Campaign for Dark Skies

Select Committee report 'all that we had hoped for'

On 2003 October 6, the Parliamentary Select Committee for Science and Technology issued its report on light pollution in the United Kingdom. Earlier in the year, representatives from the BAA's Campaign for Dark Skies (CfDS) gave illustrated talks to the eleven Committee MPs, and supplied evidence during their formal sessions at Westminster, as did Guy Hurst, BAA President. Also involved were the two Astronomers Royal, the RAS, the CPRE, the Highways Agency, Ministers from the Office of the Deputy Prime Minister and Department for Education and Skills, PPARC, the Institution of Lighting Engineers and representatives of local authorities.

In February 2003, the CfDS publicised the decision of the Committee to investigate light pollution to many astronomical groups, and formal written evidence was submitted by hundreds of societies and individuals.

The CfDS committee says that the report, of more than 30,000 words, is 'almost everything we had hoped for'. It does not change the law, nor does it oblige the Government to act; but the forcefulness of its direct accusations of indifference and confusion on the subject of light pollution among ministers and Central Government is such that they surely cannot ignore it. The Select Committee writes:

'We regret that PPARC and the Government have adopted a defeatist attitude towards light pollution and astronomy... There are substantial numbers of amateur astronomers, astronomy undergraduates and postgraduates and professional astronomers observing in the UK. Amateur and professional astronomers have undertaken a dual role of showing and explaining the night sky to students, pupils and the general public, whilst campaigning for the last ten years to prevent further degradation of the night sky. It is time they received support from PPARC and the Government.' (Paragraph 40)

The value and contribution of the amateur astronomical community are thus fully acknowledged, as is the rôle that seeing the night sky, and studying astronomy, can play in the launching of a career in science:

'There is a real opportunity of using the enthusiastic astronomy community to increase the numbers of school pupils taking astronomy and continuing into physics. PPARC and DfES together should bring to bear more pressure on ODPM and DEFRA to find a way to protect the skies, particularly around those observatories who work with local schools.' (Paragraph 41)

The Select Committee fully supports calls for proper control of excessive lighting:

'Light trespass and glare affect astronomers, but... can also affect us all. We are persuaded by the evidence that light trespass is measurable and controllable. We recommend that obtrusive light should be made a statutory nuisance.' (Paragraph 146)

'There are too many local planning authorities which have not taken the issue of light pollution seriously and have not included light pollution in their local plans. The Government must take steps to rectify this. It should have a clear policy on when Full Cut Off lighting should be used, and we recommend that this policy is communicated to local authorities.' (Paragraph 123)

The general conclusions of the report underline the poor performance of legislators so far on this issue. The Select Committee stresses that time is running out for the night sky, and recommends swift action:

'We believe that the Government should monitor the situation in the UK carefully over the next five to ten years. Should the creation of a statutory nuisance of light, a separate PPG for light pollution and enhanced guidance to local authorities on the issue of light pollution not produce a reduction of the current levels of skyglow, the Government must consider adopting similar legislation to other countries, to control the types of outside lighting used, and to ensure that no outdoor lighting shines above the horizontal. The Government must recognise, as other countries have, that the night sky needs protecting.' (Paragraph 153)

'The Government may not consider the effect of light pollution on astronomy in the UK to be a pressing issue, but amateur astronomers have taken on the issue on behalf of those who mourn the loss of the night sky, not only astronomers but also the general public, and those affected by the unwelcome intrusion of light. If the Government accepts this Report's recommendations it will start the process of reducing light pollution. In 20 years time it might then be possible for young people studying astronomy to see the Milky Way in the UK night skies once more.' (Paragraph 158)

All those who appreciate the positive nature of the report, which is available on the Internet at www.parliament.the-stationery-office.co.uk/pa/cm200203/cmselect/cmsctech/747/747.pdf, are asked to communicate their approval to the Science and Technology Select Committee at the House of Commons, 7 Millbank, London SW1A 0AA [scitechcom@parliament.uk]

The CfDS committee sees this as a large step in the long road towards its goal. An important plateau has been reached by our officers' combined efforts: a relatively small band on a limited budget. If previously uninvolved BAA members wish to contribute, either financially or by giving their time, please contact Bob Mizon at the address given below, and inside the back cover of every *Journal*.

Photograph of the central region of the Milky Way by Bill Keel, University of Alabama. *Courtesy SEDS, www.seds.org/*

Those campaigning for a turning of the tide of wasted light are, on the whole, realists. CfDS knows that the battle will still be a long one, and that the skies can never again be as dark as they were a century ago. But an optimum night sky for all, in towns or in the countryside, is achievable if those in power allow it to be so.

The Select Committee report is not a 'quick-fix' magic wand. But it is certainly a big stick with which to beat the decision makers if they continue to close their eyes to the value and majesty of the environment above.

Bob Mizon, *Coordinator*
[www.dark-skies.org]

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Notes and News

From the President

During Guy Hurst's very successful two years as President, he made many changes that have improved the management of the Association. Although it has meant long hours, a lot of dedication by him and his wife Anne, and a forever full mailbox, he has confided in me that he is somewhat saddened to be finally handing over the reins. My personal thanks, and those on behalf of our members and everyone on the Council go to Guy and Anne for their great contribution and dedication over the last twenty-four months.

As is usual in most large organisations many things need to be seen to well in advance. This is certainly true of the management of our Association's *Journal*, of which Hazel McGee does an excellent job. Early in October, I received an e-mail from her reminding me that the next 'From the President' was due and had to be with her by 20 October – and that this one was down to me. It brought the urgency of the forthcoming term home with a thud.

It doesn't seem all those months since Guy first discussed the possibility of my taking on the Presidency of our organisation, an organisation that I had looked upon with awe since my days as an amateur astronomer and telescope maker in Scotland in the early sixties. Little did I suspect then that, some forty years later, I would become its President. Like most astronomers who have been fascinated with the subject over a long period of time, I became interested at a relatively young age and so intense was my interest that I changed careers to be involved with designing and building telescopes. Career-wise this was one of the most satisfying periods in my life. It meant that I was surrounded by astronomers and we could talk astronomy and telescopes all day long, and get paid for it – albeit not a lot. When very competitive Far-Eastern low price/high quality optics become available, and with the acquisition of a family and new responsibilities, I drifted away for several years. The love of astronomy is always in the blood however and once you are hooked the subject becomes addictive. When I returned I became even more involved than before. It is an honour to have been nominated as your President and I will endeavour to ensure that this trust has not been misplaced.

Your Association is undergoing a great deal of change, some visible and some not so obvious. Dr John Mason led a very successful campaign last year to recruit new members. Over 450 members have been added to our lists. It is important that we follow up such a successful exercise by providing the sort of services from the Association that these new members would wish. Dr Nick Hewitt has done an excellent job over the past two years by introducing the Observers' Workshops. These provide opportunities for members to share their experience and for those wishing to experiment with other areas of interest to learn how to get started. The feedback on these has been extremely positive and attendance numbers at these meetings have been amongst the highest on recent record. Nick has also been looking at the introduction of a new layer of Workshops, intended for complete beginners. These might be especially useful to our newer members. If these are to go ahead it would be useful to get input as to what members would like to see included. If you think that these would be useful and well attended I would be pleased to receive your comments.

BAA members have continued to be very successful with their observing. Many have taken the opportunity to produce images and drawings during the latest favourable opposition of Mars, and the UK now has well over one hundred supernovae discovered from its shores. Congratulations must go especially to Peter Birtwhistle for his very successful astrometry of 2003 SQ222. This was a very fast moving Near Earth Object, at a mere magnitude 20 when Peter succeeded in obtaining accurate astrometry with amazingly small residuals. This is even more satisfying considering that it is intrinsically the faintest natural object for which we have an orbit. It also holds the record for the closest approach to Earth of any known NEO.

Major recognition has also come from outside the Association. I am delighted that 'The AAVSO Director's Award for 2003' has been presented to Gary Poyner. I quote the citation, 'for his meticulous observing of variable stars and his contribution of timely and often critical observations during special observing runs with ground-based and satellite instruments, making immediate observations at the request of Headquarters to confirm potential discoveries, and as [a past] Director of the Variable Star Section of the British Astronomical Association, mentoring observers, fostering productive collaborations and amity among variable star observing associations worldwide, and working to maintain and improve the level of variable star observing worldwide.' Congratulations Gary, on this achievement.

Like my predecessors I welcome input from everyone on any subject whatsoever, but I am particularly interested in hearing how you think that your Association can serve you better. What would you like to hear at meetings and see in the *Journal*? Is there any other area that we can improve? This may result in a full mailbox but I will still welcome your feedback.

Tom Boles, *President*

Comet Section

Comet prospects for 2004

2004 sees the return of 18 periodic comets. None are particularly bright and the best are likely to be 78P/Gehrels and 88P/Howell. Three new long period comets are likely to put on a good show: 2001 Q4 (NEAT) reaches perihelion in May, when it could make at least 3rd magnitude. Northern hemisphere observers will first pick it up just after perihelion as it rapidly moves north. 2002 T7 (LINEAR) could also reach 3rd magnitude at closest approach in May, however northern hemisphere observers will have lost it as a binocular object in mid-March. Observers at far southern latitudes may be able to see these two naked eye comets at the same time. 2003 K4 (LINEAR) could reach 6th magnitude as it brightens on its way to perihelion. Several other long period comets discovered in previous years are also still visible.

Theories on cometary structure suggest that any comet could fragment at any time, so it is worth keeping an eye on some of the fainter periodic comets, which are often ignored. This would make a useful project for CCD observers. As an example 51P/Harrington was observed to fragment in 2001. Ephemerides for new and currently observable comets are published in the BAA *Circulars*, Comet Section newsletters and on the Section, CBAT and Seiichi Yoshida's web pages. Complete ephemerides and magnitude parameters for all comets predicted to be brighter than about mag 18 are given in the International Comet Quarterly *Handbook*; details of subscription to the ICQ are available from the Director. The updated Section booklet on comet observing is available from the BAA office or the Director.

29P/Schwassmann–Wachmann is an annual comet that has frequent outbursts and seems to be more often active than not at the moment, though it rarely gets brighter than 12th magnitude. It begins 2004 in Aquarius, but spends most of the year in

Pisces, reaching opposition at the end of September. The comet is an ideal target for those equipped with CCDs and it should be observed at every opportunity. UK based observers should be able to follow it throughout the second half of the year.

43P/Wolf–Harrington is at its brightest (mag 12) at the beginning of the year, and slowly fades as its elongation in the evening sky decreases. This is the comet's tenth observed return. It is in a chaotic orbit, and made a close approach to Jupiter in 1936 which reduced its perihelion distance from 2.4 to 1.6 AU. It made an exceptionally close (0.003 AU) approach to Jupiter in 1841, which switched its previous perihelion distance into the new aphelion distance. It was discovered in 1924, then lost until 1951. Its next apparition, in 2010, will be unfavourable.

48P/Johnson was discovered by Ernest Johnson at the Union Observatory in South Africa in 1949, following a very close approach to Jupiter in 1931. It is now in a stable orbit between Mars and Jupiter and no close approaches are predicted for some centuries. At favourable apparitions, such as its first two returns, it reaches 13th magnitude. The next three returns were unfavourable, with the comet reported to reach only 18th magnitude. Returns are now improving, and at the last return, Werner Hasubick reported observing it at 13.5. It could reach a similar magnitude at this apparition, though it will be best seen from the southern hemisphere.

62P/Tsuchinshan This comet was discovered at Purple Mountain Observatory, Nanking, China in 1965, following a close approach to Jupiter in 1960, which reduced the perihelion distance from 2 to 1.5 AU. Unusually, the comet's name derives from that of the observatory rather than those of the discoverers. At a good apparition such as in 1985 it can reach 11th magnitude and as the perihelion distance will continue to decrease future returns may be even better. At the last return the comet was recorded at around mag 13 and this time it could do a magnitude or more better. It should be picked up as a 13th magnitude object in the September morning sky, brightening throughout the rest of the year. It tracks from Gemini in September into Leo at the end of the year, when it could be 11th magnitude.

Unfiltered CCD image of periodic comet 29P/Schwassmann–Wachmann 1, obtained on 2003 Aug. 5.003 UT with a 60cm f/3.3 Deltagraph telescope. Exposure time was 60 seconds. Image scale is 1.9 arc sec/pixel. *© 2003 by H. Mikuz, Crni Vrh Observatory, Slovenia.*

69P/Taylor A series of Jupiter encounters in the 19th century reduced the perihelion distance of this comet from 3.1 to 1.6 AU and led to its discovery by Clement Taylor, with a 25cm reflector from Herschel View, Cape Town, South Africa, in 1915 November. It was quite bright, 9th magnitude at best, and shortly after perihelion, in 1916 February, E. E. Barnard found a double nucleus, each with a short tail. The secondary nucleus became brighter than the primary, but then rapidly faded and the primary also faded more rapidly than expected. The comet was then lost until 1977, when new orbital computations led to the recovery of the 'B' component by Charles Kowal with the Palomar Schmidt. The 'A' component was not found. The comet has had several encounters with Jupiter, the closest recent one being in 1925, and had very close (0.06 AU) encounters in 1807 and 1854. The comet was not expected to be brighter than 15th magnitude at its last return, however it was found at around mag 12.5 in mid-January 1998. The observations suggest that it suffered two outbursts. This makes it difficult to predict the likely brightness at this return, but if it maintains this level of activity it might reach 11th magnitude at the end of the year. It will become visible in the late summer morning sky at perhaps 13th magnitude and CCD observers should treat it as a priority object.

78P/Gehrels Tom Gehrels discovered this comet at Palomar in 1973. Its perihelion distance is slowly decreasing and is currently around the lowest for 200 years. The eccentricity is slowly increasing, with a marked jump in both following a moderately close approach to Jupiter in 1995. This return is extremely favourable, with the comet reaching opposition and perihelion within a fortnight of each other. At the last return the comet reached 12th magnitude and it should do at least a magnitude better this time round. It should come within visual range of favourably placed observers by late spring, but UK observers will probably need to wait until July when it should be a 12th magnitude object in the morning sky. It continues to brighten on its way to opposition and by October should be at mag 10. It spends most of the apparition in Aries, where it completes its retrograde loop in mid-December, by which time it is fading towards 11th magnitude.

88P/Howell Ellen Howell discovered the comet in 1981 with the 46cm Palomar Schmidt. It passed 0.6 AU from Jupiter in 1978, which reduced the perihelion distance, but the biggest

Comets reaching perihelion in 2004

Comet	*T*	*q*	*P*	*N*	H_1	K_1	*Peak mag*
58P/Jackson–Neujmin	Jan 10.0	1.39	8.27	5	11.0	15.0	15
D/Haneda–Campos	Jan 10.2	1.27	6.41	1	13.5	10.0	16
2003 L2 (LINEAR)	Jan 19.3	2.86			10.0	10.0	17
40P/Vaisala	Jan 22.9	1.80	10.83	6	8.9	15.0	13
2003 E1 (NEAT)	Feb 13.5	3.25	50.9		12.5	5.0	17
2003 H1 (LINEAR)	Feb 22.6	2.24			6.5	10.0	11
2003 O1 (LINEAR)	Mar 17.1	6.85			6.0	10.0	18
43P/Wolf–Harrington	Mar 17.9	1.58	6.45	9	9.9	5.8	12
2002 L9 (NEAT)	Apr 6.2	7.03			8.5	5.0	17
88P/Howell	Apr 12.6	1.37	5.50	5	4.7	24.9	9
2002 T7 (LINEAR)	Apr 23.6	0.62			6.0	7.5	3
104P/Kowal	May 9.7	1.40	6.18	3	9.8	9.3	13
2001 Q4 (NEAT)	May 15.9	0.96			6.5	7.5	3
103P/Hartley	May 18.0	1.04	6.40	3	8.1	15.0	10
1996 R2 (P/Lagerkvist)	Jun 7.4	2.62	7.39	1	11.0	10.0	17
29P/Schwassmann–Wachmann	Jul 10.8	5.72	14.65	6	0.5	10.0	12
42P/Neujmin	Jul 15.9	2.01	10.70	4	9.5	15.0	14
121P/Shoemaker–Holt	Sep 1.7	2.65	8.01	2	4.5	15.0	13
120P/Mueller	Sep 30.2	2.75	8.43	2	12.0	10.0	18
48P/Johnson	Oct 12.0	2.31	6.96	8	5.6	15.0	12
2003 K4 (LINEAR)	Oct 13.8	1.02			3.5	10.0	5
130P/McNaught–Hughes	Oct 23.3	2.10	6.67	2	12.5	10.0	17
78P/Gehrels	Oct 27.1	2.01	7.22	4	7.1	10.0	10
69P/Taylor	Nov 30.4	1.94	6.95	5	8.9	15.0	10
62P/Tsuchinshan	Dec 7.9	1.49	6.63	6	8.0	15.0	11
131P/Mueller	Dec 17.6	2.42	7.07	2	13.0	10.0	18
111P/Helin–Roman–Crockett	Dec 27.1	3.47	8.12	2	5.0	20.0	18

The date of perihelion (T), perihelion distance (q), period (P), the number of previously observed returns (N), the magnitude parameters H_1 and K_1 and the brightest magnitude are given for each comet. The brightest magnitude given for 29P and 69P is that typical of an outburst.
Note: $m_1 = H_1 + 5.0 * \log(d) + K_1 * \log(r)$

change to its orbit occurred in 1585 when an encounter reduced q from 4.7 to 2.4 AU. The standard light curve was not a good fit to the observations at the last return and a better fit was obtained using a linear light curve that peaked 28 days after perihelion, thus confirming the view that the comet is brighter after perihelion. The comet was never well placed for viewing in the UK at the last return and will not be at this return either. Elsewhere it should be picked up at 12th magnitude in January as it emerges from solar conjunction. The comet should be at its best in mid-March when it could be 10th magnitude.

95P/Chiron is unusual in that it is also asteroid 2060. It will reach around mag 17 when at opposition in Sagittarius in July. CCD V magnitudes of Chiron would be of particular interest as observations show that its absolute magnitude varies erratically; it is currently around 6. It began an outburst in 2000/01 though it is likely to be fading again in 2004. It was at perihelion in 1996 when it was 8.5 AU from the Sun and will be nearly 19 AU from the Sun at aphelion in around 40 year's time.

Two long period comets are likely to become naked eye objects. **C/2001 Q4 (NEAT)** was discovered at Palomar on 2001 August 24.40 when it was nearly three years from perihelion and over 10 AU from the Sun. It begins the year as a southern hemisphere binocular or easy telescopic object and remains at high southern declination until it nears perihelion in May. By then it will have brightened considerably, and could be an easy naked eye object. Adopting a conservative magnitude equation predicts a peak of 3rd magnitude as it emerges into the northern evening twilight in the second week of May, though it could be as bright as 1st magnitude. Tail development is likely to be good, particularly in the first half of May, with a maximum length of 10°–25°. Observing opportunities are best in the second week of May as the Moon leaves the sky. It remains an evening object, becoming circumpolar in June, when it may still be just visible to the naked eye. It passes from binocular range by the end of July, but will remain visible to telescopic observers to the end of the year.

C/2002 T7 (LINEAR) reaches perihelion a few weeks before 2001 Q4, but will be at its best at around the same time, though only for southern hemisphere observers. It too begins the year as a binocular object, but at this time it is best placed for northern hemisphere observers. It remains a binocular object, dropping into the evening twilight in the first week of March. It emerges from solar conjunction as a naked eye object in mid-April and continues brightening, even after perihelion, as the distance from Earth decreases on the way to a moderately close approach at 0.27 AU in mid-May. Equatorial observers get the best view as it emerges from conjunction, but at closest approach it is a southern hemisphere object of 3rd or perhaps 1st magnitude. The tail at this time could extend as much as 40°. Thereafter the comet fades, passing from binocular view in July, and re-enters solar conjunction in August. It might be picked up again as a 13th magnitude object at the end of October.

C/2003 K4 (LINEAR) reappears in 2004 February after solar conjunction and reaches binocular range in May. We will lose it into conjunction again at 6th magnitude in 2004 September and it will pass through the SOHO LASCO fields as a mag 5 object in 2004 October. Southern hemisphere observers will pick it up at the end of the month and it should remain a naked eye object until 2005 January.

A few other long period comets will still be visible at the beginning of 2004. **2001 HT$_{50}$ (LINEAR–NEAT)** will be fading from 12th magnitude at the start of the year, but it is well placed in the evening sky in Pisces. It will be lost in the evening twilight by the end of February. **2002 O7 (LINEAR)** is fading from 11th magnitude in Aquarius, but sinks into twilight even more quickly and will be gone by the beginning of February. **2003 H1 (LINEAR)** is best placed for observation from the Southern Hemisphere and may reach 11th magnitude in March.

Several other comets are at perihelion during 2004, however they are unlikely to become brighter than 13th magnitude or are poorly placed. 40P/Vaisala, 42P/Neujmin and 121P/Shoemaker–Holt are 13th magnitude or fainter but within range of larger amateur telescopes. 58P/Jackson–Neujmin, 103P/Hartley, 104P/Kowal and D/Haneda–Campos have unfavourable returns. 111P/Helin–Roman–Crockett, 120P/Mueller, 130P/McNaught–Hughes, 131P/Mueller, 1996 R2 (Lagerkvist), 2002 L9 (NEAT), 2003 E1 (NEAT), 2003 L2 (LINEAR) and 2003 O1 (LINEAR) are intrinsically faint or distant comets and will not come within visual range. Ephemerides for these can be found on the CBAT WWW pages. D/Haneda–Campos has not been seen since its discovery in 1978.

Looking ahead to 2005, no bright comets are predicted to return. The best object for UK observers is likely to be 9P/Tempel, which will be a faint object in large binoculars from May to June. Several other periodic comets have favourable returns, but they will all be telescopic objects.

Jonathan Shanklin, *Director*

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Mars Section

Mars in 2003: Fourth interim report

The Section's website (http://www.britastro.org/mars) was heavily visited for the weeks around opposition, with some 200 visitors per day. The present very brief report continues from the October *Journal*, and concentrates upon visual work with smaller telescopes. It covers late spring and early summer in the martian southern hemisphere, from 2003 September 1 (Ls= 252°, D (disk diameter) = 25.0 arcsec, tilt= –18°S) to October 15 (Ls= 280°, D= 17.9", tilt= –21°S).

The detailed appearance of the surface features at opposition is beautifully shown in the map made by Fattinnanzi of Italy from his best CCD work (Figure 1). Visual observers also made the most of the large disk, those with smaller telescopes also achieving considerable success (Figures 2–3). Throughout the period under considera-

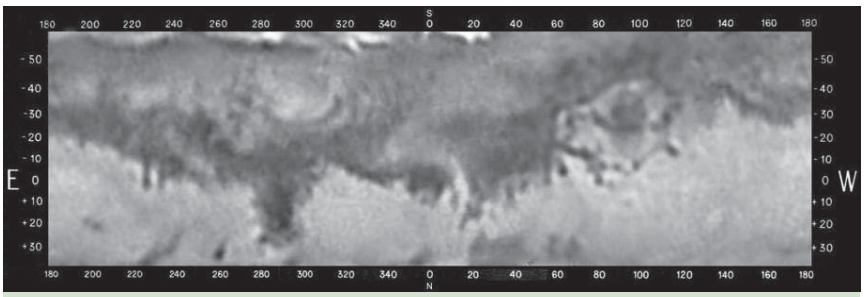


Figure 1. A general map made by Cristian Fattinnanzi (Macerata, Italy, 250mm refl.) from a computer-generated compilation of his 15 best CCD images obtained from August 8 to September 22.

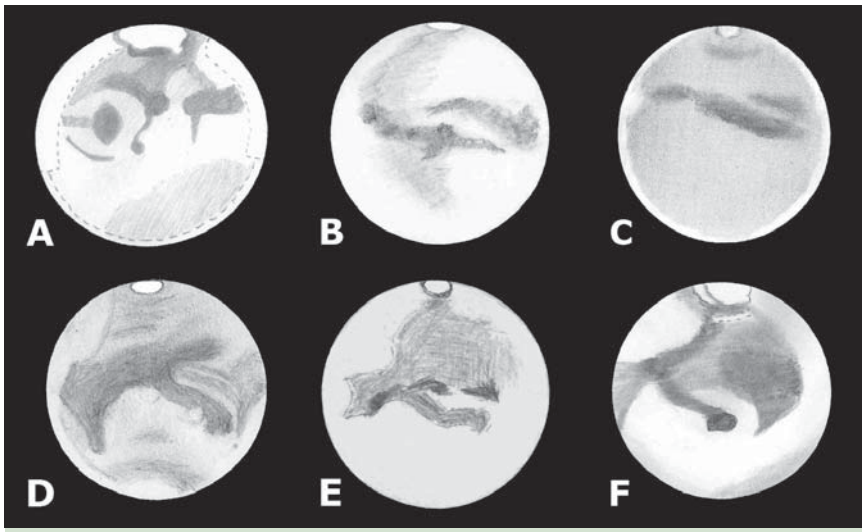


Figure 2. Drawings made near opposition.
A. Elisabeth Siegel (Malling, Denmark), August 10d 23h 35m, CML= 114°, 203mm Schmidt–Cass., ×267, INT+W25. Thyle Mons projecting from SPC. Phasis and Solis Lacus well seen.
B. Michael Hendrie (Colchester, Essex), September 4d 22h 10m, CML= 231°, 152mm OG. Wide Hesperia; SPC N. edge further south at this CML.
C. Alan Heath (Long Eaton, Notts.), September 6d 21h 45m, CML= 308°, 254mm refl., ×278, W15. Bright evening cloud.
D. P. Devadas (Madras, India), September 21d 14h 15m, CML= 324°, 360mm refl., ×300, various filters. Evening cloud; NPH; Edom light; Oxia Palus; well-developed Mare Serpentis, etc.
E. Roy Panther (Walgrave, Northants.), August 30d 01h 55m, CML= 340°, 152mm OG, ×300; dark Mare Serpentis. Compare with the drawings of Adamoli and Devadas.
F. Gianluigi Adamoli (Verona, Italy), August 22d 22h 55m, CML= 358°, 108mm OG, ×240. Note SPC detail, including Novus Mons on evening side. Dark Hellespontus.

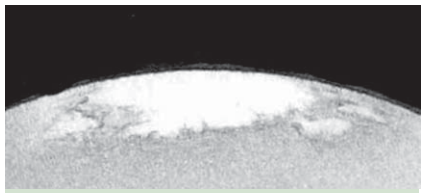


Figure 3. The SPC near opposition. Drawing by Richard Baum (Chester), Aug. 31d 21h30m–23h00m, CML= 265°, 150mm Mak–Cass. ×234. Impression derived from observation over an extended time interval. The cap had ragged edges and detached parts. On the *f.* side is an irregular Novus Mons.

Figure 4. Mars and its satellites. Drawing by Nicolas Biver (Ablis, France), Aug. 24d 00h17m, CML= 9°, 407mm refl. ×700. Both satellites to the left of Mars; Phobos closest to the planet.

tion the planet's atmosphere has been largely dust-free, despite perihelion passage (Ls= 260°) and the onset of southern summer solstice (Ls= 270°). In early October there was a brightening of NW Hellas in red light, but nothing more. The continuing very rapid retreat of the SPC was a highlight of the immediate post-opposition period. Its regression and fragmentation were followed in exceptional detail (Figures 1, 2A, 2F, 3, 4). Atmospheric activity continued to increase, and by late September considerable morning cloud could be viewed at the sunrise terminator. Several observers continued to observe and to image the martian moons (Figure 4).

A further report will be written for the 2004 February *Journal*. To date, just over 100 observers have contributed a large amount of data, and deserve the Director's sincere thanks. A complete list will appear later.

Richard McKim, *Director*

Aurora Section

The table on the next page gives the provisional list of noctilucent cloud (NLC) sightings made from the UK in 2003. The columns in order from left to right denotethe date of the observations, the no. of observers reporting, the types of cloud observed, the location at the lowest geographical latitude where the clouds were seen, the time range in which observations were made, the maximum brightness of the clouds on a scale of 1 to 4, and the maximum elevation of the clouds above the horizon. The classification of types of clouds follows the code: I, veil; II, band; III, billows; IV, whirls; V, network structure of billows, which might be two cloud levels at different altitudes.

Observations of NLC have also been received from our regular overseas observers: Jay Brausch, Glen Ullin, North Dakota: June 28/29; July 10/11, 18/19. Holger Andersen, Vildbjerg, Denmark: May 26/27; June 01/02, 26/27; July 01/02, 09/10, 11/12, 12/13, 14/15, 16/17, 17/18. Ostergaard Ølesen, Ronne, Denmark: June 01/02, 21/22; July 02/03, 14/15, 19/20, 20/21. Stephen Martin, USA to Heathrow flight, June 26/27. David Friend, USA to Heathrow flight, June 23/24; July 21/22.

With the help of Tom McEwan and the Internet the Section has now obtained over 270 NLC reports from observers at home and overseas, which will be analysed by Dr Dave Gavine, who in due course will prepare a report for the *Journal*. NLC and aurora appeared during the same nights on June 26/27 in Canada, 28/29 Glen Ullin, July 18/19 Glen Ullin, 21/22 North Atlantic, 26/27 all Scotland and Morpeth, August 03/04 Trelogan (Clwyd).

In 2003 August the geomagnetism group led by David Pettitt recorded stormy conditions on Aug 07, 17, 18, 19, 21 and 22, with disturbed conditions on 01, 02, 06, 23 and 29. David noted a storm sudden commencement at 14.25 UT on Aug 17 prior to the magnetic storm.

An active aurora took place on August 18/19, was overhead from the Moray Firth northwards, and at Morpeth was visible up to 48° above the horizon. Other active aurorae were noted from Scotland on August 21/22 and 22/23. Diffuse aurorae comprising only glows and quiet arcs were recorded on 07/08, 17/18, 24/25, 27/28 and 30/31.

David Friend was near Hudson's Bay flying to Heathrow on August 23/24 when he reported a very active aurora with an overhead corona. Jay Brausch at Glen Ullin observed a major active coronal aurora covering three-quarters of his sky on August 17/18. He observed lesser events on 01/02, 20/21 and 22/23 with other minor storms on 05/06, 09/10, 24/25, 29/30 and 31/01.

In 2003 September magnetically disturbed conditions were noted in the periods Sept. 03/05, 09/11 and in particular from 16 to 26. Stormy conditions from 15 to 19 were a 27-day repeat of similar activity in August. Stormy conditions appeared also on September 22 and 23. Curiously, active conditions were noted by some observers between 27 and 29 al-

though the planetary magnetic index Kp obtained from Niemegk in Germany showed a low level of disturbance.

The combination of a reduction in shock waves in the solar wind leading to storm sudden commencements and prolonged periods of disturbed magnetic conditions without many major magnetic storms indicates that the solar wind has entered the decline stage of the sunspot cycle.

An interesting apparition of auroral rays was observed at the Horncastle Weekend on September 13/14 between 22.15 and 22.30 UT. The rays rose to an elevation of 55°. A further unusual event on Sept. 26/27 was seen at 21.00 from Trelogan as a quiet band. On the same night white rays were recorded at Long Eaton, Notts., between 22.00 and 22.25 UT, together with a magnetic disturbance.

Auroral forms were observed from Scotland on September 04/05, 09/10, 16/17, 18/19, 19/20, 20/21, 22/23 and 30/01. These events consisted in the main of glows, arcs and sometimes rays. The most active period lay between 18/19 and 22/23.

At Glen Ullin in North Dakota, Jay Brausch recorded active aurorae on September 02/03, 03/04, 15/16, 16/17, 18/19, 19/20, 21/22, 22/23, 23/24, 24/25 and 25/26 which included active, pulsating or flickering forms. Quiet, diffuse aurorae were noted on 28/29, 29/30 and 30/31. The aurorae observed in September mirrored the magnetically disturbed period.

R. J. Livesey, *Director*

Provisional list of 2003 noctilucent cloud sightings in the UK

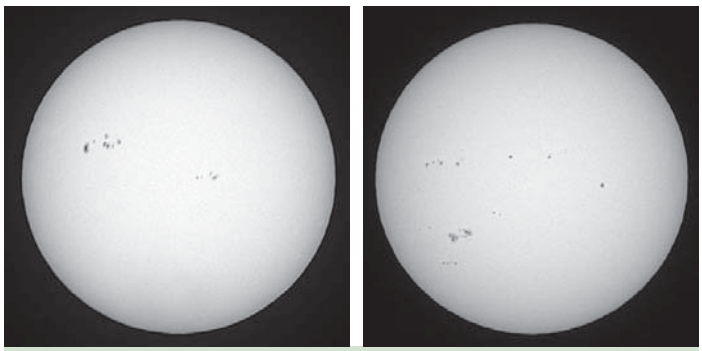
Date	*No. obs.*	*Forms*	*Lowest latitude*	*Time range (UT)*	*Max. brightness*	*Max. alt. (°)*
May 12/13	1	I	Wallsend	21.50	–	–
25/26	2	II	Upton on Severn	23.00–02.15	–	–
30/31	3	III, IV, V	Ullapool	23.00–00.30	2	90
31/01	1	?	Wallsend	02.15–02.41	1	30
June 06/07	2	I, II	Falkirk	22.20–22.30	–	–
08/09	5	I, II, III	Morpeth	23.15–01.30	1	15
12/13	1	I, II	Wallsend	21.30–23.00	1	15
17/18	3	I, II, III, IV	Wallsend	23.30–01.15	2	90
20/21	1	II, III	Morpeth	00.05–02.00	1	25
23/24	4	I, II, III, IV	Chichester	23.00–02.30	2	34
24/25	5	I, II, III	London	22.30–02.35	2	38
25/26	3	II, III	Morpeth	22.15–02.00	2	25
26/27	2	I, II, III	Morpeth	23.40–02.00	2	30
27/28	1	II	Kilwinning	02.00–02.15	5	–
28/29	1	I, II	Glengarnock	00.25–01.30	1	19
July 01/02	1	I	Glengarnock	01.35–01.43	1	18
02/03	4	I, II, III, IV	Glengarnock	23.00–02.20	4	90
03/04	6	I, II, III, IV, V	Glengarnock	23.00–01.55	3	60
05/06	1	II	Falkirk	23.35	2	5
07/08	1	–	Kincardine O'Neil	00.45–02.00	–	–
08/09	3	I, II, III, IV	Morpeth	23.30–00.35	3	12
12/13	12	I, II, III, IV	Stoke on Trent	22.20–02.41	3	40
14/15	2	I, II	Edinburgh	00.50–01.00	2	5
15/16	1	I, II	Milngavie	23.10–00.12	2	45
18/19	5	I, II, III	Wallsend	23.00–02.15	2	8
19/20	1	I, II, III	Morpeth	00.50–03.00	2	22
20/21	2	II, III	Morpeth	22.45–00.30	2	Low
22/23	1	II, III	Birnam	21.40–00.20	2	60
23/24	2	I, II, III	Morpeth	22.00–00.50	2	28
25/26	2	I, II, III, IV	Morpeth	22.29–03.00	2	23
26/27	4	I, II, III, IV	Morpeth	01.15–03.30	3	22
27/28	8	I, II, III	Glengarnock	21.45–00.50	3	25
Aug 01/02	5	I, II, III, IV	Bristol	21.40–03.45	4	28
03/04	1	III	Trelogan	–	–	–
07/08	2	II, III, IV	Glengarnock	21.15–03.30	3	30
09/10	1	I	Trelogan	21.15	–	–
30/31	1	I, II	Trelogan	20.30	–	2

Solar Section

2003 July

There was another small rise in the sunspot MDF in July. Activity during the month varied from low in the first and last weeks to moderately high in between. No high latitude spots were observed but there were a number at low latitude at the beginning and end of the month. In particular, was a single penumbral spot at –02°/137°, which showed little change throughout its passage across the disk reaching the W limb on July 28.

The complex Fki group seen at the beginning and end of June at +11°/26° was visible again in early July. It dominated the northern hemisphere and covered just over 15° of longitude. It crossed the CM with increased vigour on July 3/4 and by July 6 its area was 730 millionths. It did, however, seem to fade as it neared the W limb around July 9/10. This group reappeared on the E limb for a third time on July 25 but by now appearing as a small penumbral Jsx type spot at +11°/40°.



Images by Kevin Smith, N at top, E to right. *Left:* 2003 July 6; *right,* 2003 July 21.

On July 2 a small spot appeared on the disk at +5°/347°. By next day it had developed into a type Dsi group surrounded by three small penumbral spots. It developed steadily and crossed the CM on July 7 as a type Eai group. By July 11 it had started to fade and was no longer visible by July 13. In contrast the southern hemisphere was much quieter in the first week and was spotless from July 3/6. A new group appeared in the west at –11°/24° on July 8 but this faded and went over the W limb on July 10.

During the second week sunspot activity began to pick up as several groups developed on the solar disk or came over the E limb. On July 13 a group appeared over the limb at +14°/196°. It quickly developed to a type Dkc group by July 15 with an area of 580 millionths. Its two leading spots appeared to merge together and a trail of small spots appeared following it. The whole group was later seen to reduce in size as it crossed the CM. It was visible to the naked eye from July 19 to 23. However, sunspot activity following this group

began to rise and on July 19 a trail of spots was seen across the northern hemisphere. In addition, a southern group at –10°/196° developed rapidly to a type Dkc group of 440 millionths by July 19. As this group headed westwards its area grew. A peak in the number of AAs was seen on July 20/21 as a result of this sunspot activity. As the month ended much less activity was seen.

Hydrogen alpha

Prominence MDF for July: 6.55 (9 observers). Generally, there were many small prominences, some too small to be counted.

July 6 saw a number of large arch type prominences on the NE limb. Eric Strach observed an insignificant prominence on July 11 at 08.55 UT on the W limb at latitude +13°. When observed again at 10.30 UT the base of the prominence had become a brilliant red colour and was slightly enlarged. This continued until the whole prominence was a crimson mass but it did not reach any height. At 10.49 UT it had split into four parts. By 10.53 UT it had started to fade and subside leaving only a few stragglers in its place.

Filament activity was seen throughout July. On July 21 an elliptical shaped filament was on the E limb from lat. –08° to –17°. It took on a more circular appearance by July 23 and by July 26 was on the CM. It was observed again on July 27 but had broken up by July 28.

BAA sunspot data, 2003 July–August

	July		*August*	
Day	*g*	*R*	*g*	*R*
1	7	111	4	54
2	6	96	5	68
3	3	72	6	89
4	3	72	6	93
5	2	58	6	99
6	3	67	6	89
7	5	87	5	89
8	6	112	5	82
9	6	101	5	85
10	5	76	5	91
11	4	62	4	84
12	5	66	5	75
13	8	111	4	70
14	7	102	4	67
15	7	107	3	71
16	7	106	5	85
17	7	126	5	81
18	7	131	5	81
19	8	141	4	66
20	10	190	4	58
21	10	157	4	69
22	9	139	5	85
23	8	116	5	92
24	6	87	5	101
25	4	48	6	100
26	3	36	6	108
27	3	33	6	99
28	4	59	7	108
29	3	47	7	103
30	4	49	6	81
31	4	52	5	69
MDFg	5.49 (60)		5.01 (56)	
Mean R	90.93 (54)		83.62 (51)	

North & south MDF of active areas g

	MDFNg	*MDFSg*
July	2.94	2.87 (37)
August	1.76	3.30 (34)

g = active areas (AAs)
MDF = mean daily frequency
R = relative sunspot number
The number of observers is given in brackets.

2003 August

August saw a slight fall in the sunspot MDF. This was more noticeable in the northern hemisphere, which was less active than the south and was spotless from August 8 to 15. There were no high-latitude sunspots but there were three at low latitude of +/–3° at the middle and end of the month.

The beginning of the month saw most of the sunspot activity on the southern hemisphere. On Aug 1 a single spot at +13°/19° was the only sign of activity on the north compared to two groups at –5°/1° and –8°/296°. On Aug 2 two more groups appeared: a small Axo type group at –11°/327° and a larger Dai group –18°/296°. The two AAs at –8°/296° and –18°/296° developed as they moved away from the SE limb with a few following pores appearing up to Aug 6. The leaders of both groups reached the CM on Aug 7. The one at -18°/296° seemed to coalesce in longitude and was seen with the naked eye from August 4 to 10. After this both groups began to decay before passing over the W limb on Aug 13 and 14. Both groups seem to have been visible on a previous rotation in early/mid-July.

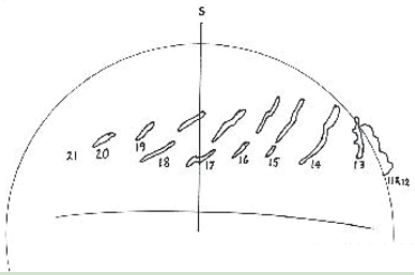
On August 9 yet another group appeared over the SE limb at –12°/199°. As it moved away from the limb it showed continual development and this seemed to accelerate to become a type Eac group. It was seen with the naked eye from Aug 13 to 16 and crossed the CM on Aug 14. Thereafter, it aligned itself in a WNW to SES direction but started to fade. It went over the W limb on Aug 20/21 as two single spots.

Northern hemisphere activity began to show again on Aug 17 with a single spot near the E limb at +7°/91°. On Aug 18 follower spots had developed at +8°/83° and as the group approached and crossed the CM on Aug 22, it had grown into a fairly long trail of small sunspots.

By the end of the month most of the spots visible were fairly numerous but small.

Hydrogen alpha

Prominence MDF for August: 5.62 (8 observers). There was a small decline in the prominence MDF this month. There seemed to be many small prominences, just high enough to be counted, with a concentration in the sunspot latitudes of +/–40°.



Drawings by Brian Mitchell of a prominence becoming a filament, and its passage across the disk from 2003 August 11–21.

The W limb showed much large spicular activity on August 1. The SW limb showed four almost parallel detached prominence jets at latitudes +41° to +48° at 11.55 UT which were not seen before this time. By 12.10 UT they were further from the limb and almost parallel to it (estimated height 220,000km). At 12.20 UT only one remnant was seen at a height of 320,000km, rapidly becoming fainter by 12.24.

On Aug 16 a box-like prominence was visible on the W limb at lat. +44° from 07.45 UT to 08.10 UT. An eruptive prominence taking the form of a curved jet was later seen at 11.52 UT. Its height was estimated at 12.06 UT at 130,000km from the limb. By 12.50 it had disappeared with only a small prominence remaining.

A striking multiple arch type prominence was seen on the SE limb at 13.30 UT on Aug 19. It had gained in size by Aug 20 but by Aug 21 only a low mound remained.

There was a great deal of filament activity. A fragmented filament was seen on the NE limb on August 1. By the next day it had become a curved structure reaching more than a solar radius in length. Its most westerly part was just west of the CM at lat. +35°, it then veered south to about lat. +25° and 15°E of the CM, and extended ENE stopping just short of the E limb at lat. +28°. This filament remained visible for the following four days but became fragmented in parts.

As the two sunspots appeared over the E limb on August 2 a filament was seen very close to the limb together with an unusual darkness around the spots. Eric Strach has suggested that perhaps this might have been a diaphanous filament.

A rapidly expanding filament seemingly associated with the sunspot group at +7°/91° was observed by Lyn Smith on Aug 27 from 11.05 UT to 11.15 UT. It resembled a tadpole in shape with the filament looping towards the east and the head appearing very dark against the granulation of the disk.

Geoff Elston, *Director*

Saturn Section

Spots on Saturn in visual wavelengths

Introduction

The 2002–'03 apparition of Saturn was one of the most active in several years, aided by the Earth's finally reaching its maximum angle south of the Saturnian ring plane, giving northern hemisphere observers their best view of the planet and its ring system since the early 1970s. The maximum southerly tilt of 27° occurred in late March, though by then Saturn had already begun its descent into evening twilight.

This interim report provides details of small but definite white spots and other features recorded on the globe and rings of Saturn during the apparition. The primary contributors of high-resolution CCD images of the planet during the period were Ed Grafton (Houston, Texas, USA), Don Parker (Miami, Florida, USA) and Damian Peach (Tenerife, Canay Islands, Spain). Excellent images were also received from Gu Yu (USA) and Teruaki Kumamori (Japan). Meanwhile high quality visual drawings were received from David Gray (County Durham) and Richard McKim (Peterborough).

2002 September & October

The first high resolution observations and images of the planet were obtained by Jesus R. Sanchez on 2002 September 13 from Cordoba, Spain. Two weeks later Ed Grafton turned his attention to Saturn on September 29 and his images were the first to reveal a small but distinct white spot in the planet's South Tropical Zone, nudging the South Temperate Belt. The spot was seen to rotate with the planet and was thus confirmed as a real feature. This was the first of several similar spots to be followed across this region of the planet during the apparition.

The spot was recovered on October 4 by Don Parker in Florida though under poor seeing. Again on October 7, Grafton obtained further images of the feature under excellent seeing conditions, and also detected other low contrast spots in the planet's South Equatorial Belt (SEB).

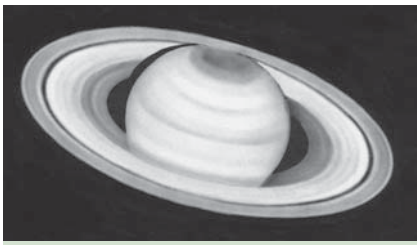


Figure 2. Drawing by David Gray with 415mm Dall–Kirkham Cass., X348 and W25 red filter. 2002 October 31, 01h 30m UT. CML= 43° (SI) and 146° (SIII). Note banded appearance to Ring C, most pronounced at the p. ansa. Gray's impression was that the ring displayed a deep reddish hue.

Parker then obtained further images of the spot on October 8 and 12, as well as recovering the small mid-SEB spots. This allowed drift rates to be determined for these features. The small STrZ bright spot showed almost no drift relative to System III, while the fainter mid-SEB spots showed a rapidly prograding drift, as is easily seen in the drift chart (Figure xx). Parker's October 12 images were the last to show this spot and it is believed to have faded from view soon after, which was confirmed when Damian Peach began his imaging run from Tenerife on October 16. Further high resolution images of the spot's longitude were secured on October 22 under excellent seeing, confirming that the feature indeed appeared to have faded. Yet strangely, David Gray recorded what he described as a 'light STrZ spot' at the longitude of this feature on October 30. Observing in to the early hours of October 31, Gray was rewarded by a steady improvement in conditions with all too rare spells of perfect seeing being enjoyed. Using a Wratten 58 green filter he was able to confirm the 'enhanced STrZ lightness over longitudes approximating to the Grafton spot'. Switching to a Wratten 25 red filter he found the STrZ 'uniformly light across the disk'. However in his notes, Gray goes on to relate that *'it was while using this filter (Wratten 25 red) I was immediately struck by the prominence of Ring C. The preceding ansa looking decidedly banded during the better moments*'. Gray found this also to be the case at the following ansa though the impression was not as strong. Applying Wratten 23A, 22 and 15 (light red, orange and yellow filters) gave 'progressively poorer views of the effect'. Meanwhile a green colouration to the planet's southern regions was recorded in green light images by Peach on October 27 and 31, which can also be traced back further in images by Parker at the beginning of the month.

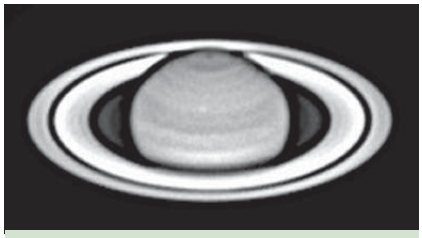


Figure 3. An image from Jean Lecacheux using the 1m Cassegrain telescope at the Pic du Midi Observatory on 2002 November 25. This image shows the small STrZ white spot discovered 6 days earlier in images by Peach and Grafton. *Image courtesy Dr Jean Lecacheux.*

2002 November

Images during November were rather more prolific as the planet now lay on the local meridian before dawn, and further interesting spot activity was noted. It began on

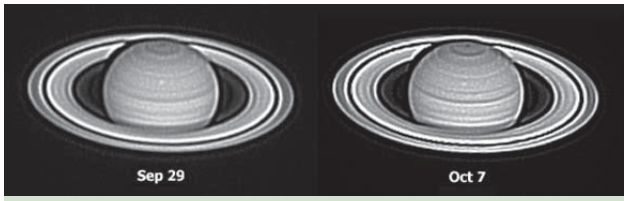


Figure 1. The first STrZ white spot discovered on 2002 September 29; CCD image by Ed Grafton. The same spot was again imaged on October 7 by Grafton, showing an almost identical appearance to the discovery images, though having faded slightly. Its drift was almost static in System III. Ed Grafton, Houston, Texas, USA. 350mm SCT at f/27 & SBIG ST-5c CCD. 2002 Sept. 29, 11:28 UT, CML= 13°.5 (SI), CML= 94°.6 (SIII).

Figure 4. Two images by Peach on 2002 December 15 (left) and 24 (right) in green light showing the storm in the Equatorial Zone. By December 24 the feature had changed greatly in appearance. Also note the small white spot in the right image, which had been discovered by Grafton two days earlier. Images by Damian Peach, Tenerife, Spain. 280mm reflector & SBIG ST-5c CCD; 2002 December 15 at 00h 39m UT, CM= 212°.1 (SI), CM= 248°.1 (SIII); 2002 December 24 at 00h 48m UT, CM= 256°.9 (SI), CM= 351°.1 (SIII).

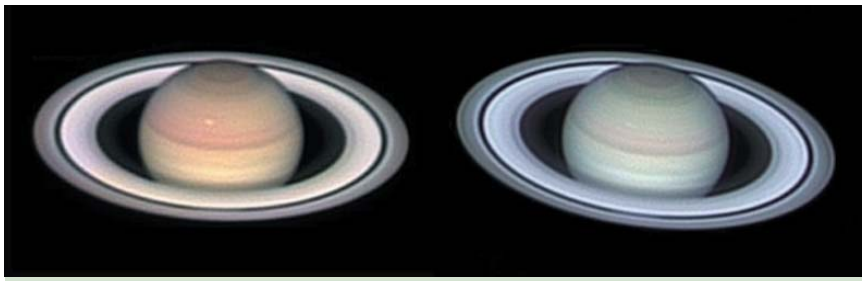


Figure 5. An image by Ed Grafton on December 22 showing the new bright STrZ white spot, and an image taken just two days later by Peach on December 24 at the same CM longitude, revealing the spot having faded considerably. *Left:* Ed Grafton, Houston, Texas, USA, 350mm refl. with SBIG ST-5c CCD; 2002 Dec 22, 05h56m UT, CM= 188° (SI), CM= 342° (SIII). *Right:* Damian Peach, Tenerife , Spain, 280mm refl. with SBIG ST-5c CCD; 2002 Dec 24, 00h48m UT, CM= 256°.9 (SI), CM= 351°.1 (SIII).

Figure 6. One of the final amateur images of the 2003 apparition was made in Japan, as the ring system neared its maximum presentation angle of 27º. This image taken by Teruaki Kumamori on March 12 using the 600mm telescope at the Sakai City Observatory shows the magnificent spectacle. Teruaki Kumamori, Sakai City, Japan, 600mm refl. with Philips ToUcam Pro Webcam; 2003 March 12, 09h45m UT, CM= 159° (SI), CM=174° (SIII).

November 12, when Peach discovered a small white spot in the mid-SEB, which was confirmed by Grafton two days later. Peach, observing under mediocre seeing on November 19, recorded another small white spot in the STrZ in CCD images. This was confirmed again by Grafton the following day, and re-imaged by Peach on November 22. A further image was secured by Dr Jean Lecacheux using the 1 metre telescope at the Pic du Midi observatory on November 25. The spot's drift rate determined from all the observations was +0.3° per day in System III – almost identical to the spot discovered on September 29. Finally, just one day after this spot was discovered, Gu Yu, observing from the USA using a 230mm reflector, imaged another small spot in the STrZ, though this was rather fainter than the others. It was confirmed by Grafton two days later, after which it disappeared. It is likely the spot was discovered as it was fading.

Its worth noting that, despite the excellent CCD coverage of these features, at this point in the apparition no confirmed visual sightings had been reported other than those of Gray, most probably because the low contrast of these spots made them very difficult features to see visually.

2002 December

December was perhaps the most active month of Saturn observation for both amateur and professional astronomers. The Hubble Space Telescope was employed for a series of observing runs on December 9, 14, 16 and 17–18 and the results were reported to the observing community by Agustin Sanchez Lavega of the International Outer Planets Watch (IOPW).

The first half of the month was rather quiet with no new spots noted, but on Dec 15, Peach imaged a storm rotating across the Equatorial Zone consisting of dark streaks of material surrounding brighter clouds. This storm was also imaged by the HST on Dec 17. The feature proved to be rapidly moving. On Dec 15, its centre was located at 200°·9 (SI), and just two days later when imaged by HST had increased to 214°·4 (SI). This provides us with a drift rate of +6°·7 per day (SI).

No new STrZ white spots had been recorded at this time but a few days later Peach, imaging the planet on December 18, found a further small feature. This spot was also imaged by the HST just the day before. This storm was to become the longest lived of them all, lasting into 2003 January.

A few days later, on Dec 22, Grafton captured a brilliant new spot in the STrZ – easily the brightest such storm to date. Peach recorded this storm under excellent seeing just two days later, and found it had remarkably faded. Don Parker then imaged the longitude of the spot on Dec 27, finding it had disappeared from view, making this feature seemingly both the brightest and shortest lived storm of the apparition.

2003 January to March

As mentioned above, the storm from Dec 18 persisted until the end of January, as a small spot was clearly recorded close to its position as late as Jan 28 by Peach (corresponding with the observed drift of +15° per 30 days (SIII)). This spot was observed visually by Don Parker on January 7, proving it was possible to see these features in larger amateur scopes. No other spot outbreaks were recorded after Peach's January 28 images, and the remainder of the apparition was quiet, though fewer observations were received after opposition. Most notable during this period were images by Grafton and Legault (Jan 5) and Peach (Feb 19) which proved to be some of the best images of the planet ever obtained by amateur observers.

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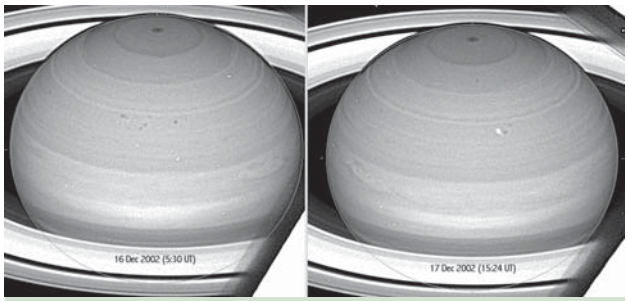

Figure 7. Two images from the Hubble Space Telescope obtained through a ~700nm (deep red) filter on 2002 December 16 (left) and 17 (right.) The small brilliant STrZ white spot is visible on December 17, which was independently discovered a day later by Peach. The December 16 image shows a group of the small dark spots mentioned in the text. Both images show a storm system in the Equatorial Zone, which was again imaged by Peach on December 15 and 24. *Images courtesy A. Sanchez Lavega, IOPW, and NASA.*

At the end of March the Earth finally reached its maximum angle south of the ring plane, presenting us with the finest view of Saturn's southern hemisphere since 1973. The sight was best captured in a late image on March 12 taken from Japan by Teruaki Kumamori, using the 600mm Cassegrain telescope at the Sakai City Observatory.

Hubble Space Telescope imagery

NASA's Hubble Space Telescope was employed for a series of imaging runs on Saturn during the apparition. Observations were made on 2002 September 21, November 30, December 9, 14, 16 and 17–18 and 2003 March 7, and reported to the Saturn observing community by Dr Agustin Sanchez Lavega of the IOPW. The images in many cases either confirmed the spots discovered by amateurs, or displayed new spots. The images revealed these features in excellent detail, and showed them to be brilliant white clouds, with multi-spectral images obtained by HST on November 30, revealing the features to be brightest at green and blue wavelengths, indicating they are located at higher altitudes. Also these spots showed no contrast in 890nm methane band or violet imagery due to their being blurred by the thick high altitude haze of Saturn's atmosphere. The storms appear to be small convective eruptions, which as shown by the images, can last several weeks.

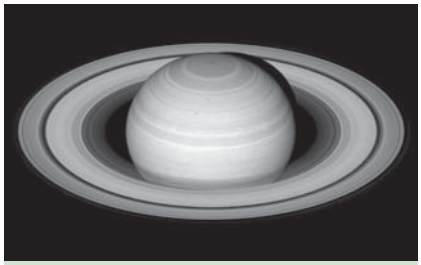

Figure 8. Saturn imaged by the Hubble Space Telescope on 2003 March 7. This red filtered image clearly reveals two small dark spots present within the planet's southern hemisphere. *Image courtesy NASA.*

In red and I band imagery taken by HST, a notable series of dark spots also persisted during the apparition, however all seemingly went undetected by amateurs as these spots only had good contrast in red light, and most amateur imagery during 2002/'03 was obtained by the use of webcams or unfiltered CCD cameras. These darker spots display drifts of between +0.5° per day (SIII) to –3° per day (SIII) at a slightly more southerly latitude. They appear more numerous than the bright spots tracked by amateurs, and with the appropriate R filter imagery, could be visible in amateur telescopes. It is interesting to note that Gray noted irregularities in the STB consisting of a chain of small condensations, observing visually on September 3.

Summary

5 small storms were seen in Saturn's South Tropical Zone during 2002/'03, all exhibiting the same appearance and observed drift rates (+15° per 30 days (SIII).) This apparition was the first time so many of these features were recorded, though they have been followed in previous HST images, and even some of the *Voyager* images show similar storms. The last such storm of this kind recorded by amateur observers was in 2000 December, by Maurizio di Sciullo and Don Parker, though this feature was very short lived.

Below is a table of the South Tropical Zone white spots, and those who observed them:

Storm 1	Sep 29–Oct 8	Grafton, Parker, HST
Storm 2	Nov 19–Dec?	Peach, Grafton, Pic du Midi, Yu
Storm 3	Nov 20–22	Yu, Grafton
Storm 4	Dec 17–Jan 28?	HST, Peach, Grafton, Parker
Storm 5	Dec 22–27	Grafton, Peach, Parker

In all 2002–03 proved to be the most active and interesting apparition of Saturn since at least 1997. Some have speculated this indicates increased atmospheric activity, now that the southern hemisphere is inclined at its maximum tilt sunward. Only time and the continued work of the amateur and professional community can provide answers to these questions. At the time of writing, Saturn is again present in the morning sky, and the first new STrZ white spot has already been discovered. This occurred on 2003 September 13 in images by Christophe Pellier, and was confirmed in further images by Pellier on September 17. The spot again displayed the classic STWS characteristics, being located at 40ºS (planetographic), and displaying a slightly retrograding drift.

Observations of these features will continue during 2003/'04, and hopefully more detailed papers will appear in the near future as our understanding of them grows.

Cassini encounter

Next year will see the long awaited encounter with the Saturn system by the *Cassini* spacecraft. IAU Commission 16 (Physical Study of Planets and Satellites) has specifically requested observations of the planet and satellites by the worldwide astronomical community for the anticipated duration of the mission, 2003–2008. Additionally, a recent meeting of the Division of Planetary Sciences agreed to establish a special observing campaign to support the *Cassini* mission. The International Outer Planets Watch (IOPW) encourages contributions from the amateur community and observations may be contributed directly to the IOPW by established observers.

Suitable observations submitted to the Saturn Section will be forwarded to the IOPW and in this capacity, Section Assistant Director Damian Peach has agreed to take on the role of 'Imaging Coordinator'. Visual observations of Saturn should be sent to the Director, while electronic images should be e-mailed to the Assistant Director and copied to the Director. Contact details can be found at the rear of the *Journal*.

David Graham, *Director*
Damian Peach, *Assistant Director & Imaging Coordinator*

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Mercury & Venus Section

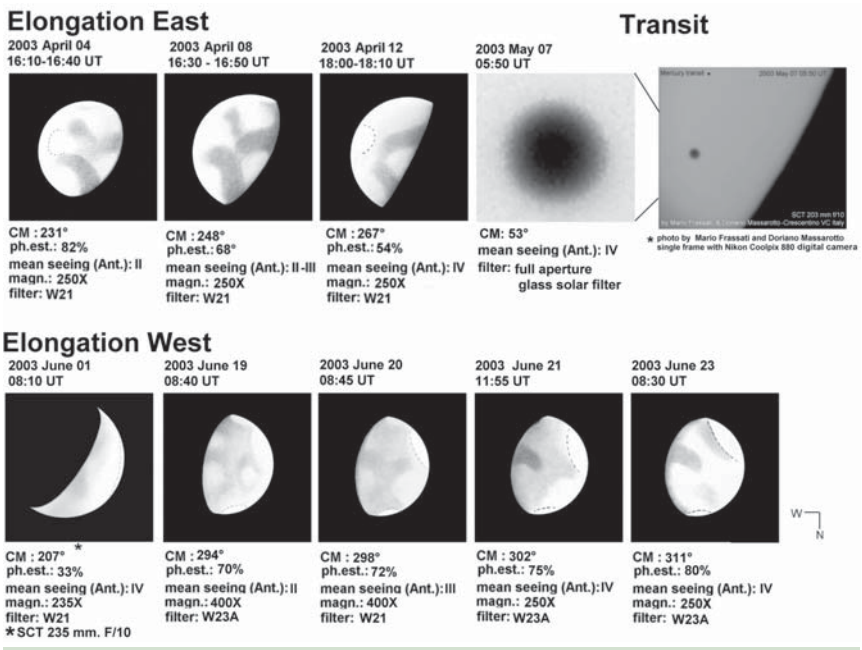
A note for observers of Mercury

Did Earth-based observers pre-empt the discovery of craters on Mars? The evidence is inconclusive and highly contentious. A much better case can be made out for Mercury where bright spots have often been sighted on its tiny disk. Initially these were thought to be evidence of atmospheric activity, but it is now known they correspond to the ejecta blanket of bright ray craters; a fact that gives new meaning to direct visual study of the planet, inasmuch as they provide a more reliable means of correlating albedo features with the planet's morphology.

The mapping of bright spots therefore, will be an important addition to the excellent programme produced by the former Director, R. M. Steele (*J. Brit. Astron. Assoc.* **111**(1) (2001), 49–51) which intending visual and CCD observers of Mercury are urged to study. Using this as standard our main objectives can be briefly stated, thus:

1 Every effort should be made to improve knowledge of the albedo markings, especially in the hemisphere not explored by *Mariner 10*.
2 The position and physical appearance of all bright spots and associated bright regions should be recorded as accurately as possible.
3 Special attention should be devoted to the planet's polar regions. At times they appear dark, at others bright. Whether this is due to albedo differences, or the existence of ice fields as some investigators suggest, has still to be resolved. Any peculiarity, such as truncation or extension, of the cusps should also be noted.

Today Mercury is observed with an informed eye, and our understanding is no longer characterised by uncertainty. Knowledge, enthusiasm and burgeoning technology have widened the field considerably, enabling the amateur to take up lines of inquiry likely to add to our growing store of understanding of mysterious Mercury.



Observations of Mercury by Mario Frassati, Crescentino (VC), Italy. 203mm SCT at f/10.

In addition to the paper already mentioned, I recommend the following articles:

David L. Graham, 'The nature of albedo features on Mercury, with maps for the telescopic observer', *J. Brit. Astron. Assoc.*, **105** (1995), Pt 1. 12–16, and Pt. 2, 59–64

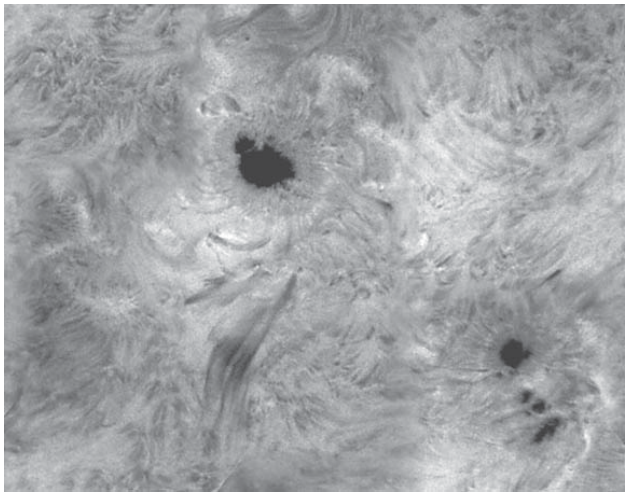
Mario Frassati, Raffaello Braga & Richard Baum, 'A new optical map of the regolith albedo of Mercury', *J. Brit. Astron. Assoc.*, **112** (2002), 125–129

Richard Baum & Raffaello Braga, 'Mercury's craters seen from Earth?', *J. Brit. Astron. Assoc.*, **112** (2002), 158–159

I wish to acknowledge the help given by Richard Baum, and thank him for his kind assistance.

Mario Frassati, *Director*

Our turbulent Sun



Sunspots in H-alpha. Taken at the Equinox Star Camp at Thetford on 2002 September 12 by Kevin Smith. Equipment used was a Daystar 0.7ATM H-alpha filter on a Takahashi FS128, and a Televue ×4 Powermate. The image was made using a Basler digital camera with Aquinto A4I Docu software. Slight adjustments to highlight surface detail were made with Adobe *Photoshop*.

Picture of the Week

This image first appeared on the BAA Web site, **http://www.britastro.org**, as the Picture of the Week for 2002 November 11. Send your best images to the Picture Editor, Callum Potter, at **picture@britastro.com**