (Lincoln AS)</i>

### SOCIETY MEETINGS

By tradition meetings are held on the second Wednesday of each month. The theme is normally a lecture or presentation on a particular astronomical topic, given by guest speakers or society members. Meetings of an informal nature, where members have the opportunity to show something about their interest—e.g. slides, videos, instruments, observations, etc—occur two weeks following, again on a Wednesday. The venue is CENTENARY HOUSE, NORTH STREET, LEEDS, between 7 and 9pm. Please enter by the top entrance, with automatic doors.

### MEMBERSHIP SUBSCRIPTIONS

The following subscriptions are due at the beginning of each calendar year:

Full Membership:	£20	Reduced Rate:	£10
First Year Membership:	£10	Institution Membership:	£20

The reduced rate is applicable to junior members of 17 years of age or less, full-time students, registered disabled, senior citizens over 65 years and members who are unemployed when subscription is due. The institution rate is applicable for groups or schools and includes membership for one adult and 15 juniors.

### SUBMISSIONS

Nebula is produced three/four times a year. Submissions of material from members welcome—as are comments, suggestions and letters. Items should preferably be emailed to the editor or sent by post on floppy disk, but material in paper or print form is acceptable. Digital items should ideally be in Word format (for text) and .jpg format (for images). Contributors please note that we place copies of the journal (in PDF format) on our website (<http://www.leedsastronomy.org.uk>).

### PUBLIC DAYTIME OBSERVING SESSIONS

The latest Committee meeting agreed to the following weekends for arranging public viewing sessions at Millennium Square, Temple Newsam Park or Golden Acre Park. Details are to be confirmed, and will of course depend upon good weather.

**15/16 March 2003**

**24/26 May 2003**

**26/27 July 2003**

**27/28 September 2003**

**13/14 December 2003**

### A Note for your Diary TRANSIT OF MERCURY 7<sup>th</sup> May 2003

This transit will be visible from the UK. The contact times (UT) for Leeds will be as follows. Don't forget to add one hour for British Summer Time.

#### *Ingress*

External Contact:	5h 11m 20s
Internal Contact:	5h 15m 45s

#### *Egress*

Internal Contact:	10h 28m 27s
External Contact:	10h 32m 52s

The Sun will be 6 degrees above the eastern horizon at the commencement of the transit

### ANOTHER DIARY NOTE

**Saturday 15<sup>th</sup> March 2003-02-09**  
**Leeds Scientific Societies Exhibition**  
**(for National Science Week)**

# PRESIDENT'S PIECE



Gone 2002, welcome to 2003!

While writing these words outside it is cloudy and there is a fair breeze. I just hope that this weather is not an indication of what the coming year has in store for us. Last year the weather was disappointing to say the least, but despite of that I can see some encouraging signs from the members.

The Astromet meeting was a success, despite a failing PA system for which we received full apologies from LMU. These things are bound to happen and it was our first real glitch in 7 years of having such meetings. Most member of the public were happy about the new accommodations, although some things will have to be modified for the next edition.

The instruments are still going around. The loan system is nearly one year old now, and some fine tuning is going to be applied soon to try to avoid having members loaning for a month and being unable to use them because of the adverse conditions. Most of you who have used them have had only praise for their optical qualities. The aim now is to spread their use towards those of us who have never used a telescope so far.

The observations sessions of the Sun are ongoing as well. Last year the first one was reasonably successful and the second one had to be aborted because of the weather. But these are encouraging because we have the support of the City Council and always have had at least 5/6 of us turning up, with 3 or 4 instruments on show. This year I intend to try to set the dates well in advance, so that we can warn the local newspapers and radios.

Indeed if there is one thing that I would like to push this year it is to try to make us more known from the general public. Membership number has fallen back towards 40 (from 53 in 2000) and

now this number seems stable but is hardly enough for us to allow continuing in providing quality speakers and trying to organise activities. So there is every chance that soon you will be asked to placate posters or cards in libraries and other public places near where you live. I hope that you will help us any way you can, as this is vital for the future of the society.

With this and further Sun observations, not to mention other events like the Science Fair (March 8<sup>th</sup>) or the Mars Week (end of August), I truly hope that we can convey our own passion for astronomy further afield.

I wish you clear skies.

*Xavier Vermeren*

## COMMITTEE NOTES

The new LAS Committee met on 29<sup>th</sup> January 2003. The following items were discussed:

Public venues to be obtained for the Anthony Hewish and Monica Grady meetings (note: Centenary House large Hall not available).

Speakers for 2004: agreed that LAS speakers should normally be 'reserve' speakers.

Speakers for Astromet 2003 to include: Allan Chapman, David Hughes, Andrew Newsome, Jan Morrison and others.

LAS Bank Account: agreed to transfer from Nat West to Alliance and Leicester (Girobank).

Charitable Status: agreed that this should now be firmly pursued. The steps involved will be: (1) recommend this to LAS informal meeting to get a consensus; (2) get sample 'charity' astro soc constitutions; (3) fill in the application forms; (4) convene a Special General Meeting to agree constitutional changes and to confirm the decision to apply for charitable status.

## LAS AURORA TELEPHONE ALERT LIST

Please do not phone after the latest (civil) time given. The symbol @ indicates that an answerphone may be in use. Please try to speak to a person (code 0113 unless stated).

**10.30pm**

John Ericson

**11.00pm**

John Blockley  
Tony Higgins  
John Malin  
Paul Marchant  
Paul Meeks  
Alex Pratt  
David Sellers  
Melvyn Taylor  
Xavier Vermeren

**11.30pm**

Ray Emery  
Cyril Rawcliffe

**12.00 midnight**

John Fitzgerald

# OBSERVING REPORTS

## JOINT OBSERVING SESSION, PENISTONE HILL, OCTOBER 12<sup>TH</sup> 2002

**I was the sole LAS representative at what was a successful event, despite initially unpromising weather prospects.**

The trip involved a return journey of 80 miles, but the effort turned out to be worthwhile. Set up as a joint venture between Leeds, Bradford, and Hebden Bridge A.S.'s, there seemed to be a fairly even spilt between the latter two bodies. I didn't do a proper head count in the dark, but probably 20 or so persons were on site, perhaps more.

As promised, the heavy rain and cloud (which had persisted during the day) did clear around late teatime, and at around 1845 I made the decision to venture forth. The journey out took about an hour and 15 minutes, including getting lost once around Haworth.

Conditions improved throughout the evening until I left at midnight for the return trip. Starting mostly clear but with occasional fast-forming cloud and a light breeze, by about 2200 the sky was completely clear. The wind had dropped completely, and – unexpectedly – the air itself was quite dry, despite the early heavy rain. The legacy of large puddles of water scattered liberally around the car park meant that boots were definitely required! Although it was quite cool, the lack of any real air movement meant that the chill factor was not a problem. Moreover, there was no real risk of dewing up of instruments until the point at which I dismantled my own gear, by which time dew was evident on the tube and mount, though not on the optics.

As to sky darkness, I would rate the site as quite good, but by no

means outstanding, not quite as good as our previous location at the Oxenhope Laboratory. There was a low, first quarter moon which brightened the sky, until it set in mid-session. The lights of Haworth, Oxenhope, and (further afield) from Bradford, were decidedly evident. The Milky Way was visible, with the Great Rift through Cygnus and Aquila just discernible.

The largest telescopes on site were of 200 mm / 8-inch aperture. These comprised a Meade SCT goto scope, and an Orion Optics newtonian on a nice pillar-mounted German equatorial with full goto facility. This latter was very smooth, accurate and positive in operation - and quiet, to boot. The optics of this latter telescope were impressive in their quality.

A nice, compact 6-inch dob was in use, several pairs of good binoculars (including some nice 20 x 80's), the odd spotting scope, and another goto special in the shape of a Celestron 125mm Nexstar. This was put through its paces by "chasing up" some obscure NGC objects in the Cassiopeia region. Most of these were not too visually impressive I fear, and rather more for the astro-train spotter than for this particular observer!

For my own contribution, I had taken up my Helios 150mm f8 refractor on its driven EQ5 mount. This was in fact its first trial on the night sky. It definitely did not like the breeze, but once this had died away it performed very nicely, tracked well, and received many favorable comments. Saturn, close to zeta Tauri, was well imaged by the time it had gained a bit of altitude. It was stated by a certain fellow observer that I would never find M1, the Crab. Conditions were not good, but

such a challenge to a Yorkshireman could not go unanswered, and the said beastie was eventually "dredged up" from the light pollution above Haworth; the sceptic was duly confounded! The M13 globular in Hercules was just nicely resolved, especially when the air settled that little bit more.

It would be good to take a larger-aperture instrument up there at some point, possibly at the next scheduled event on December 7<sup>th</sup>, if the skies permit.

I was given reason to ruminate upon the virtues or otherwise of the (nearly) all-conquering GOTO revolution. I mention no names of course, but the electronic trend in general does seem to have brought forth a new brand of rather nerdy type in the ranks of observers, which can be rather trying. However, one cannot any longer doubt the pleasure of being able to hop to the less obvious celestial objects (i.e. most of them) without undue effort, and with all but guaranteed success. Moreover, I was made very much aware of another genuine advantage of these scopes, in the shape of a keen observer who is now wheelchair-bound due to an accident. Having altered the height of my refractor so that he could enjoy the view himself, we fell to discussing options for instruments, which he could use. It was rapidly evident that – funds permitting – a (folded optics) GOTO scope of handle-able proportions and reasonable aperture was just the thing. A Maksutov-Cassegrain would be compact, of high optical quality, and would provide observing with little real change in the height of the eyepiece. The real challenge, of course, is for a scope which requires minimal setting up. Perhaps this latter difficulty will always require an assistant (at least away from home

*Continued on page 11*

# Observational Notes: 2003 January

## SOLAR

2003 Jan 25 and there were five active areas counted on the solar disc using a 60mm refractor and visual filter. Observers are still keeping an eye on any possible auroral displays in case the decline lives up to expectations. In Capricornus and not far away from M.72 and M.73 the Sun moves into mid Aquarius, slowly gaining its declination northwards. The solar diameter at Feb 25 is 32' 22" arc. Solar rotation no. 2000 begins 2003 Feb 20.29; the mean synodic rotation period is 27.2753d. Richard Carrington (1826 -1875) introduced the numbering system of solar rotations starting with no. 1 on 9 Nov 1853. Time systems: for Feb 01 (at midnight) the Julian Date is 2452671.5 and the solar longitude, a measure of time in meteor studies is 311.66 $\phi$ .

## LUNAR

Phases: New Feb 01d 10h; First Qrt. 09d 11h; Full 16d 23h; Last Qrt. 23d 16h.

Lunar perigee Feb 19d 16h, diam. 32' 45" apogee 07d 22h, diam. 29' 33". Total lunar occultations for Leeds have approximate times as follows: (U.T.) Feb 05 19h 47.7m, ZC 66, mag. 6.8, DD; Feb 06 21h 36.9m, ZC 192, mag. 5.3, DD; Feb 09 22h 36.5m, ZC 517, mag. 6.4, DD; Feb 10 20h 04.9m, ZC 633, mag. 5.4, DD; Feb 10 21h 27.2m, ZC 642, mag. 6.9, DD; Feb 11 00h 59.5m, ZC 665, mag. 5.7, DD; Feb 11 23h 18.7m, ZC 789, mag. 6.9, DD; Feb 13 00h 18.6m, ZC 949, mag. 7.7, DD; Feb 13 02h 41.2m, ZC 966, mag. 7.2, DD; Feb 13 18h 08.5m, ZC 1068, mag. 6.9, DD; Feb 14 01h 11.2m, ZC 1099, mag. 6.0, DD. Please report any timed observations to 0.1s.

## PLANETS

Mercury at magnitude -0.2 is a morning object in Sagittarius moving near the Sun in Capricornus; its greatest western elongation on Feb 04 is 25 $\phi$ . On Feb 21 Mercury and Neptune are separated by only 1.5 $\phi$ . Venus remains near its brightest at mag. -4.1 and not far from Mercury in the morning sky. On Feb 07 the star  $\mu$  Sgr ( mag. 4 ) is only 2 minutes of arc distant from Venus. The planet's elongation from the Sun is on average 44 $\phi$  and its diameter about 18" arc. A grand sight for those with a low eastern horizon will be Feb 27 with a thin crescent Moon and Venus. Mars at mag. +1.2 and diam. 5.5" arc is in southern Ophiuchus with Antares (alpha Sco) not far away, by the month end Mars is about 18 $\phi$  east of Antares. The two objects are of similar brightness and colour and a binocular will really add to the view. The red planet is at a close opposition Aug 28 during National Astronomy Week when it will be about 25" arc diameter. The last quarter Moon is near the planet on Feb 24. Minor planet 4 Vesta is moving from the east of delta Virginis (mag. 3) to a position just north of this star; the brightness is increasing slowly from mag. 6.9 to 6.3. The mighty Jupiter is shifting minutely to the west near the Beehive star cluster (M.44) which forms the centre-piece of Cancer the Crab. It shines some three times brighter than the Dog Star Sirius and looks quite isolated in a fairly barren constellation. The planet is at opposition Feb 02 and mag. -2.5, diam. 45" arc. Rising near sunset there is plenty of detail in the cloud belts which may be followed with small, or large instruments. The bright Galilean satellites perform a horizontal dance across the planet's disc and there will be a-

table phenomena on Feb 03 (17h 09m to 23h 44); Feb 12 (22h 59m to 23h 02m), Feb 18 (17h 46m to 20h 52m); Feb 19 (20h 28m to 22h 15m); Feb 27 (17h 46m to 22h 06m); Feb 28 (23h 37m to 23h 52m). Saturn is at conjunction June 24 but for the present is in eastern Taurus and magnificent to view in any instrument from large binocs. to small telescope. Saturn's yellowish hue is interesting to compare with Capella, Betelgeuse and Procyon. The rings, south polar region and subtle cloud belts may be best seen when the planet is near the local meridian in early evenings. The polar diameter is 17" arc and over the rings 44" x 20". The planet is not far from the Crab Nebula M.1 zeta Tauri. Watch Saturn move in relation to Betelgeuse, zeta and beta Tau, and Capella.

## COMETS

Comet C/2002 X5 (Kudo-Fujikawa) probably did not come up to brightness expectations as it neared perihelion on Jan 28. In March it comes back up from the UK horizon and may just be seen in Lepus and Orion but by that time it will be faint at about mag. 10 or 11. C/2002 V1 (NEAT) is visible in binocs. at present (Jan 26) near alpha Pegasi. This comet is at perihelion Feb 18.

## VARIABLE STARS

Of the bright variables on show Algol (2.1 to 3.4, period 2.867d) is faint on Feb 16 at 0h, and 18d at 21h. The Cepheid, 3.7 to 4.2 period 10.15d, will be faint Feb 07. A long period variable U Ori, 6.3 to 12, period 368d, is fading and may be seen in binocs. R Cyg, 7.5 to 13.9, period 426d is near maximum brightness early February.

*M.D. Taylor 2003 Jan 26*

*(Data: BAA Handbook for 2003)*

# INSTRUMENT REVIEWS

## *A Night Using Binoculars*

If you want to start Astronomy, you do not need a large Telescope. Go down to your local stores and ask for a pair of new 10 x 50 binoculars. You could get second hand which I tend to do, but be careful. I like the old second hand types. I think they have better glass. New ones should be affordable. You could get 7 x 50, but I think a lot of people as they get older find that their eyes can change size and, if he or she is using 7X they will lose a bit of light around the eye and eye piece.

You will need a tripod to mount most binoculars. On my tripod I have a upward centre clip, which attaches to the base of the tripod and clips around the centre column of the binoculars. When you get that sorted a clear night, off you go outside. To start, if you do not know the sky too well, start by finding that big round white thing: it's called the moon! You can not miss it. There's a lot of detail looking at the moon.

If you want to find your way around the sky more, try to find the three Orion dog stars, then find the Plough. Line up the bottom stars in a straight line to the top and you should be able to find the North Pole star. It would be a good idea to use a planisphere to help you get used to the skies. Have a paper and pencil and remember to write down notes and drawings. A compass will help to find north-south and so on.

I use different sizes of binoculars 10 x 50 and 12 x 50 (which is a hard size to buy). They say its best to try and use a 50 field of view. You might ask "what do you mean?" Well, 50 is the field of light coming through at the front of the binocular: the other end is where you look through. The

magnification 10 means the object appears ten times bigger and so on. YOU CAN buy bigger glasses but they will be heavier. The mass made glass will be Japanese which means that the glass prisms are glued in so if you drop them that's the end of then. If you get a pair German glasses - if they are very good - the glass will be screwed in, so if dropped they can be reset and screwed back in place.

Next are the planets: they will be out around midnight and out early in November. If you look up, Venus is the brightest. When you look at Jupiter you should be able to make out a small spot. It looks like a grapefruit with pin points of light around the planet. They are its moons.

Saturn will be good soon to look at with the rings opened. Looking through will give a view of a small disk with a ring around the planet.

Mercury is very hard to see if you do not have clear viewing. Where I live there are trees blocking my view of the landscape. I have asked the Council to move them, which is like banging your head against a wall.

The outer planets Uranus and Neptune are too faint, as is the tiny planet Pluto.

It would be an idea to contact a more experienced member, who has a telescope, for a more rewarding view of the planets. You can use your binoculars to find comets and asteroids.

I will finish by saying what Patrick Moore says: Never look at the sun or you will be blinded.

*John Fitzgerald*

## THE MEADE ELECTRONIC EYEPiece AND THE COMING TRANSITS

**Having been greatly taken with John Blockley's excellent video imaging using a Meade Electronic Eyepiece on his 5-inch Takahashi apo refractor, I have been wondering if this little item might be of use for the upcoming transits, especially the Venus transit in June 2004.**

The device is small, requires no external power source (it has an internal battery), and fits directly into the eyepiece tube. When one has battled with cables, power supplies, adapters, balance adjustment, and the like, then simplicity of operation is something devoutly to be wished!

Granted that the imaging chip is only very small (1/8<sup>th</sup> inch on the diagonal), and the output is only black and white, but these are probably acceptable trade-offs in the search for lightness, compactness, and immediacy of use.

So, I have taken steps to acquire one (second hand, being Yorkshire that knows) via the *Astro-Ads* website. My "wanted" ad brought two instant responses - there may be lots of these little devices out there in "unused gubbins"-land.

The first thing will be to see if the Electronic Eyepiece is suitable for the task I have in mind. I will need to attach it to a small portable scope, fitted with a mylar-type filter, and see what I get. An attraction of the camera is the manual gamma (contrast) adjustment feature; my electronic images taken of the sun through a reflective filter have thus far suffered from a lack of contrast, and hopefully this variable-contrast facility may be of help in this regard.

I will report back on what I find!

*Ray Emery*

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These take images in the dark but they achieve it by implementing an infra red beam which illuminates subjects up to a few metres away.)

In addition I have a 1/3-inch format (4.8mm x 3.6mm) Maplin monochrome video camera which is rated at 0.02 lux.

### Video recording

The camera is mounted on a driven equatorial head and is centred on a field of bright stars, generally 30 degrees away from the meteor radiant. Alignment, focusing and monitoring are done on a 12.5cm monochrome monitor. The camera is also sometimes operated on a static tripod. The output signal from the AstroVid camera is fed into a time-and-date inserter unit and the composite image is captured on a standard VHS video recorder. Long play mode is avoided because it causes degradation of the images. Tape copies also result in a further reduction in image quality.

The time-and-date inserter is not linked electronically with radio time signals and has to be synchronised manually with a MSF radio-controlled clock. The time-and-date feature on the camcorder is also synchronised manually.

The mono video camera and time-and-date inserter require a 12 Volt DC power supply, which is provided by a portable 'power station'; a sealed lead-acid battery pack. The video recorder and monitor are 240 Volt mains devices and are kept indoors, protected by a residual current circuit breaker. Meteor observing often takes place during cold damp nights so please consider electrical safety at all times. Let's be careful out there!

### Videotape analysis

Analysing the tapes is a laborious manual procedure and requires patience. This is performed in a darkened room, with the video monitor set to maximum contrast, minimum colour and the brightness adjusted to personal taste. The tape is played and the

time of each meteor (if any!) is noted. Fatigue soon sets in so it is recommended that these sessions are limited to 20 or 30 minutes in duration. At least 3 complete passes through the tape are required to note all events.

### Image processing

To process the meteor images the videotape is played through a PC and graphics card. A video sequence encompassing the duration of the meteor is captured at 25 frames per second and this is saved to an AVI file and processed by Animation Shop. Individual frames are saved and then merged into one composite image within Paint Shop Pro. Meteors are generally only visible for less than 1 second, so most are visible on no more than 15 frames. An interesting effect is that with the video frames being recorded every 1/25th second it is possible to create a composite image which looks as if a rotating shutter has been used.

Figure 1 is of a Geminid meteor passing Orion, recorded on the night of 1997 December 13/14, with the Full Moon only 30 degrees away.

Figure 2 shows a Perseid meteor near the star  $\epsilon$  Pegasi. It was recorded at 22:50:55 UT on the night of 2002 August 12/13.

### Applications

Accurate video timings of meteors can be combined with astrometry from photographic stations to determine the shower radiant.

Meteor shower activity can be monitored from light-polluted sites, during twilight and moonlight and through partly cloudy skies.

The magnitude distribution of brighter meteors can be estimated and compared with visual observers.

Motion sequences and single/composite frames of bright meteors can be used to illustrate lectures and to promote interest in their study.

Video should be used to complement - not to replace - other

methods of meteor observation.

In recent years my enjoyment of visual meteor observing and meteor photography has been severely hampered by my neighbours' 'insecurity' lighting. Vi has helped me to continue to monitor the major showers from my garden in Leeds. I have successfully recorded Quadrantid, Perseid, Orionid, Taurid, Leonid, Geminid and sporadic meteors and it is fascinating to note the different velocities of the meteors.

Len Entwisle also runs a video camera system from Elland, West Yorkshire and we aim to do two-station meteor videography. Our climate is hindering this project!

*Alex Pratt*

## SUNDIAL INSCRIPTIONS

*Let others tell of storms and showers*

*I only mark the sunny hours*

This English sundial inscription is unusual, partly for its touching optimism, and partly because it is in the vernacular. Most dialers seem to have favoured Latin. Here are a few popular Latin mottos and their translations:

CARPE DIEM

*Use well the day*

TEMPUS FUGIT

*Time flies*

SI SOL DEFICIT, RESPICIT ME NEMO

*Nobody looks at me, when the Sun is not there*

HORA FUGIT NE TARDES

*Time flies, do not be late*

TEMPUS BREVE EST

*Time is short*

SOL OMNIBUS LUCET

*The Sun shines for all*

UMBRA SICUT HOMINIS VITA

*The life of man is like a shadow*  
HORAS NON NUMERO NISI SERENAS

*I show only the bright hours*  
UTERE, NON NUMERA

*Use them, don't count them*

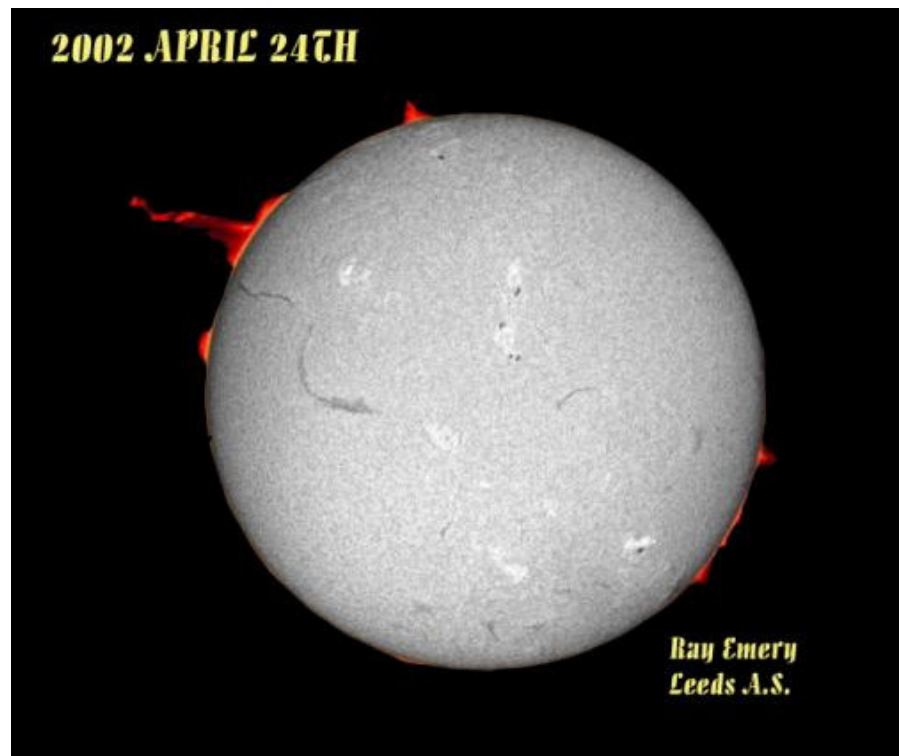
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turf). However, once set up, the disabled user should be up and operating independently, with the pleasure of control which this brings.

There are, I know, those who feel that unless observing conditions are optimal, there is no point in turning out. This does, I feel, miss the point of belonging to an amateur astronomy society in the first place. The real virtue of such membership is on the social side. I may not have made many new discoveries in the night sky, or logged any numbers in the book, but the chance to re-engage with my fellow enthusiasts in a supportive group, under a star-filled sky, was –as it always is – very pleasant indeed.

*Ray Emery*

## SOLAR MAXIMUM – A Personal Retrospective



### PUZZLES FROM THE PAST

896 AD

Three extraordinary stars appeared between Aquarius and Pegasus, one large and two small; sometimes they approached one another and sometimes they separated; they moved eastwards and after 3 days the two smaller ones disappeared, while the larger one faded away.

*recorded in Hsin Thang Shu*

1554 AD 15<sup>th</sup> February

'...about ix of the clock in the foorenoone was seene in London in the midst of the Element a raynebowe lyke fyre, the endes upward, and two sunnes, by the space of an hower and an halfe'

*recorded in an English chronicle*

**Source:** A Chronicle of Pre-Telescopic Astronomy, by Barry Hetherington (Wiley, 1996)

**So, how was it for you? A good one? Pretty average? For me, the answer would have to be “a fair average, interspersed with moments of the stupendous and the sublime”.**

Yes, I *am* talking about the recent period of maximum solar activity! Now that the sun is definitely “on the wane”, it seems a good time to briefly look back at the pattern of the recent maximum, with a mention of some of its highlights, as they have appeared to this particular humble observer.

As with any extended “event” such as this, the experienced quality comes down to both what actually happens, and one’s opportunity to observe same.

In my own case, I have been fortunate to have had the equipment to observe in both white light and h-alpha, have been able to travel to foreign parts to witness two spectacular total eclipses, and have seen, in addition, a glorious display of aurora from my own garden in south Leeds.

It would be easy to whinge about the opportunities missed, the auroras which were on the wrong side of the globe, hidden by cloud, or washed out by moonlight. This would of course be churlish. One should be grateful for the sights one has seen – and indeed I am!

Any list of the types of activity one might look to witness at a solar max would surely include the following:

- White light activity, especially sunspots;
- Hydrogen-alpha activity, especially prominences and filaments;
- An actively symmetrical corona (visible at totality during an eclipse);
- Auroral displays.

In brief, the sunspot activity was averagely enhanced for a solar maximum, but with some very fine large groupings, some of which survived several solar rotations. As to h-alpha, I eventually obtained my small Coronado filter in time to witness the “second

peak” of the maximum, and it most surely did not disappoint. The wonderful (should that be transcendently beautiful?) solar corona was seen by me at the 1999 and 2001 eclipses, in clear conditions; the awful prospect of never seeing one was thereby most superbly and gratefully avoided! The auroral activity was, I suppose, the somewhat disappointing area, since we were thwarted on so many promising occasions. However, a display witnessed from one’s very own back garden could only be described as “Great”, and thus far unique in my personal experience. The added delight of travelling to the Arctic on a day trip to see the aurora from the frozen north was also unforgettable.

A solar maximum is a bit like any other historical event or process – very easy to follow in hindsight, but extremely difficult to follow the twists and turns at the time! Rather like weather forecasting, one might be able to suggest in advance an overall likely pattern, but attempts to predict conditions on a daily, weekly, or even monthly basis, are fraught with problems and uncertainties. It may be ever thus - notwithstanding our ever-improving understanding of solar events on both the very fine and the very large scale. Most strikingly, not all maxima are the same. They vary in overall intensity, but not on any thus-far understood pattern. Even within any given maximum, activity can vary tremendously over weeks and months. Events visible in white or “integrated” light do not necessarily keep in lock-step with activity in monochromatic light, such as the red light of hydrogen-alpha. Indeed, the “maximum” is not something which can be identified, let alone predicted, as occurring on any particular day. Only looking back at the records of activity can one say “yes, that was it, and now it is over”. Even now, on the downslide of solar activity, the sun continues to surprise us with occasional outbursts of activity comparable to events witnessed many months ago.

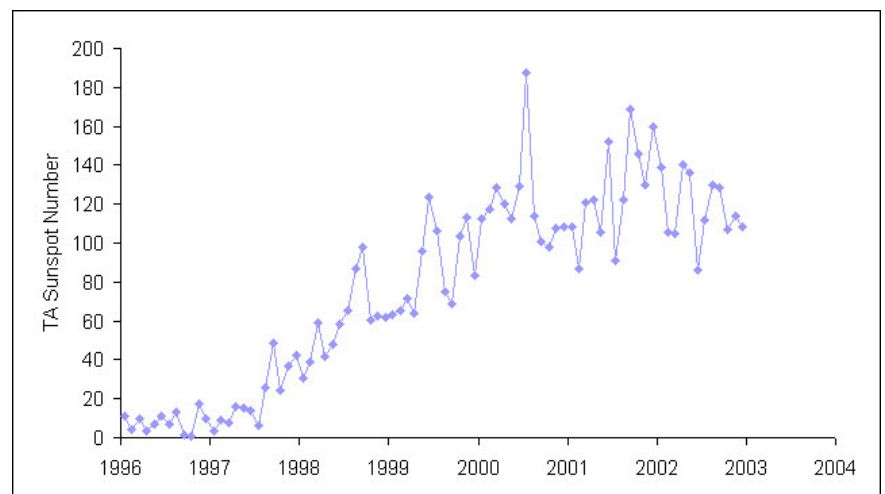
The best and simplest way to get an overview of the ebb and flow of solar activity over time is to depict it graphically. Those who know me will appreciate that I tend to avoid “doing the numbers” if I can, and have even been known to smile wryly at the celestial train spotters who feel compelled to tabulate, compile, and compute. But we would be nowhere without their efforts, and even I can appreciate a simple line graph or histogram!

Looking at graphs of various types of solar activity over any given cycle, certain elements seem pretty clear, viz:

- Both solar minimum and solar maximum are of lengthy duration, probably in excess of a year;
- At solar minimum, activity (observable features, not overall solar output!) can be virtually absent for many weeks, giving a very flat “profile” to the graph line at this time;
- Rise up to maximum is gradual, and *relatively* even, until the very early maximum period, when activity becomes much more erratic;
- Maximum of observable activity is a very “lumpy” affair, with

peaks and troughs, and perhaps more than one retrospectively-identifiable “high point”;

- “Intensity” of both maxima and minima vary as between cycles;
- Duration of any (single polarity) cycle is only approximately 11 + years: no magic indicator is displayed to denote this, although the appearance of reversed-polarity spot groups is taken to denote the appearance of the “new cycle” to those with the requisite equipment. Obtaining magnetograms which demonstrate polarity-reversal (as between one cycle and the next) requires sophisticated spectroscopic apparatus not currently within the amateur’s orbit. This may of course change!
- It must be remembered that cycles do overlap, as evidenced by the opposing polarities of old and new spot pairs;
- Any fine-determination of cycle length refers very much to sunspot polarity; other features such as those seen in h-alpha do not follow such a simple rule.



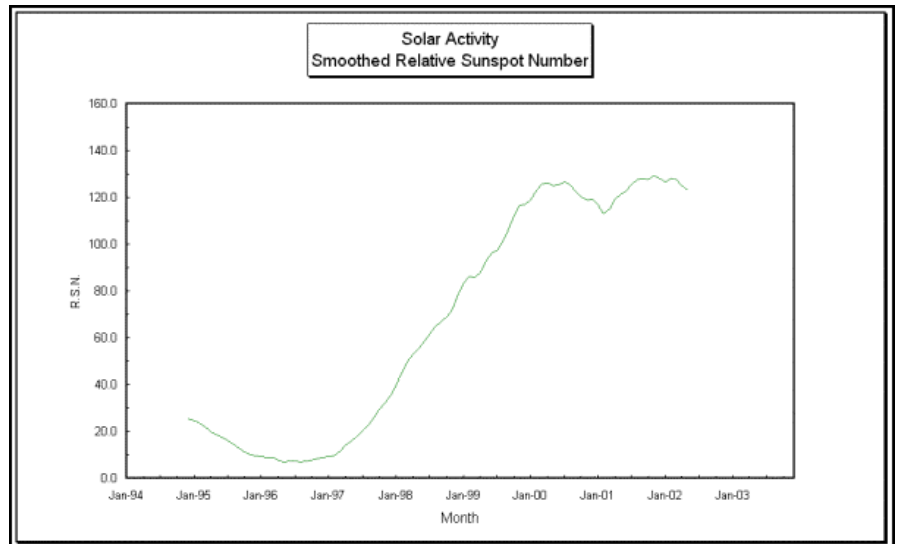


I do not wish to go into the details of frequencies, latitudes, polarities, and all the panoply of physical and structural details of observable phenomena. Interested readers will no doubt be able to find this information for themselves. Those with Internet access may profitably be pointed towards the websites of The Astronomer, the BAA Solar Section, and the SPA Solar Section, where all such information is available either directly or via other linked websites.

The accompanying graphs quite clearly demonstrate the overall pattern of this recent cycle, from its previous minimum, over the climb to a prolonged and apparently "double" maximum, and the definite beginnings of the decline to the next expected minimum.

It is evident that there was a sharp peak in mid-2000, and a broader but very bumpy second "peak" over the second half of 2001 and the first part of 2002.

These particular graphs (the first one was compiled from the observations of dedicated amateur solar observers who have submitted their work to "The Astronomer" magazine in the UK, the second being from the solar section of the Royal Astronomical Society of New Zealand, and published by Bob Evans on their website) show sunspot number, and a "smoothed" line of the overall pattern of activity. Other graphs might show the number of white-light "active areas" in general (i.e. including the bright faculae as well as the dark spots), sunspot "quality" (many very small spots doesn't necessarily denote a high level of activity),



and of course monochromatic observations of prominences and disc features. There tends to be a general agreement between the various data sets, but this is by no means a matter of parallel and synchronised activity.

An interesting sidelight to the main data graphs is a simple log of the number of days (on a monthly basis) during which observers were able to contribute their results. This of course follows the pattern of clear or cloudy days. It will come as no surprise, I think, to learn that this 2002-3 winter season has thus far been the worst for some years

in terms of observing opportunities available in the U.K!

I would like to share just a few images which I have taken over the past couple of years, representing the types of activity of interest to your "basic" amateur observer: sunspots, h-alpha features, and the aurora. Specialist work is also carried out by amateurs in the radio bands, but this remains a dark and mysterious pursuit to yours truly.

Here's hoping for a slow and eventful decline from solar max!

*Ray Emery*

