



Mars Section

Mars in 2003: Second interim report

General

Beagle 2 was successfully launched aboard *Mars Express* in early June. It is due to reach the Red Planet in late December this year to look for signs of organic life in the Isidis Planum (telescopically Isidis Regio) area. A good deal of information about the mission is featured on the official website at <http://www.beagle2.com> and in the *Beagle 2* bulletins. Meanwhile, *Mars Global Surveyor* and the more recent *Mars Odyssey* continue to gather interesting images of the planet, many of which can be accessed online. *Mars Odyssey* is returning gamma-ray maps of the elemental composition of the planet as well as thermal and infrared images (<http://mars.jpl.nasa.gov/odyssey/>).

The present report is concerned chiefly with the work of BAA contributors, and is a continuation from our first interim report on the great perihelic opposition of 2003, published in the June issue of this *Journal*.¹ Although many valuable observations – mostly CCD images – have been received from contributors from abroad, there is still rather little sign that Section members in the UK are actually able to rise before dawn. Many UK members have been unavoidably hindered by buildings or trees, given the planet's continuing rather southerly declination (-25°S to -14°S during the period covered by this report). They have been missing a real spectacle! At the time of writing the disk of the planet is now more than adequately large, and the combination of a large bright polar cap crowning the pale orange disk with a blue dawn sky for a background is a beautiful sight.

The new Section website (<http://www.britastro.org/mars>) has been the subject of much favourable comment and we hope to have more Mars charts available on it soon.

The state of the seeing at the Director's observatory has often been good (or at least moderate) just before sunrise, by which time

the planet has risen to a respectable altitude. The Director (Northamptonshire, UK), fortuitously aided by the sleeping pattern of a three-month old baby daughter, rose at 3am BST or earlier on the last 70 consecutive mornings to record sky conditions. In all, 47 mornings were more or less totally overcast, 18 very clear and 5 partially clear. Of those opportunities available, the Director chose 10 mornings to make a total of 39 drawings. Persistence is the key!

Of the other UK observers, Chris Proctor continued to take images, Martin Taylor sent some results of early imaging experiments, and Roy Panther (Northants) sent a sketch. Drawings from overseas have come from Jeff Beish (USA), Mario Frassati (Italy), Gerard Teichert (France) and Johan Warell (recently removed from Sweden to the USA). We know of several observers planning to 'go south' for the opposition period, and they may like to compare their experiences with those of Section member E. A. L. Atkins who travelled to Madeira for the great perihelic opposition of 1924: see the paper by the Director elsewhere in this issue.

This report covers late winter and early spring in the martian southern hemisphere, encompassing the period 2003 April 21 ($L_s = 172^{\circ}$, D (disk diameter) = 8.7 arcsec, tilt = -14°S) to June 30 ($L_s = 212^{\circ}$, $D = 16.4$ arcsec, tilt = -21°S), considering all work received at the time of writing (July 1). Over 30 observers have contributed. In the following notes I have highlighted interesting points rather than trying to write a full account.

The Director would like to remind observers to submit *paper* copies of drawings at regular intervals through the normal postal service. CCD images by email should be in jpg format and labelled in the form 2003-06-30-RJM (year-month-day-observers' initials).

Surface features

It has now become obvious that the Solis Lacus has returned to the shape and orientation it had immediately before the great dust storm of 2001 (see the illustrations). It has very recently shown some further small boundary changes which are described in the discussion on yellow clouds later in this account. The Phasis streak has been rather dark, and now runs as far north as Phoenix Lacus. The whole area is remarkably similar

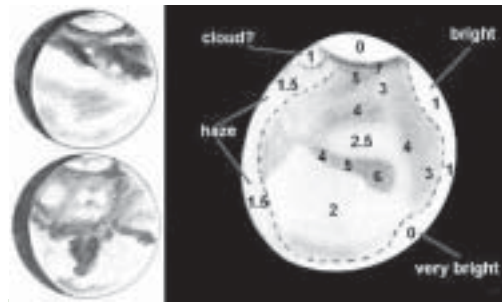


Figure 1. Selected visual observations of Mars in 2003. *Left:* two sketches by J. D. Beish, 41cm refl. $\times 520$. *Top:* 2003 June 3, 08h 15m, CML = 165° . *Bottom:* June 27, 07h 15m, CML = 281° . Note structure in Mare Cimmerium (top) and surface details in Hellas and SPC (bottom).

Right: drawing with intensity estimates by M. Frassati on 2003 June 12, 01h 05m, CML = 334° , 20cm Schmidt-Cass. $\times 400$, W80A blue filter.

to its appearance in the 1986 apparition, when Phasis was also very prominent. The latter north-south dark streak – one of the classic 'canals' – faded out in the decade of the 1990s only to reappear at the time of the 2001 planet-encircling storm. With the exception of the variable features near the SPC boundary, the martian markings have shown a remarkable constancy in their appearance during 2003. Since April the very dark area from Aonius Sinus to Mare Sirenum has faded considerably, as the SPH/SPC south edge retreated southwards. Depressiones Helleponticae continued to be a very large and intense condensation at the edge of the spring S. polar cap. Hellepontus remains dark, as is Yaonis Fretum. Some surface details have appeared in the Hellas basin, especially the north-south half-tone known as Alpheus, and the faintly dusky central patch, Zea Lacus.

Atmospheric activity

Some excellent images of the classic martian 'W' cloud over Tharsis have been received. Elysium has often appeared bright in the morning, and there are other bright areas over Ophir-Candor, Thymiamata, etc. Hellas has shown little evidence of white cloud, which is normal for the season, and Argyre shared this behaviour. The so-called 'Blue Clearing' has been strong at certain times and

Cover images

Top row: Six drawings of Mars in 2003 in the early martian southern spring ($D = 11''.7-16''.1$; $L_s = 192-211^{\circ}$) by the Director, using a 41cm Dall-Kirkham Cassegrain, $\times 256$ and $\times 409$, in white light. From left to right:

A. 2003 May 26, 03h 45m, CML = 178° . Morning cloud in Elysium. SPC dark rift.

B. June 2, 03h 50m, CML = 112° . Evening cloud over Ophir-Candor-Tharsis-Tractus Albus. Solis Lacus and Phasis well seen.

C. June 13, 03h 05m, CML = 354° . Argenteus Mons bright in SPC. Normal albedo mark-

ings with morning cloud over S. Chryse-Xanthe.

D. June 15, 02h 15m, CML = 322° . Syrtis Major and the Hellas basin on the evening side. Depressiones Helleponticae very dark spot at SPC edge.

E. June 20, 03h 20m, CML = 291° . Rift visible, and Novus Mons bright, in SPC. Yaonis Fretum-Hellepontus very dark from Hellas to SPC. Internal details in Hellas.

F. June 28, 02h 15m, CML = 199° . Mare Cimmerium and SPC details.



longitudes, surface markings standing out well in blue-violet light (as illustrated here), but full analysis will be deferred for now.

The first hints of dust activity (or 'yellow' clouds) appeared on May 21, when a small yellow dust cloud arose NW of Solis Lacus, between Tithonius Lacus and Phoenicus Lacus. Maurice Valimberti (Melbourne, Australia) first imaged it on May 22 (Figure 2A). It was more diffuse next day, and some additional faint patches of yellow dust appeared to have spread around the Thaumasia region. But these soon faded and all activity stopped. An image of the disturbance as witnessed from close at hand by *Mars Global Surveyor* appeared on the *MGS* website. If we compare the Valimberti image from May with one taken by Eric Ng (Hong Kong) on June 29 (Figure 2B), we see that since May the Phasis canal has extended further north to Phoenicus Lacus, and there is now some albedo marking connecting the dark spot on Phasis (Gallinaria Silva) with the NW (Nf.) corner of Solis Lacus. This nicely demonstrates the effects of dust-raising, where ground beneath or adjacent to the dust storm is darkened by exposing the underlying rocks.

To date Hellas has not given us any signs of telescopic dust activity, but experience shows that it will be the focus of at least one event, maybe only local, but perhaps planet-encircling, by the end of southern summer. This area and the region of Solis Lacus and environs need careful watching. Historically the chance of a planet-encircling storm developing in any given martian year is about one in three.

The polar regions

The transition from S. polar hood to ground cap has been nicely documented. The OAA (Japan) in their *Communications* bulletin

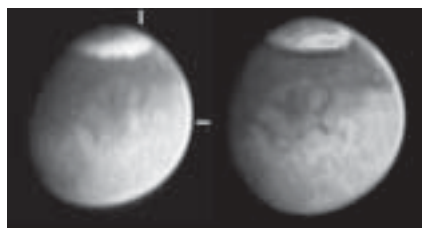


Figure 2. CCD images with the Philips ToUcam camera to show recent changes in the Solis Lacus region. (Black & white reproductions of original colour composites.)

A. Left: 2003 May 22, 18h 51m, CML= 76°, 36cm Schmidt-Cass. Small yellow cloud (position indicated) NW of Solis Lacus. *M. P. Valimberti.*

B. Right: 2003 June 29, 20h 22m, CML= 94°, 25cm refl. Changes since May include a northward extension of Phasis and a faint streak joining the latter to the *f.* end of Solis Lacus. *E. Ng.*

suggest that the transition occurred at about $L_s = 160^\circ$ when the cap first started to displace the hood, though the hood did not immediately disappear at all longitudes, whilst a dark northern edge to the new ground cap appeared from around $L_s = 175^\circ$.

The S. polar cap remains very large, but as early as late May we began to see the seasonal rift patterns begin to appear as the cap thins and slowly starts to evaporate. Some bright patches have also appeared already, notably Novus Mons (or Novissima Thyle) and Argenteus Mons. These tend to be left behind as isolated bright patches by the retreating frost-line, and later break up into tiny bright spots. It is interesting to try to time the separation of Novus Mons from the cap. In 1988, for example, BAA data showed that separation from the rest of the cap was complete by $L_s = 239^\circ$, which corresponds to early August in the present apparition. (See the 1988 Section Report.²) The 2003 apparition has been the first in which amateur CCD work could record these SPC light patches and rifts successfully. It is also interesting that the dark patches within the cap are also often imaged in blue light, suggesting an absence of haze over the cap at those times.

The north polar region is not favourably displayed at present, and will not be so again until much later in the apparition, but the N. polar hood has appeared as a thin bright band along the N. limb, somewhat variable with longitude.

Illustrations

On the front cover we have a simulation of how *Beagle 2* should be deployed on the martian surface, together with six drawings by the Director taken from late May to late

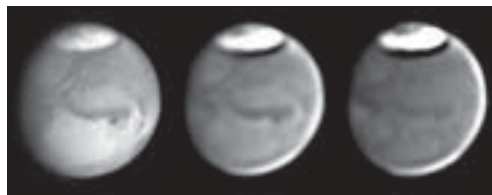


Figure 3. Filter series by D. C. Parker using an ST9XE CCD camera and 41cm refl., 2003 June 24, 08h 31m–41m, CML= 328–331°. (a colour composite was also made). Note SPC rifts and bright patches, weak evening cloud over S. Syrtis Major and a 'Blue Clearing' rated as 2+ on the usual scale.

Left: red filter (RG610); *middle:* green filter (centred on 531nm); *right:* blue-violet filter (centred on 450nm).

June, described further in the caption on page 189.

All Section members are to be congratulated upon their fine work thus far in the Great Perihelic Opposition of 2003.

Richard McKim, Director

- 1 McKim R. J., *J. Brit. Astron. Assoc.*, **113**(3), 130 (2003)
- 2 McKim R. J., *J. Brit. Astron. Assoc.*, **101**(5), 264 (1991)

Note added in proof (July 3)

Since writing this report, two exciting developments have taken place. First, on July 1, visual and CCD observations showed dust storm activity around the Hellas basin and in Iapigia with a number of small discrete dust clouds visible, the whole region having changed considerably within the past 24 hours. This event developed further on July 2 and 3 with dust spreading both E. and W. of the Hellas basin. This was reported as a BAA e-circular on July 1. The event already appears to be larger than a mere 'local' event but its final classification must await developments. Second, on July 2, several observers independently noticed a small bright dust cloud chiefly within the Chryse Planitia basin. The seasonal dates of both events are quite typical.

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