Mars Section

The opposition of Mars, 2007 – 2nd interim report

A short note on the present apparition appeared in the April *Journal* (**118**, 73–74 (2008)). Here we review some aspects of the observations from around opposition (2007 December 24) to 2008 late May, by which time the apparition was virtually over. We also report upon the safe landing of NASA's *Phoenix* probe (Figure 1).

The weather in early 2008, at least in the UK and Europe generally, was not at all helpful. It was very frustrating to experience long runs of cloudy nights in the period just after opposition. The Director eventually managed to make over a hundred drawings: see Figure 3 for six examples. Makoto Adachi, David Gray, Paul Abel and Ian Hancock also made very detailed drawings. Gray enjoyed a particularly fine view in near-perfect seeing on December 11 (see Figure 4). As in 2005 the majority of our observers have been taking digital images and video (Figures 2 and 5).

Phoenix

NASA's *Phoenix* landed safely on May 25 (Ls= 76°) at lat. +68°, long. 234°, in *Vastitas Borealis* (midway between classical *Utopia* and *Lemuria*), making it the first such craft to land in either of the martian polar regions. At the time of landing, the bulk of the N. polar seasonal cap had already retreated well north of latitude +68°. (The average latitude recorded by the BAA in the 1980s and 1990s at a mean Ls of 78° was +76°.) *Phoenix* has a stereoscopic camera and sample arm, each of which is presently working well. It also carries a meteorological station, a mass spectrometer for soil outgassing analyses, and facilities for microscopy and soil conductivity experiments. Its two primary aims are to assess the biological potential of the ice-soil interface, and to study the history of water in the martian arctic.

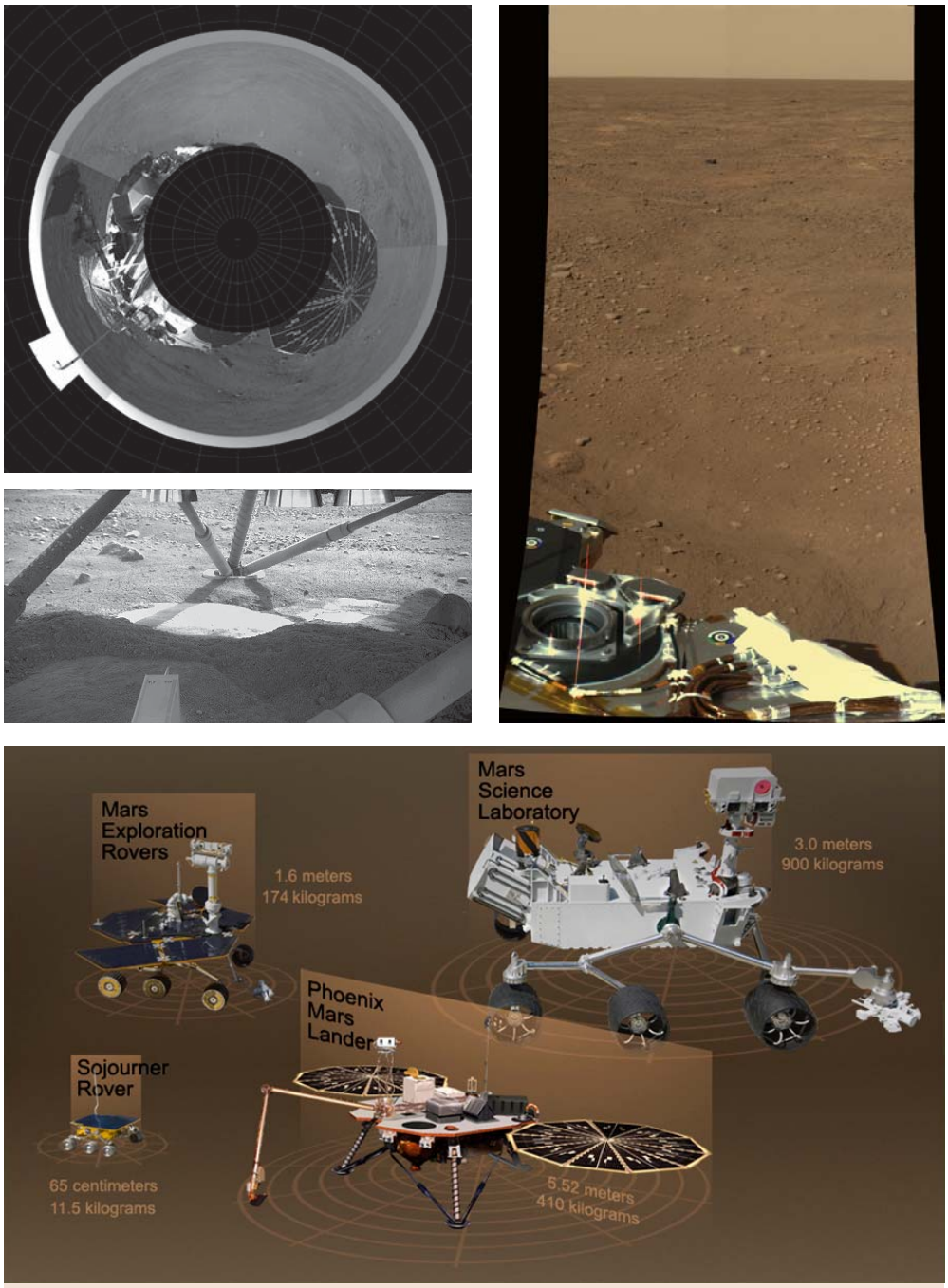


Figure 1. Images of the martian northern plains from NASA's *Phoenix* lander. *(NASA/JPL-Caltech/ University of Arizona/Texas A&M University.)*

***Top left*:** 360° view of the horizon compiled on Sols 1 and 3 at different local times. North is up.

***Top right*:** Colour view to the northwest of the lander, which shows terrain with a polygonal cracking pattern, sprinkled with small pebbles, extending away from the craft; Sol 2.

***Centre left*:** Sol 5 image showing the result of soil removal by *Phoenix's* descent thrusters. (The thrusters are visible at the top of the picture.)

***Bottom*:** A scale model montage of NASA's Mars landers and rovers from *Sojourner* (1997) up to the forthcoming *Mars Science Lab* (scheduled for launch in 2009).

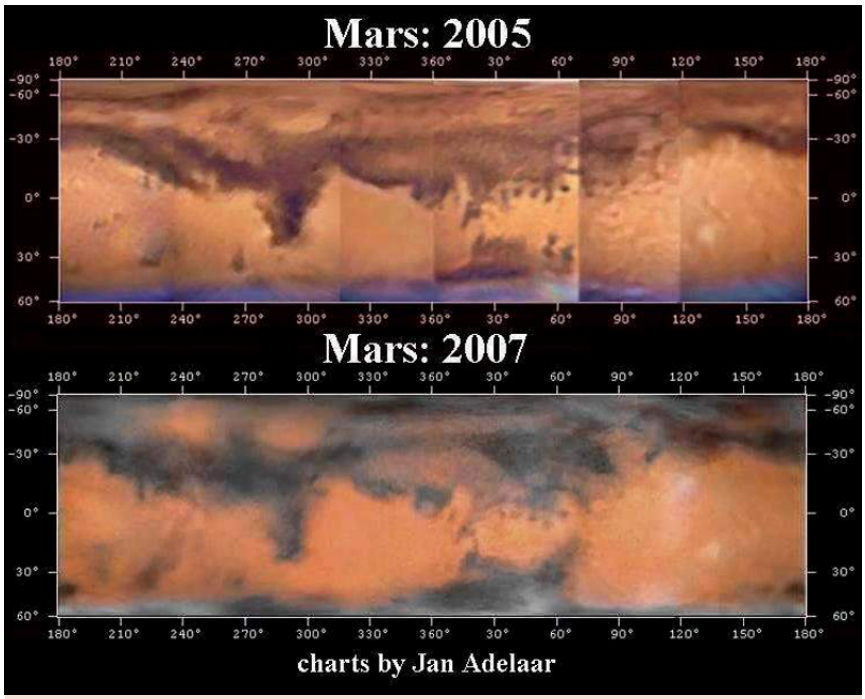


Figure 2. Comparative Mars apparition charts for 2005 and 2007 compiled by Jan Adelaar (235mm SCT, Arnhem, Netherlands), from personal images (Philips TouCam webcam, 2005 Oct 6–Nov 9; DMK camera, 2007 Nov 15–Dec 30). South is up.

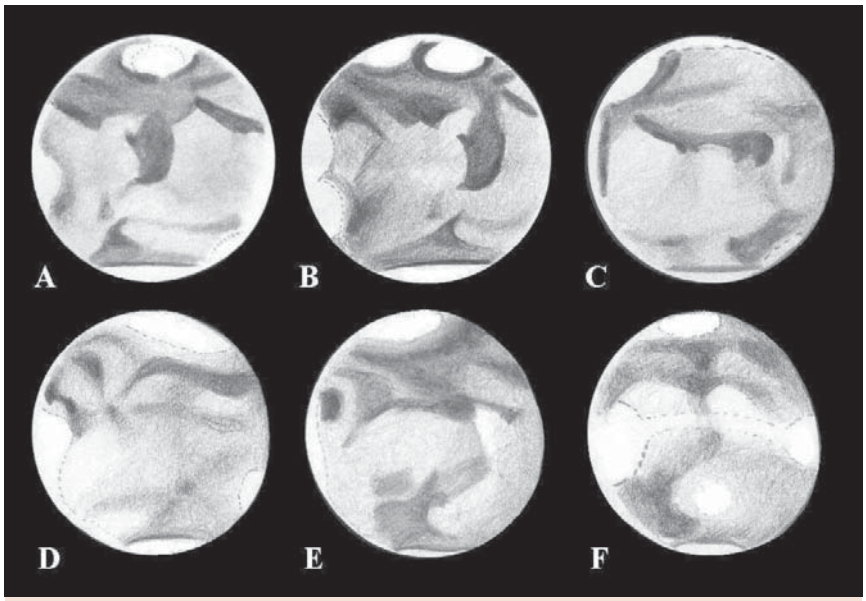


Figure 3. Drawings by the Director with 410mm Dall–Kirkham Cass., ×256, ×410. South is up.
A. 2007 December 12d 21h 15m, CML= 285°. *Hellas* is very bright.
B. 2007 December 13d 20h 35m, INT (integrated light) + W23A (orange), CML= 266°. Note the new albedo streak crossing *Aethiopis*.
C. 2008 January 16d 22h 05m, W23A, CML= 348°. NPC seen. (In blue light, a larger, overlying N. polar hood was evident (Ls= 19°).)
D. 2008 February 4d 18h 40m, INT, CML= 126°. *Solis Lacus* is extended to the NW; *Mare Sirenum* is extended NE towards *Phoenicus Lacus*; *Olympus Mons* is visible.
E. 2008 February 11d 18h 00m, INT + W23A, CML= 52°. *Nilokeras–Ganges* is well seen. *Argyre* is bright within the S. polar hood.
F. 2008 March 21d 19h 10m, CML= 63°. ECB (dashed lines) is seen to be running from the evening *Chryse/Xanthe* to the morning *Tharsis*, at Ls= 48°. Whiteness also exists in *Argyre* and *Tempe*.

The spacecraft was starting to return many images, some of which are given in Figure 1, as this note was being written. A few days after landing, the probe examined the terrain between its footpads to discover that the upper soil (or regolith) had been dispersed by its descent thrusters upon landing to reveal a brighter, harder layer of what appears to be ice. The *Phoenix* website may be found at **http://www.nasa.gov/mission_pages/phoenix/main/index.html**

Albedo charts and the aftermath of the global dust storm

In the previous report we listed the principal albedo feature changes resulting from the global storm. If we compare the regions from *Margaritifer Sinus* through *Mare Erythraeum* to *Aurorae Sinus* upon the comparative charts made by Jan Adelaar (Figure 2), we can see evidence of other changes in relative intensity. In particular, even by early 2008 the markings in general had still not returned to the intensities they had shown at opposition in 2005. Richard Baum found features still 'somewhat subdued' visually on January 10, and Alan Heath and the Director had similar impressions. Since our last report, the martian atmosphere has not shown any further signs of dust storm activity, at least none at the telescopic level of resolution.

Meteorological observations

According to our BAA Section reports of 1995, 1997 and 1999, the so-called Equatorial Cloud Band (ECB) is a more or less constant feature from northern mid-spring till late summer (Ls= 50–145°, approximately). The post-opposition observations in 2008 also show this feature from

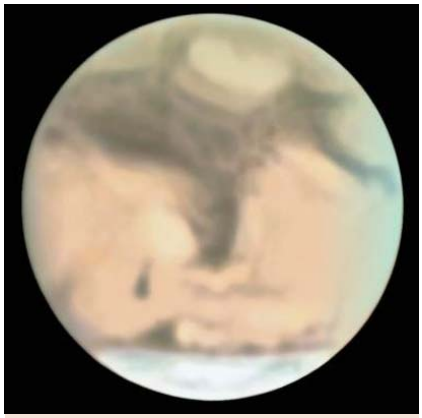


Figure 4. Drawing made on 2007 December 11d 20h 50m, 415mm Dall–Kirkham Cass., ×365, Seeing I–II, CML= 287°, *D. Gray*. Fine details abound; the best view ever obtained by this highly experienced observer.

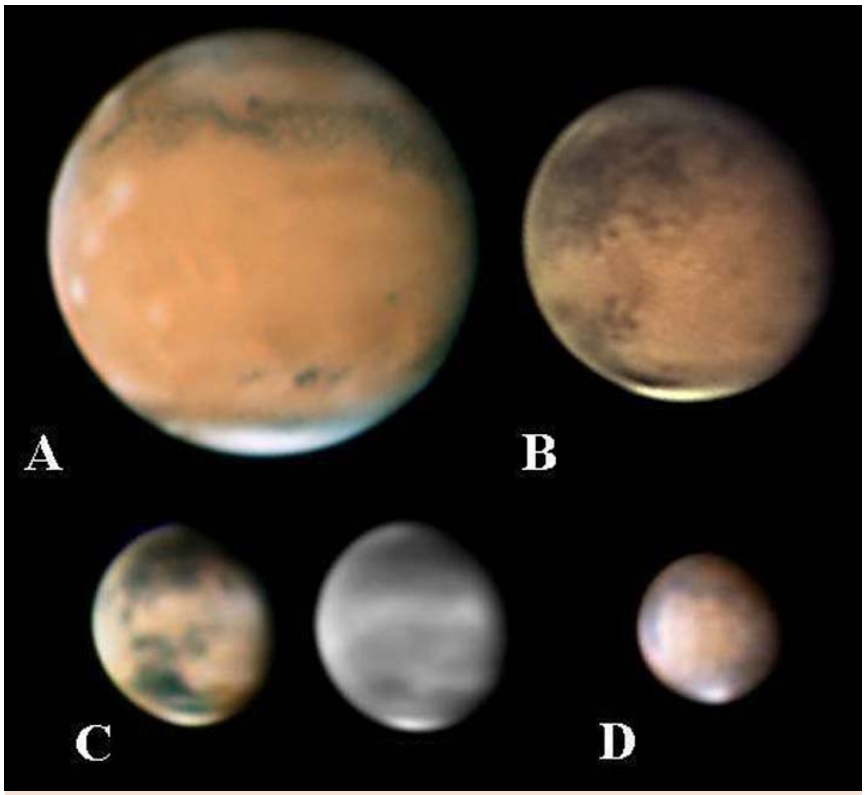


Figure 5. Selected images as Mars receded from Earth after opposition. Not to scale. South is up.

A. 2008 January 9d 05h 12m, CML= 164°, 410mm refl., Skynyx 2-0, *D. C. Parker*. Bright evening clouds over *Arsia Mons*, *Ascraeus Mons* and *Pavonis Mons*, with fainter afternoon cloud over *Olympus Mons* at Ls= 15°; note the resolution of the remarkably fine details within the southern maria. (D= 14.7")

B. 2008 February 12d 21h 08m, CML= 88°, 356mm SCT, DBK 21AF04.AS colour camera, *A. S. Kidd*. Fine details in *Solis Lacus*, which retains its new shape since the global dust storm. The calderae of all four volcanoes from **A** are shown on the morning side as small dark spots. (D= 10.7")

C. 2008 May 8d 01h 00m, CML= 59°, 410mm refl., Skynyx 2-0, *D. C. Parker*. RGB and blue (480nm) images are shown, the latter best showing the equatorial cloud belt extending from a bright terminator cloud over *Tharsis*, to *Chryse*, at Ls= 69°. Also note a white cloud streak over *Tempe*. (D= 5.5")

D. 2008 May 14d 00h 04m, CML= 347°, 320mm refl., DMK 21AU04.AS camera, *S. Walker*. The *Syrtis Major* at the evening limb looks bluish, being affected by evening cloud (forming part of the ECB) extending over it from *Aeria*. (D= 5.4")

the anticipated time onwards. See Figures 3F and 5C. The seasonal presence of thin white cloud crossing the *Syrtis Major* produces the so-called *Syrtis* Blue Cloud: see Figure 5D. Long strips of white cloud have also been seen in the temperate latitudes of both hemispheres; these were beautifully shown on Hubble Space Telescope images taken in December, and can also be traced in Figure 5A.

Other white clouds have become prominent as the season progressed and the N. polar cap recessed, in particular the orographic clouds over *Olympus Mons* and the *Tharsis* volcanoes (Figure 5A). These latter clouds show a longer range in Ls than the ECB, but the volcanoes behave individually on account of their different latitudes.

Observers

In addition to those listed above and in the previous note, useful data were received from M. Adachi, R. M. Baum, N. M. Bone, E. Colombo, D. Dierick, P. Edwards, C. Fattinnanzi, D. Fisher, M. Foulkes, C. E. Hernandez, P. J. Garbett, C. Go, M. Green, K. C. Howlett, S. Johnson, M. Kardasis, S. Kowollik, M. R. Lewis, R. N. B. Lewis, P. Lyon, C. Meredith, D. Niechoy, K. Peters, M. J. Porter, A. R. Pratt, R. W. Schmude, D. Storey, D. Strange, G. Teichert and J. Warell.

A full Section Report will be prepared later. Meanwhile, my thanks are due to all contributors for achieving such an excellent level of coverage over many months.

Richard McKim, *Director*

Meteor Section

Another good year for the Perseids

In a year when the majority of the most active meteor showers during the autumn months fall victim to bright moonlight, the Perseids still offer a good opportunity to catch high rates close to their maximum in 2008. Always a favourite target, even for those who don't regularly observe meteors, the shower is active from late July until about August 20. Peak this year is expected close to Aug 12d 07h UT, during morning daylight in the British Isles. UK-based observers can probably expect highest observed rates as dawn approaches on the Monday night to Tuesday morning of Aug 11–12. By the end of the night, the Perseid radiant – on the Perseus/Cassiopeia border – is over 60° high in the northeastern sky, and observed rates of up to a meteor per minute may be seen under the most transparent skies at locations well away from light pollution.

At a first glance, this might seem rather an unfavourable Perseid return, with Full Moon on August 16, just four days after maximum. However, the 10-day old waxing gibbous Moon sets around 23h 20m UT on Aug 11–12, leaving a window of about four hours of dark sky between moonset and dawn. It should also be possible to squeeze a good couple of hours of dark-sky observing out of Aug 12–13, when rates should still be high in the interval immediately following peak.

Observations are, of course, also worthwhile in the run-up to maximum, when the Moon will be much less of a nuisance. As activity begins to kick towards peak from Aug 8–9 onwards, watches over the weekend prior to maximum could prove surprisingly rewarding. With a high proportion of bright events, the Perseids are a good target for photography, though observers will find it most productive to concentrate their efforts on nights close to maximum. Fast film (ISO 400–800) and exposures of 10–15 minutes' duration at f/2.8 with a 50mm or 28mm wideangle lens, centred on Cygnus/Aquila in early evening, or Pegasus in the early hours, are the standard recommendation.

UK observers obtained good coverage of the shower in 2007.[1] Figure 1 presents a preliminary analysis of Perseid rates derived from the many reports received, indicating a slightly lower than usual peak ZHR of the order of 60–70 on 2007 Aug 12–13 (maximum was expected around Aug 12d 02h UT); the single higher point on the night is probably an 'outlier'. While some were disappointed by the Perseids' 2007 showing, observed rates were still pretty respectable, and experienced observers logged up to a cou-

ple of hundred meteors in 4–5 hours of watch time on peak night.

For many, 2007 Aug 11–12 produced the best sky conditions – although rates had yet to peak – and this Saturday night to Sunday morning proved particularly popular for local society group watches. Relatively few very bright Perseids were seen, but the shower produced its usual abundance of meteors in the magnitude 0 to –3 range, with about 25% leaving persistent ionisation trains (a consequence of the incoming meteoroids' high – 60 km/s – velocities). Notably, the usually weak Kappa Cygnid shower, also active at this time, produced a number of bright events, including a slow, flaring mag –3 meteor at 23h 33m on Aug 12–13, seen by several observers across southern England.

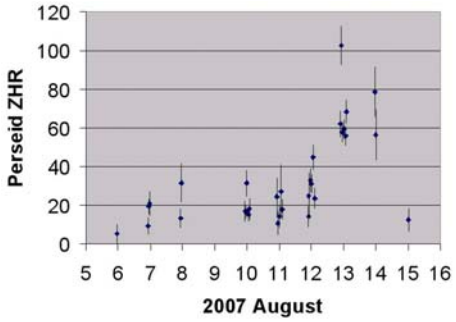


Figure 1. Preliminary activity profile for the 2007 Perseids, from BAA Meteor Section observations.

Full analysis of the 2007 Perseid results will be completed shortly, and a formal report will be presented for the *Journal* in due course, continuing the Section's long series of coverage on the shower.[2] A report on the well-covered 2005 return has also recently been completed.

Observations of the 2008 Perseids, made by the Section's standard methods[3] will, as usual, be welcomed at the Director's address inside the back cover of this *Journal*.

Neil Bone, *Director*

1 Bone N., *J. Br. Astron. Assoc.*, **117**(4), 163–164 (2007)
2 Bone N., *J. Br. Astron. Assoc.*, **116**(4), 196–199 (2006)
3 Bone N., *J. Br. Astron. Assoc.*, **114**(4), 215–218 (2004)

From the President

My apologies for not producing any notes 'From the President' for the last *Journal* – our Editor insisted that I do something this time, so here is my humble offering.

Firstly though, let me offer an excuse for not writing anything last time. My wife and I already had a holiday booked for the second half of March in the USA and in my wife's words 'there is no way we were going to miss that'. So, back from that on Sunday afternoon, answer as many e-mails as possible before travelling to Winchester to introduce Dr Arne Henden of the AAVSO the following Friday evening where he was giving the Alfred Curtis Memorial Lecture. Back home on Sunday (having thoroughly enjoyed the new Winchester weekend venue) to put the finishing touches to the joint BAA/AAVSO meeting at Cambridge at the end of that week. But firstly, there was also the small matter of entertaining Dr Henden and his wife Linda for a couple of nights whilst they were touring Wales. Then, off on Thursday to confirm that all was OK for the arrival of the delegates at Cambridge. Next, after what I've been advised was a very successful meeting, I returned home on Sunday to resume more 'normal' Presidential (and VSS Director) duties. I'm glad I won't have another international meeting to organise during my Presidency!

So, what to write about this time? Well, as I've mentioned before, my great passion is observing but, of course, at this time of the year that is very restricted – even without the amount of persistent cloud cover we are experiencing at the moment (I'm writing this at the beginning of June and haven't observed since mid-May.) That said, if you own a CCD camera and your telescope is well mounted then at least you can carry out short (3–4 hour) time series observations on asteroids or variable stars. Such observations have the advantage that you can usually be set up by 11 pm (BST), set the alarm for say 3.30 am, quickly close down the observatory and return to bed and so not lose much sleep in the process.

Perhaps one reason for the poor weather recently has been the fact that I've had the opportunity to borrow a Meade ETX telescope from my local astronomical society (the Marches Astronomy Group). When I unpacked it I found there was also a Philips Toucam Pro inside and so I thought it would be interesting to see what I could do with it, especially as Saturn was still well placed. (Not that I was expecting to emulate Damian Peach!). But apart from the first couple of nights when I was using my main telescope, it has been cloudy.

I was particular interested in the article in the latest *Journal* (June '08) by Ron Livesey about the aurora. I always like to keep an eye on the sky for such events as aurora, noctilucent clouds, meteors and other atmospheric phenomena. I remember one aurora that I observed from Kent that had the appearance of high cirrus cloud in that it blocked out all starlight (I was observing variables at the time, of course), and I was about to pack up and go to bed when I noticed a red tinge to it in the north which soon changed to the more familiar(!) slowly moving red rays emanating from the northern horizon. This lasted for several hours – and I'd nearly gone to bed! Again, returning from work when there was still strong twilight, just before I got into my car at the station I looked up and was treated to the most amazing noctilucent cloud I've even seen. By the time I'd driven home (about 15 minutes) and got my camera it had all but disappeared. My point here is that, even though, for example, articles on aurora may not be your specific area of interest, do at least glance through them as there may be something that catches your eye and stimulates your interest.

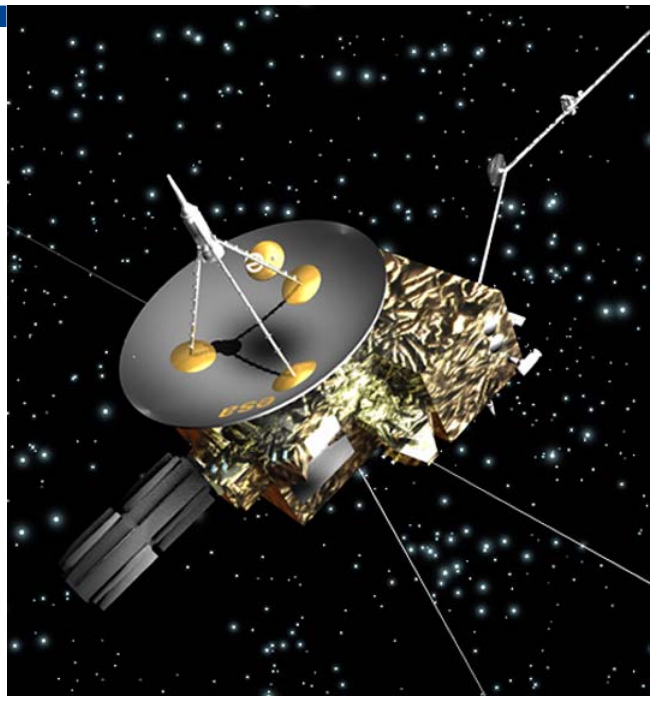
Another area I like to read is Observers' Forum. It's good to see what other observers are doing but I feel this area of the *Journal* could be expanded. However, our Editor advises me that although a few of you do submit some excellent drawings and images not many are accompanied by notes describing the observation or if they are, they are the barest minimum with details of the equipment used and nothing else. It can make such images etc. more interesting if you can add something about the object observed and any special reason why it may be particularly interesting at this time.

With so many meetings going on around the country it is not possible to attend them all and so it is great to be able to read about them in the *Journal* afterwards. This even applies to some I have attended, and then realised I hadn't taken in all that a speaker had been talking about! I particularly enjoy Section meetings and like to get to as many as possible, but was rather saddened to find I was unable to make the recent Instruments and Imaging meeting. This is one of those meetings which is usually a 'must' for me and by all accounts this was another one not to be missed. I shall enjoy reading about it in the *Journal* in due course.

So finally, my message this time is, try something different in your observing programme, in your reading material or even the meetings you attend. You just might find they can all be very stimulating.

Roger Pickard, *President*

End of a modern Odyssey



'The joint NASA and European Space Agency *Ulysses* mission to study the Sun and its influence on surrounding space is likely to cease operations in the next few months.' This is curiously like the announcements at the end of King George V's reign – perhaps the regal note is warranted by the extraordinary career of my favourite spacecraft.

Ulysses was launched in 1990. (That was several years later than the original plan. The *Challenger* disaster ramified in all sorts of ways with the horrific deaths of 7 astronauts haunting us all.) The Space Shuttle carried the probe and its booster to a low Earth-orbit. Their job, which they did splendidly, was to push *Ulysses* away from the Earth faster than any probe had gone before. Indeed, only *New Horizons* had a terminal speed greater than *Ulysses*.

The probe's name was appropriate. 'Ulysses' is the Latin version of 'Odysseus'. The mission aimed to examine the poles of the Sun, never visible from the Earth. First it went to Jupiter, for a remarkable flyby: *Ulysses* approached the planet over its north pole and dived through most of a right angle into a new orbit. This was the first time that a probe had gone so deep into Jupiter's magnetosphere and through a Jovian polar region. One of the surprising things was just how good an investigator of a giant planet a solar probe turned out to be – Jupiter's huge magnetosphere had a thorough and usefully skewed examination. It took the probe about ten days to travel through Jupiter's magnetosphere and out again.

Ulysses' new orbit is like that of one of the Jupiter family of comets. The period is about six years (half that of Jupiter). Aphelion is more or less at the distance of Jupiter from the Sun (5.2AU) and the orbit is quite eccentric: not almost circular, like the Earth's, but a relatively long ellipse, taking the little probe round the Sun and much closer to it on the 'far' side.

Leaving Jupiter and flying south, *Ulysses* began to pick up something strange as its southern solar latitude increased. The solar wind had been gusty and, now, batches of solar wind were faster and smoother and containing fewer particles. The changes were related to the rotation of the Sun. The Sun's axis of rotation is inclined so high latitude regions swung in and out of the spacecraft's view. As *Ulysses* swung still further south, the gusty ecliptic solar wind could no longer be seen and there was just the swifter polar solar wind.

Ulysses maximum latitude was 80° and now something even more surprising began to emerge. The Sun had no south magnetic pole. There was a large polar area with the about same level of magnetic flux, unlike planets where the flux increases to a maximum in a small area – the magnetic pole. So far as I know, the Sun's lack of a south magnetic pole was not predicted by scientists.

The southern polar pass finished in 1994 November and *Ulysses* sped north towards the ecliptic at a perihelion distance of about 1·34AU (farther from the Sun than the Earth, but closer than Mars). The probe was soon back in the gusty, denser and slower solar wind of the solar tropics. This corresponds to the region in which sunspots are found and they are known to be areas of strong localised magnetic fields, looping high over the Sun's visible surface. Of course, it is all in slow motion, as the equatorial region of the Sun takes more than 25 days to spin round its axis and *Ulysses* did not reach the ecliptic until 1995 March 13.

From mid-June to the end of September, 1995, *Ulysses* flew over the northern part of the Sun. Again there was this broad magnetic expanse, but no concentrated pole. The Sun's magnetic field is simple from about latitude 40° up to either geographic pole and complex, full of swirls and loops, in a broad band around the equator. There is also a 'current sheet', which is a sort of fluctuating boundary between the north and south magnetic regions and extends, rippling north and south and in and out, from beyond the solar corona into the depths of interplanetary space.

Another unexpected discovery sneaked out of the data. We had thought that cosmic rays, pouring into the solar system from all directions, would be inhibited by trying to cross the lines of magnetic force in the equa-

Variable Star Section

OJ287 – the final word (for now...)

Following on from the success of the OJ287 observing campaign (of which regular reports appeared in this *Journal*), two research papers have been published detailing the outbursts which occurred in 2005 and 2007:

– 'The structure of the October/November 2005 outburst in OJ287 and the precessing binary black hole model', Valtonen M., Kidger M., Lehto H. & Poyner G., *A&A*, **477**, 407–412 (2008) and

– 'A massive binary black hole system in OJ287 and a test of General Relativity', Valtonen M. J., Lehto H. J., Nilsson K., Heidt J., Takalo L. O., Sillanpää A., Villforth C., Kidger M., Poyner G. and 17 coauthors, *Nature*, **452**, 851–853 (2008 April 17).

The success of being published in *Nature* (the world's foremost scientific journal, and the hardest in which to get published) is a testament to the importance of the work carried out on OJ287 over the past three years and longer.

OJ287 is currently (2008 May) varying between magnitude 14.0–15.0 as it approaches solar conjunction in June. This is in line with behaviour predicted by Dr Valtonen, and displayed graphically at **http://www.garypoyner.pwp.blueyonder.co.uk/oj-future.gif**

The next major outburst is predicted for sometime in 2016 January, a favourable time of the year to observe, unlike the recent two outbursts which occured just after solar conjunction. We will then start all over again!

Gary Poyner

http://www.garypoyner.pwp.blueyonder.co.uk/oj_camp.html

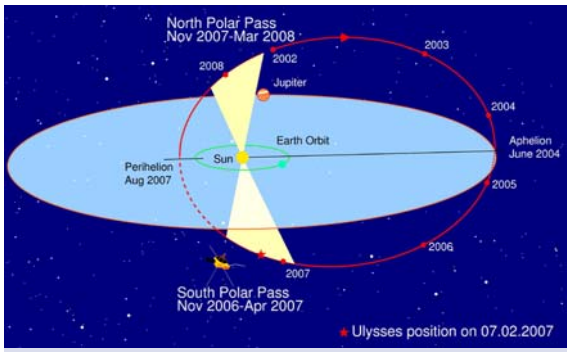


Diagram of Ulysses' third solar orbit. *(ESA)*

torial regions. Conversely, the cosmic rays in the solar polar regions should plunge sunwards between the converging lines of force. This did not happen. There was scarcely any increase in cosmic ray flux at high latitudes. The explanation seems to be that the violent surface activity of the Sun whips the lines of force about and ripples pass rapidly outwards along them. The cosmic rays bounce off the ripples!

The Sun runs an eleven year cycle, with sunspot activity peaking and reducing, sometimes to zero – no sunspots visible. *Ulysses* first pass was near solar minimum and in 2000 the Sun was at maximum sunspot activity.

On its way, *Ulysses* picked up evidence of interstellar helium atoms, moving so fast that they must travel right across the solar system and out into interstellar space again. Similarly, it detected dust grains that seemed to be doing the same. These atoms and particles are electrically neutral so they slip, unaffected, through the outer magnetic fences of our Sun's domain.

Now completing its third orbit, *Ulysses* is running short of power. The radio-isotope thermoelectric generator can no longer power the probe's instruments and communications or keep the hydrazine for its thrusters warm. The fuel lines are freezing as the temperature drops on the outward journey from the Sun. A desperate measure, switching off the main transmitter, failed: the old war horse staggers on, but its mission is done, and well done.

Roger O'Brien

Solar Section

2008 March

March saw an increase in activity in the southern hemisphere towards the end of the month but otherwise activity remained low. Most observers reported a blank disk between March 1 and 23 whilst all observers saw a blank disk on March 1, 2, 7, 9, 12 to 14 and 19 to 22.

Unclassified, S03°/203°: 2 small pores were observed on Mar 3 lasting less than 24 hrs.

AR984 S05°/253° appeared briefly on the disk type Bxo on Mar 5 and 6 but was not seen thereafter.

AR985 S10°/201° made an even briefer appearance on Mar 10 type Bxo.

AR986 S05°/095° also made a brief appearance on Mar 15 and 16 type Bxo and was Axx on 17, but not seen thereafter.

AR987 S08°/259° suddenly appeared on Mar 23 type Cso. By the following day the group had developed to type Dsc but had declined by 29th from 90 to 50 millionths in area. By Mar 31 the group had reduced to a single Hsx spot approaching the western limb.

AR988 S07°/236° also made a sudden appearance on the disk on Mar 23 trailing AR987. The group was type Cso on Mar 24 and clearly bi-polar type Dao by Mar 26. On Mar 29 the group was observed as type Eao with an area of 140 millionths. By Mar 31 the group had started to fade losing its following penumbral spot but its leader had increased to 190 millionths.

AR989 S10°/207° joined AR987 and AR988 on the disk on Mar 25 close to the eastern limb type Hsx. The group developed over the next few days to type Cso and Csi but started to decay on Mar 30 type Axx and was no longer seen on Mar 31.

H-alpha

Prominences

15 observers reported a prominence MDF of 2.55 for March.

Prominences during the first half of the month were small and unremarkable. Bill Leatherbarrow reported a hearth of 3 or 4 very bright pillar prominences on the NE limb spanning 5° on Mar 4.

On Mar 19 Monty Leventhal reported a long hooked prominence on the SE limb extending to a height of 112,000km, being the longest he recorded for the month.

In the days preceding the appearance of the sunspot groups on Mar 23, several observers noticed prominence activity on the eastern limb just south of the E point. Bill Leatherbarrow reported a very large 'spectacular eruptive prominence' at the ESE limb on Mar 21.

Mark Walters reported a 'huge arc shaped prominence' extending over the northern limb at 14.24 UT on Mar 22 as well as witnessing the break up of an eruptive prominence on the eastern limb.

BAA sunspot data, 2008 March–April

	March		*April*	
Day	*g*	*R*	*g*	*R*
1	0	0	2	22
2	0	0	1	15
3	0	6	1	13
4	0	1	0	3
5	0	1	0	0
6	1	7	0	0
7	0	0	0	0
8	0	1	0	0
9	0	0	0	0
10	0	5	0	0
11	0	1	0	0
12	0	0	0	0
13	0	0	0	1
14	0	0	0	4
15	0	5	0	0
16	0	5	0	0
17	0	2	0	0
18	0	1	0	0
19	0	0	0	2
20	0	0	0	1
21	0	0	0	0
22	0	0	1	9
23	0	6	1	12
24	2	31	0	4
25	3	48	0	0
26	3	52	0	0
27	3	50	0	0
28	3	50	0	0
29	3	45	0	0
30	3	42	0	0
31	2	33		
MDFg	0.81 (48)		0.22 (53)	
Mean R	12.61 (42)		2.84 (44)	

2008 April

April saw activity fall off again after a brief resurgence in March. Both hemispheres returned a low but equal sunspot count. All observers reported a blank disk from April 5 to 12; 15 to 18, 21, and 25 to 30. Most observers recorded a blank disk from Apr 4 to 21 and 24 to 30.

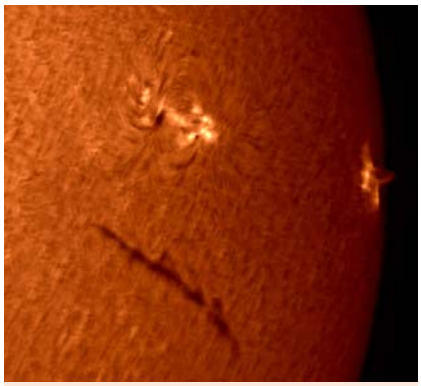
AR987 S08°/259° remained on the disk from the previous month, type Axx near the W. limb. The group was not seen on Apr 2.

AR988 S08°/239° also survived from March as a penumbral spot with two umbrae and

North & south MDF of active areas g

	MDFNg	*MDFSg*
March	0.00	0.94 (32)
April	0.10	0.10 (37)

g = active areas (AAs)
MDF = mean daily frequency
R = relative sunspot number
The no. of observers is given in brackets.



Active regions and a dark filament imaged by Jim Phillips on 2008 March 25.

a trace of a third between the two. The group remained as type Hax until Apr 3 but was no longer seen thereafter.

AR989 S10º/210; no reports of this group in white light but it was seen in H-alpha as a filament on Apr 1, 2, 3 and 5 and as a small prominence on the west limb on Apr 8.

AR990 N27º/360º was seen briefly on Apr 14 type Axx, a Cycle 24 spot. It was not seen the following day.

AR991 S10º/283º type Axx briefly appeared on Apr 19 and 20.

AR992 N13º/274º was seen on Apr 22 type Bxo consisting of 3 small spots. By the next day the group was type Cao and by Apr 24 had decayed to type Axx. It was not seen on Apr 25.

Three observers reported a Quality sunspot number Q = 0.55

H-alpha

Prominences

15 observers reported a prominence MDF of 2.26 for April. The prominence count for the month was low and most prominences were unremarkable.

On Apr 3 Ken Medway noted a pyramid shaped prominence on the NW limb which had developed into a spire by the next day.

On Apr 4 Eric Strach reported 7 prominences on the western limb and 3 on the east. Monty Leventhal noted a pillar and two accompanying prominences on the SW limb, the largest extending to a height of 93,000km. This same prominence was still present on Apr 5 and had grown to a height of 102,000km. Lee Macdonald noted a small H-type spot at the western limb, being all that remained of the trio of sunspot groups seen the week before.

On Apr 6, the residue of AR988 was seen crossing the western limb. Eric Strach reported a 'high and unusual prominence, resembling a giant flower with a bright bare stalk, the flower at the tip being spread out and slightly bent southwards'. Eric estimated the height of this prominence to be 140,000km. Mark Walters reported an 'impressive high arching eruptive prominence' curving over the western limb until around 09:30 UT, probably associated with AR988. Bill Leatherbarrow also reported a 'large complex curtain prominence just N of the W limb point with a smaller separate prominence to the north' between 12:30 and 12:40 UT. He also reported a large curtain of prominences at the S limb and around towards the west.

Apr 7 still produced some activity in the region where AR989 had crossed the western limb. Mark Walters recorded a large active prominence at this point at 16:22 UT. Bill Leatherbarrow observed between 12:10 and 12:55 UT recording a 'beautiful large curtain prominence with embedded arch at the W limb' and a large curtain prominence at the south limb.

Monty Leventhal reported a pillar prominence on the NE limb on Apr 11 rising to a height of 84,000km. Eric Strach also recorded an 'interesting set of prominences' on this day on the NE limb between N24º and N32°. Otherwise prominence activity remained low throughout the mid-month period.

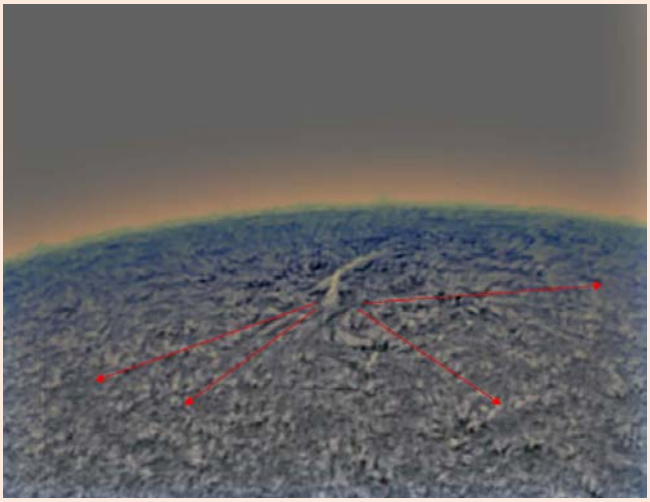
On Apr 20 Ken Medway reported a low arch on the SE limb.

Bill Leatherbarrow observed on Apr 26 and reported a variety of prominences, including a large flame at the SSW limb and an extensive hedge of prominences at the ESE limb.

Monty Leventhal concluded the month by reported a pillar prominence on Apr 29 on the NE limb rising to a height of 46,000km.

Lyn Smith, *Director*

An image of a 'Moreton Wave'



This image by Nick Howes, taken in CaK on 2008 April 6, has possibly captured a 'Moreton Wave'. Moreton Waves are flare-associated waves observed to propagate across the solar disk at speeds between 500–1500 km/s, visible in H-alpha and ultraviolet. They seem to occur at all levels of the inner corona. Filament eruptions are closely related to Moreton Waves, appearing as a slow moving diffuse arc of brightening, spreading out concentrically from a solar flare like the ripples on a pond. You could say they are a kind of solar 'tsunami'.

They are named after the American astronomer Gail Moreton who first reported their existence in 1960 as found in observations by Harry Ramsey. Further papers on the subject were published 1968–1974 by Y. Uchida of Lockheed Observatory, explaining that Moreton Waves were 'the intersection of coronal shock waves (due to a flare) with the chromosphere'. They are not to be confused with EIT waves which are slower, about one-third the velocity of a Moreton Wave and have a blurred shock front on images. The term 'EIT wave' arose when they were identified on SOHO images, taken in ultraviolet, by the EIT telescope. ***– LS***

Prominence and filament on April 05, imaged by Nick Howes.

Campaign for Dark Skies

'Sky-friendly' street lighting in Newport

On 2008 May 17, amateur astronomers from South Wales met the MP for Newport East, Jessica Morden, and the Newport City Council Head of Engineering, Brian Kemp, to recognise and reward positive progress and prompt responses to calls for 'sky-friendly' lighting practice, in Newport, Gwent.

Newport astronomers Rosa Adams and Nick Hart had contacted the BAA Campaign for Dark Skies to report the recent appearance of large numbers of well-directed luminaires in the city, and Nick, who achieves stunning deep-sky images from his urban back garden and from places as far afield as Australia and California, was particularly pleased with the extra shielding provided by Newport City Council on lights near his observatory. Jessica Morden MP was especially supportive in their communications with the Council.

CfDS co-ordinator Bob Mizon joined Nick and Rosa, and other members of the Cardiff Astronomical Society, to present the CfDS' Award of Appreciation to both Jessica Morden MP and Brian Kemp. The presentation took place in the august surroundings of the National Museum of Wales in Cardiff.

The photo shows (l. to r.) Ms Morden, Rosa Adams, Nick Hart, Brian Kemp and Bob Mizon. *(Photo by Ian Davies, Cardiff AS.)*

Bob Mizon, *Coordinator, CfDS*

Asteroids & Remote Planets Section

100-up for Peter's asteroid discoveries

England's cricketers may be struggling to make large scores but we have our own century maker – and for once he's not a supernova hunter! Peter Birtwhistle made his 100th discovery, of main belt asteroid 2008 GE_3 (Figure 1), on 2008 April 7. Two days earlier he had discovered two other main belt asteroids, 2008 GB_2 and 2008 GD_3.

Of Peter's 100 discoveries 41 have only been observed at a single opposition and so risk being lost if they are not observed on a subsequent orbit, and 50 have been seen at several oppositions and thus have reasonably well defined orbits. A further nine objects have very secure orbits and have therefore been numbered, but not yet named.

Figure 2 shows the orbit of 2008 GE_3. Its orbital elements suggest that it is a Main Belt IIIb asteroid, also described as Zone III Outer, which have the following attributes (2008 GE_3 values in brackets):

– a semi-major axis between 3.03 and 3.27AU (3.19 AU)
– eccentricity less than 0.35 (0.06)
– inclination less than 30° (12.06°)

Our congratulations to Peter on his remarkable achievement.

Roger Dymock, *Director*

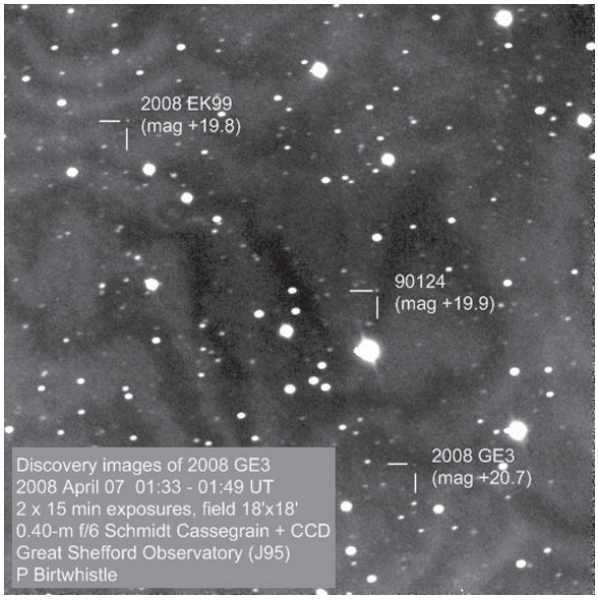


Figure 1. Discovery image of 2008 GE_3 *(P. Birtwhistle).*

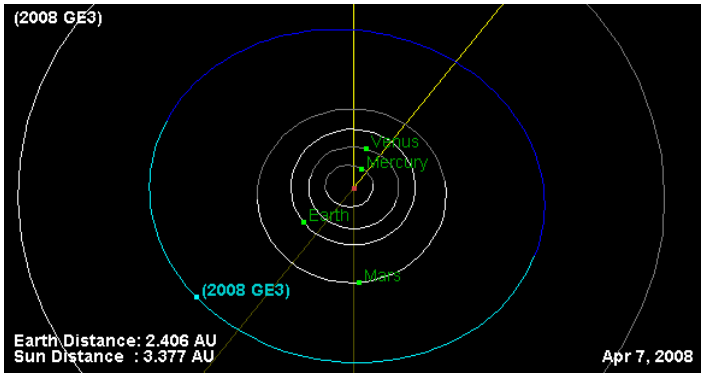


Figure 2. Orbit of 2008 GE_3 *(NASA JPL).*