Mars Observations in 2005. Part I

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(Abstract) In the 2005 apparition of the planet Mars, which made its closest approach to the Earth on 30 October 2005, it was possible for the present writer to observe Mars from 22 November 2004 until 29 June 2006. Observations were performed at the Observatory of the Fukui City Museum of Natural History and at the Lick Observatory, CA, USA (in October 2005). The present article has been intended to deal with the observations in the 2005 apparition. However because of the lack of space, the report here includes only the observations produced from the start until 15 August 2005, and the rest would be published in the following issues. In Appendix we shall however touch on the international chasing of a dust cloud well worked in 18 October when the present writer stayed at the Lick observatory.

Key words: About the apparitions of Mars, How to observe Mars, Observatory of the Fukui City Museum of Natural History, Chasing of a dust storm on 18 October at the Lick Observatory.

1. Introduction

In 2005, the planet Mars was closest to the Earth on 30 October 2005 at 03h26 GMT. The angular diameter of the planet (denoted by δ) on the day was maximal in 2005, and reached 20.2 arc second (which we write as δ=20.2"). This value is of course inferior to the value in the supper apparition year in 2003 when it recorded the maximal δ=25.11", but still the angular diameter was preferable. In 2005, the planet Mars was at opposition on 7 November 2005 at 07:51 GMT.

It is notable that we cannot observe the full Martian year within any apparition, even in such a super apparition as we met in 2003. In 2003, in the case of the present writer, he started to observe on 25 October 2002 (λ=086°Ls, δ=3.7") and ended his work on 4 June 2004 (λ=043°Ls, δ=3.9"), and hence he observed Mars continuously for one year and about eight months, while it is short to continue to watch the planet Mars for one Martian year. Let Ls denote the areocentric longitude of the Sun (that is, seen from Mars), and then this angle implies the Martian season (we denote the season by λ): Namely λ=000°Ls(=360°Ls) corresponds to the spring equinox of the northern hemisphere (or the autumnal equinox of the southern hemisphere), λ=090°Ls denotes the northern summer solstice (or the southern winter solstice), λ=180°Ls does the northern autumnal equinox (or the southern spring equinox) and finally λ=270°Ls does the northern winter solstice (or the southern summer solstice). Hence in 2003, it implies the present author observed from λ=086°Ls, just before the southern summer solstice to λ=043°Ls, the season between the southern autumnal equinox and the southern winter equinox. Conversely speaking it was impossible for the present writer to observe from 043°Ls to 086°Ls. Furthermore, the angular diameter changed as δ=3.7"→25.1"→3.8", and hence the period spent for the watching was not always favourable. This implies we have to watch every apparition of Mars which visits us every two years plus about two months. The apparition in 2005 was the next opportunity of the 2003 apparition.

In 2005, the present writer started his work on 22 November 2004 (δ=3.8", λ=119°Ls) and ended on 29 June 2006 (δ=4.0", λ=073°Ls), and so he could not observe the seasons from 073°Ls to 119°Ls. If we take account of the period in 2003, the data between 073°Ls to 086°Ls are lacking. So we have also to observe the next apparition, and thus it will finally need 15 years or 17 years to fill the gap.

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The next great opposition will come on 27 July 2018 with maximal angular diameter δ=24.3" (on 31 July 2018). We may furthermore say it is nearly impossible to observe the surface under the same season and the same angle.

Now we would like to turn to describe our fundamental method of observations of Mars which we employ on every occasion: We try to chase Mars when the planet is observable in the sky every 40 minutes (it implies every ten degrees on Mars). We spend 20 minutes for each observation, and hence when the planet is near at opposition, we observe nearly ten times a night. However it is apparent it is impossible to observe if the sky is cloudy or rainy, and when Mars rises in the early morning it is only possible to chase it for once or twice a day before dawn, and similarly if it declines to the west within the evening, we are not able to observe it more than once or twice again. Thus we should say the opportunity to check the surface of Mars does not always come. Even from this point of view, we need to repeat the work of observations given by every apparition.

The first part of the 2005 observations of the present writer was performed during the period from 22 November 2004 (λ=119°Ls) to 30 September 2005 (λ=298°Ls) at the Observatory of the Fukui City Museum of Natural History by the use of a 20cm Refractor at 340×, 400×, 480×, and 600×.

Next on 3 October 2005 the present writer took a flight from Narita to San José, California, stayed for twenty days at the Lick Observatory, University of California, which is located atop Mt Hamilton at 1,284 metre above sea level near San José, and he tried to observe the planet Mars during the period from 4 October to 24 October. Actually he caught the planet on 6 Oct, 7 Oct, 9 Oct~15 Oct, 17 Oct, 18 Oct, 21 Oct, 23 Oct, 24 Oct GMT by the use of the second largest 91 cm grand Refractor.

On 25 October, the present writer took a non-stop flight from San José to Narita, and moved to Haneda (where he met Masami MURAKAMI and made a conversation) from which he took another flight to Komatsu, and soon moved to the Fukui City Observatory where he met Takashi NAKAJIMA, and thus happily continued to observe Mars at Fukui on 25 Oct, 27 Oct, 29 Oct, and 31 Oct.

The third period then began from 4 November 2005 (δ=20.1") until 29 June 2006 (δ=4.0").

We here treat, because the space is limited, no more than the period from the first observation to the middle of August 2005 and postpone the further report of the observations including those made at Lick to another following issue, and just in Appendix here we shall pick out an interesting world-wide observational episode with which the present writer encountered during his stay at the Lick Observatory.

The expedition to Mt Hamilton was kindly coordinated by Bill SHEEHAN to whom the present writer is very indebted. He is also would like to express his sincere thanks to Tony MISCH, Rem STONE and Laurie HATCH of the Lick Observatory for their kind help and discussion. They all had a nice experience in the foregoing 2003 apparition at the Lick observatory; see the site
http://mthamilton.ucolick.org/public/TwoWeeksOnMars/

2. Observations up until the end of May 2005

At Fukui, the weather was dismal from the end of 2004 through the New Year. In January 2005, no more than a few observations were possible. It just became possible to make a series of observations from around 5 Mar (λ=171°Ls) just at 20:40 GMT (05:40 JST) when δ=5.2". On the day it was possible to observe also at 21:20 GMT. The angles were at ω=301°W and ω=310°W respectively where Syrtis Mj and S Sabæus were visible. The south polar cap (spc) is seen while Hellas was dull. It was possible to watch on 6 Mar (λ=171°Ls), as well on 9 Mar (λ=173°Ls), but the next occasion jumped to 19 Mar (λ=178°Ls) at ω=164°W when δ=5.6". Next it was possible to watch on 20 Mar (λ=179°Ls), and on 26 Mar (λ=182°Ls). On 31 Mar (λ=185°Ls), we were able to observe at 19:50 GMT, and we observed three times the day until 21:10 GMT at ω=034°W, ω=044°W, and ω=054°W. The spr area is large but does not shine. In March, 21 numbers of drawings were produced.

On 1 Apr (λ=186°Ls), δ=5.9" and ι=38°. In April, no more than 19 drawings were made. Just

on 8 Apr (λ=189°Ls) we met with a preferable seeing at 19:30 GMT and 20:50 GMT and observed at ω=320°W and ω=330°W, when ϕ=19°S to see the white spc and the broad extension to Noachis of M Serpentis. Western Noachis is light. Hellas is dull to the south of the dark Syrtis Mj. S Sabæus is definite. We could chase Syrtis Mj until 14 Apr. On 14 Apr (λ=193°Ls) we observed at ω=264°W when it was twilight, while the spc appeared clearly. On 16 Apr (λ=194°Ls), and on 23 Apr (λ=198°Ls) the spc looked white brilliant. It looked for a depression to exist inside the spc. The north polar hood (nph) is also whitish. A watching on 27 Apr was the last in April.

In May, the observation rate increased to a total of 44 times. The diameter δ extended from 6.8" to 7.9". The planet became to rise a bit earlier, and it was possible to watch from 17 hrs GMT (02 h JST), so that it was possible to observe four times every 40 minutes. On 2 and 3 May (λ=205°Ls), and on 4 May, the spc was seen largely: On 3 May the spc was distinct, but on 4 May it looked a bit dirty. On 4 May (λ=205°Ls) at ω=066°W the centre of the spc seemed to show a shadowy depression. The area around Solis L is shadowy but no details were grasped. Henceforward the spc is definite, and sometimes showed a depression. On 10 May, S Sabæus was obvious, and on 13 May (λ=210°Ls), Syrtis Mj and Hellas came into sight finally such that at ω=309°W, Depr Hellesponticæ and Hellespontus were visible. It was possible to observe 4 times on the day, and observed similarly on 15 May (λ=211°Ls), 16 May, 17 May, 19 May, 20 May, 25 May, 28 May, and on 31 May (λ=222°Ls). On 16 May, Hellespontus appeared broad and dark, and on 25 May (λ=217°Ls) it was recognised that the dark fringe of the spc was sharp. On 31 May (λ=222°Ls) we could observe five times every 40 minutes from 17:20 GMT to 20:00 GMT. At 18:00 GMT (when ω=126°W), a curved dark segment inside the spc, and at 20:00 GMT (ω=155°W) a shadowy streak looked to come down inside the spc. On the day at ω=135°W, the perimeter of the spc did not look smooth, but at least a protruded corner was seen near the central meridian. Here δ=7.5".

At this place, we shall compare the situation of the spc at the end of May with the aspect in 2003. In 2005, we entered the case when the diameter δ is quite small, and so we may ask how it was late to detect the shadowy area inside the spc in 2005 compared with the case in 2003. This time it was around 23 Apr (λ=198°Ls) when we witnessed the shadowy area inside the spc, and the phenomenon was definite in May 2005, while in 2003 we already detected a shadowy rift on 2 May 2003 (λ=178°Ls) when δ=9.5" as mentioned before, and on 5 June 2003, 6 June 2003 (λ=198°Ls) it was clear, though the diameter was up to δ=13.6". Furthermore on 21 June 2003 (λ=205°Ls), the dark area was inside the spc and on 27 June 2003 (λ=211°Ls) at ω=086°W, the peripheral part of the spc was bright but the inside was largely quite shadowy under δ which was already 16.1". On the contrary in 2005, the season λ=211°Ls came on 13 May 2005 with δ=7.2" when the shadowy area was seen but no more details than the case where the shadowy came down to northward at ω=338°W. The case above mentioned of 31 May 2005 at the season λ=222°Ls was experienced on 14 July 2003 when we observed seven times from 15:30 GMT at ω=242°W to 19:30 GMT, but the same angle did not appear. However a big rift was differently seen inside the spc and the diameter was already δ=19.1". On the other hand, the sharp corner at the perimeter witnessed on 31 May (λ=222°Ls) at ω=135°W may correspond to 27 July 2003 (λ=230°Ls) at ω=132°W or to 8 July 2003 (λ=230°Ls) at ω=133°W or to 29 July 2003 (λ=231°Ls) at ω=133°W where some bright patches like beads were associated with the perimeter. We observed it at Okinawa by the use of a 25cm speculum. Conversely, if we look for the cases in 2003 at ω=126°W, 155°W which were experienced on 31 May 2005 we may find the cases on 24 June 2003 (λ=209°Ls) at ω=126°W, and on 21 June 2003 (λ=208°Ls) at ω=153°W: We should say the aspect of the shadowy area resembles. However in 2003, the diameters were already as large as δ=15.6" and δ=15.1" respectively so that the shadows were sharper.

It should be further remarked that in 2003 there occurred a dust storm on 4 July 2003 (λ=215°Ls) until 8 July (λ=218°Ls), so that there must

have been some troubles. After the storm, the reproduced M Serpentis to Hellespontus turned out to be quite deformed, and it lasted until the end of the 2003 apparition. This deformation looked to continued also in 2005 as was mentioned already: The fact was also recognised on 8 April, 27 April and 28 April and further on 13 May, and on 15 May 2005.

3. Observations in June and July 2005

In July, the rainy season approached regularly, so that a total number of observations in July decreased to 34. For example, it was impossible to find the planet during the period from 20 June until 1 July. However the angular diameter went up from δ=8.0" (on 3 June) to δ=8.8" (on 19 June; the last occasion in June). On 5 June (λ=225°Ls) at ω=101°W, ϕ=25°S, the spc appeared still large, while its perimeter looks zigzagged, and there is a protrusion downward from the perimeter near the central meridian (CM). On 6 June (λ=225°Ls) at ω=076°W, the zigzagged boundary was apparent, but it was still difficult to discriminate the details of the boundary. Chryse looks normal, and Solis L is visible, but not so dark. On 8 June, S Meridiani came into the sight, but M Acidalium (Niliacus L) cannot be caught because of the presence of the nph and the deep tilt ϕ. At ω=048°W, the morning side of the nph is light. On 8 June and 9 June, it was possible to observe five times every 40 minutes from 17:20 GMT until the dawn. There is not found any bright patch inside Chryse. Auroræ S is dark, while the details around there cannot be checked. On 12 June (λ=229°Ls), it was rather cloudy, and we just caught the planet only twice: Nilokeras looked brownish without details. Also on 13 June (λ=230°Ls) we could not watch more than twice: At ω=002°W, the dark fringe of the spc at the evening side looked darker. S Sabæus was grasped and S Margaritifer was faint but complete. Niliacus L glimpsed above the nph. Argyre also looked to show up. Some haze of the evening Hellas seemed to overflow to the following Noachis. On 17 June (λ=232°Ls) it was possible to observe five times: Syrtis Mj came in, and M Serpentis and S Sabæus were definite. At ω=318°W, 328°W, Hellas was atmospherically light. M Serpentis was broad and bent to Noachis. Argyre is light near the morning limb. At ω=347°W, the morning limb area following the spc is light thru G filter. At the evening terminator along mist is bright from Hellas to Æria. On 18 June (λ=233°Ls), due to a cloudy condition, no more observations were made than those at ω=318°W, 328°W, 338°W. The Note describes that the spc has become smaller. The roundish boundary is clear. Darkest is the area around M Serpentis. The day 19 June (λ=233°Ls) was the last in June: At ω=289°W where Syrtis Mj is near the CM, and the darkest. Hellas is dull. At ω=298°W, where the western part of the spc is brighter. Hellas at the evening side is not so whitish, generally dull. At ω=308°W, Hellas is at the evening side, and roundish. The spc shows a shadowy part on the evening side. The limb side to the west of the spc shows a white cloud. At ω=318°W, Hellas is atmospherically whitish. M Serpentis is broad and dark. S Margaritifer is visible at the morning limb. The nph, if any, is narrow. Finally at ω=328°W, Hellas is now half-roundish in the evening. M Erythræum appears to be dark. The last was the 118th drawing made during this apparition.

On 27 June, the rainy season ended at Okinawa, while at the same time at Fukui the rainy season set in.

In July 2005, we started from 2 July (λ=242°Ls) up until 31 July (λ=260°Ls): During the period the diameter went up from δ=9.4" to δ=11.3" and we obtained a total of 53 drawings. On 2 July (λ=242°Ls), we started from the angle ω=163°W (at 17:30 GMT), and we lost many of the angles since the just foregoing observation was made on 19 June. At ω=163°W, Cerberus and Propontis I are visible. Until ω=193°W, we observed four times every 10° degrees. At ω=173°W, there is a shadowy area at the following western part of the spc. The perimeter is not roundish. ϕ=23°S. The nph is thick. M Cimmerium is darker than M Sirenum. At ω=183°W, M Tyrrhenum is coming. Finally at the session of ω=193°W, a bit light protrusion from the terminator near the spc around at 19:15 GMT (ω=189°W). Maybe near Arsia Mons. Faint and not whitish. Inside the spc, there is seen a shadowy area clearly at the western part.

On 6 July (λ=244°Ls), we started from 16:50 GMT (ω=114°W) with a glimpse: The spc is bright. Solis L is near the evening limb. M Sirenum is a bit dark. At ω=124°W, the spc appears as if a rift exists inside to divide the spc in two. On 8 July (λ=246°Ls) at ω=100°W and 110°W, the perimeter of the spc is zigzagged. Outside the spc, there is seen a light patch to its NW direction. Maybe an effect of the spc. On 12 July (λ=248°Ls), the angular diameter reached δ=10". We observed four times from 17:50 GMT. First at ω=070°W, Solis L is never definite, but Phasis is visible. Margaritifer S is distinct near the terminator. Auroræ S is as dull as Solis L. At ω=080°W, Solis L has become distinct. Ophir is light. The perimeter of the spc does not look smooth. At ω=090°W, Solis L is dark roundish. Argyre is still whitish. At ω=100°W, the morning side of the spc looks lost. M Sirenum is a bit seen. This day through, the nph appeared to be a bit larger and at ω=090°W it looked to show a bright core inside. On 14 July we observed just twice at 18:30GMT and 19:40GMT, waiting from 16:50 GMT: The spc was bright, and the nph is whitish bright. Solis L shows a tint of dark brown. On 17 July (λ=251°Ls) we observed five times from 17:30 GMT: At ω=017°W, S Meridiani was coming. The spc was purely white, and the boundary looked protruding towards the north direction. Argyre was caught. Noachis was dull. Auroræ S was the darkest. It looked the nph contained a core, but blunt as a whole. At ω=027°W, S Meridiani still remains inside. A trace of Argyre. Niliacus L is a bit seen, but M Acidalium is completely concealed by the nph. The nph is still dull. At ω=036°W, Argyre looks faded, but evident. The place where Noachis adjoins the terminator is slightly whitish misty. The spc is whitish clear and the fringe of the spc is well dark. The nph is bright at the centre. At ω=046°W, Argyre is evident, and its east, near the terminator, is slightly misty. Solis L has become darker. The nph has a bright core and Niliacus L is a bit visible. At 20:10 GMT, in the twilight, the angle is at ω=056°W where Argyre begins to show an evening white mist. Solis L is visible, but Auroræ S is darker. Ophir is dull. On 19 July (λ=252°Ls), we observed seven times from 16:20 GMT until 20:20 GMT: The season λ=252°Ls implies the highlight time in 2003 when the neighbourhood of the spc was observed in details, but looking for the similar angles in the CMO Gallery we unfortunately could not find the appropriate angles to compare. At ω=340°W, the spc is bright but its right-hand side is brighter. The surface looks airborne dirty. Noachis and Deucalionis R look dull. D Hellesponticæ is dark. S Sabæus is near the CM. At ω=350°W, Margaritifer S, being in the morning, looks more definite than S Sabæus. S Meridiani is not so dark. Hellas is quite misty. At ω=000°W, Hellas looks to protrude from the terminator (thru G). Argyre is also misty light. The spc appears to be clear, while the surface looks slightly dirty. Niliacus L is a bit visible. At ω=010°W, the spc appears to be divided, the morning side looking to be another patch (if we compare with the images in 2003, the matter at the morning side may be possibly atmospheric). The inside of Argyre is roundish and surface lit. Niliacus L is well grasped. Margaritifer S is well visible, while Auroræ S is darker. At ω=019°W, the morning side matter of the spc is still seen. Hellas went into the dark side. Lunæ L is seen. Hellesponticæ Dep is distinct. S Meridiani is still inside the disk. At ω=029°W (19:40 GMT), a misty light matter at the morning side of the spc. Hellas completely disappeared, while S Meridiani a bit remains (at 19:48 GMT). Lunæ L and Niliacus L are a bit seen. Solis L is quite inside the disk. The evening terminator is generally misty. At ω=039°W, there is seen a protrusion of the perimeter to the north. Solis L is now more evident. Thaumasia is clear. Margaritifer S has become obscure. Argyre is roundish light. Ganges is evident. On 20 July (λ=253°Ls), it was heavily hazy around at 16:20 GMT. We started from 17:00 GMT at ω=340°W and observed five times until 18:40 GMT at ω=019°W. At ω=340°W, Hellas showed a roundish clear boundary at the evening side. At the morning side, Argyre came in with a white tinge. S Meridiani is darker than S Sabæus. Syrtis Mj is near the terminator and looked dark. Margaritifer S is clear cut but faint. No bright patches inside Noachis. At ω=350°W when the transparency improved, Hellas is still whitish dull. Niliacus L looks bluish. Margaritifer S is distinct. The nph is whitish. At ω=000°W, Hellas still

remains inside the disk, but looks as if it has moved upward. The Noachis band is dull. Margaritifer S is well visible. At ω=010°W, S Meridiani has become fainter. The area around M Erythræum is dark, but Auroræ S is darkest. Argyre is roundish light. At ω=019°W, S Meridiani still shows its trace. The shadow of Solis L has come deeply. On 24 July (λ=256°Ls) the sky cleared. At ω=326°W, there is no sign of dust patch on Noachis. The deserts are ruddy. Hellas is reddish/whitish at the evening side.

At ω=336°W, Hellas is dull misty whitish with a clear boundary. Argyre is also whitish light at the morning limb. Hellesponticæ D is notably dark. The area from Sabæus S to Margaritifer S is as usual. On 27 July (λ=258°Ls) we observed seven times from 16:00 GMT until 20:00 GMT: At ω=258°W we first grasped Novus Mons this season when δ=11.0". It is really faint. Let us note that in 2003, we observed Novus Mons at λ=260°Ls (on 14 Sept 2003) at ω=354°W and 009°W when the diameter was as large as δ=23.7". It disappeared at λ=273°Ls and so on. Here on 27 July 2005 Hellas and Ausonia are quite dull. The preceding area of the spc near the terminator is whitish hazy. M Tyrrhenum is the darkest next to Syrtis Mj. Libya ruddy. At ω=268°W, Hellas is roundish, being clearer than the surroundings. Perhaps it is of lemon-yellowish tint and its NE corner is bright. Ausonia is dull, while there is a dark spot to the south. Now it is hard to check Novus Mons. At ω=277°W, the NW part of Hellas shows a bright streak. The preceding part of the spc is whitish misty. At ω=287°W, Hellas is near at the centre, though it looks dull. The spc is bright, but the fragmental Mons does not show up. At ω=297°W, Novus Mons seems to be seen. Æria looks ruddy. The western part of Hellas is lighter. The markings on the southern hemisphere show a tint of ochre. The high latitude area around the spc is ruddy. In general the surface looks a bit airborne dusty. At ω=306°W, Novus Mons mostly melted, though a remnant is visible. Its preceding terminator area looks to show a protrusion. The nph normally shows up. The west corner of Hellas is still bright. At ω=316°W, S Meridiani is clearly seen. The eastern side of S Sabæus is darker. Hellas is whitish dull, less light than the northern desert. We ended at 20:00 GMT, the twilight time. On 28 July (λ=258°Ls) at ω=248°W, Hellas is off-white light, and its eastern boundary is clear. The NW part of the inside of Hellas is already lighter. M Tyrrhenum is darkest though the clearly visible Syrtis Mj is already inside the disk. The nph is today strong. The evening terminator side (on the SH) looks whitish misty. At ω=258°W, the preceding desert of Syrtis Mj near the limb looks reddish. Æria light. The upper boundary of Hellas is clear. The nph looks today white and thick. At ω=268°W, Syrtis Mj appears to be quite classic. Hellespontus is not so evident (faintly seen later). For a while it was cloudy, then at ω=285°W, we checked Hellespontus which bounds Hellas. Syrtis Mj is clearly seen. At ω=295°W, Hellas looks large but its tint is rather reddish. M Serpentis is quite dark and broad. The northern desert appears reddish. The limb side is light. Finally at ω=305°W, Hellas looks rather reddish though not bright. M Serpentis quite dark. Meridiani S is now definitely visible. On 31 July (λ=260°Ls) we observed six times from 16:20 GMT. First at ω=224°W, Hellas, near the morning limb, is certainly bright but less than the spc. Syrtis Mj is hardly seen yet. The evening side of the northern desert is reddish. At ω=234°W, Syrtis Mj is faint near the morning limb, but appearing as well as M Serpentis. Hellas is brighter (also thru O56 filter), but not so conspicuous (with a creamy tint). The spc is much brighter and whiter. The nph is also whitish. At ω=243°W, Æria is now brighter than Hellas which is now duller and not so distinct, while less reddish than Ausonia and Trinacria. Syrtis Mj is now darker, nearly is as dark as M Tyrrhenum. At ω=253°W, Hellas is a bit light in creamy colour, while duller than Æria. Ausonia and Trinacria are rather shadowy, maybe reddish. At ω=263°W, Hellespontus is now visible. Ausonia-Trinacria is rather shadowy. Hellas is a bit light. M Tyrrhenum is as dark as Syrtis Mj (quite clear thru O56). The area around the spc looks wine-coloured. Northern desert looks reddish. At ω=273°W, the following desert including Æria shows a ruddy colour. Hellas is rather dull. Ausonia near the terminator is misty.

4. Observations in August 2005 up until 15 August

In August we started from 3 August (λ=253°Ls) at 15:40 GMT and ended on 31 August 2005 (λ=280°Ls) at 18:30 GMT. The angular diameter went up from δ=11.5" to 14.1". During the one-month period we observed a total of 98 times. The spc has become much shrunk. However we treat here only upto mid-August, because of the lack of space. Now on 3 Aug (λ=253°Ls) at ω=185°W, Ausonia is bright near the terminator but less bright than the spc though the spc itself is dull and narrow. The nph is white to the morning side. At ω=195°W, Hellas is coming. The northern desert is reddish. M Cimmerium is quite dark near the CM and separated from M Tyrrhenum. Elysium on the morning side looks whitish (by means of G). At ω=205°W, the surroundings of the spc look faded. The nph is the brightest (in G). Hellas is less bright and of a different colour. In R, the spc is the brightest and Hellas dull. At ω=214°W, the spc, already smaller, is bright in a pure white tint, while Hellas shows a cream colour. The nph is wide: The morning limb patch is bright in O56. Hellas is not so bright (not in R, a bit in O56). At ω=224°W, Hellas is more and more apparent with the boundary, but not whitish, rather cream yellowish. In O56, the spc and the nph are white, while Hellas is dull light, never whitish. In R60, it may be said as light as the nph. M Tyrrhenum is as dark as M Cimmerium. The west end of M Cimmerium is quite dark. The outside of the spc has a fine dark band. At ω=234°W, Hellas is distinct on the morning side in Integrated Light with a tint of off-white. In O56 it is usually light and far brighter than Ausonia-Trinacria. At ω=244°W, a remnant of Novus Mons is visible, and its preceding area is wine-coloured (the vanishing of Novus Mons is said to occur around λ=273°Ls, while in 2003 Novus Mons was chased until λ=286°Ls – See the situation in 2003 and 2005 in a report of CMO #327 page Ser2-0539). Hellas is roundish light (as light as Æria). Syrtis Mj is as dark as M Tyrrhenum. Here the former is dark-brownish while the latter dark-blue. Trinacria is faint as in 2003. At ω=253°W, Hellespontus has come. Hellas dull. Syrtis Mj is as dark as M Tyrrhenum. The southern markings are also as dark as Syrtis Mj. Novus Mons is faint but its west end is lighter. On 5 Aug (λ=263°Ls) at ω=195°W, Ausonia is never bright. Cerberus is visible but Elysium is never light. M Tyrrhenum is more evident than on 3 Aug. At ω=205°W, Thyles Mons is not yet visible, while a fragment is seen to the preceding side. Hellas is a bit light near the limb. The upper markings are of the wine-coloured. The faded area around the spc is apparent. The nph is scarce though the morning part is thick. At ω=215°W, The brighter part of the spc is small. The west end of M Cimmerium is dark. M Chronium and Tiphys Fr are brownish. Cerberus and the Ætheria dark patch are faintly visible, while Elysium does not show up. The nph is a bit seen. At ω=225°W, Hellas is a bit light, but showing quite a different tint than the spc (less bright in R60). The spc shows a bright spot inside. Syrtis Mj is coming. The nph is now very evident. M Chronium is apparently brownish. M Cimmerium is darker than M Tyrrhenum. The evening southern hemisphere is misty. At ω=234°W, Syrtis Mj has become darker (especially its west coast) but still a bit less dark than the preceding M Tyrrhenum. M Chronium is definitely brownish. Hellas is visually different in colour and brightness from the spc, while in R60 both look similarly light. The spike of M Cimmerium is apparent. M Tyrrhenum may be the darkest but not so particularly. On 6 Aug (λ=264°Ls) at ω=156°W, the spc is brighter than expected, but shows no detail because of the poor seeing. The band made by M Cimmerium and M Sirenum is dark evident. When the transparency and the seeing improved, a white spot near the terminator was seen. Arsia cloud? At ω=166°W, the spc is narrowly long bright, both sides being whitish light. The eastern part of M Cimmerium is quite dark. The nph is white up to the morning side. At ω=176°W, the brightest main part of the spc is apparent by the use of O56, while in Integrated Light, the southern limb looks just bright. At 400×, M Cimmerium shows dark bluish colour, while others do the brownish colour including M Sirenum. At ω=186°W, the lump of the nph is conspicuous. Ausonia is a bit lighter than the others. The spc is also detectable thru O56. At ω=195°W, The brightness of the spc is now clear in Int. The nph is conspicuous today.

Hellas is coming. M Tyrrhenum is rather full and M Hadriacum is a bit visible. At ω=205°W, M Tyrrhenum and M Cimmerium look parallel in density. Hesperia is clear cut. The southern hemisphere evening haze is still visible. The nph is also clear. Hellas is a bit bright, off-whitish or creamy white. At ω=215°W, M Chronium and Tiphys Fr are brownish dark. The nph is still conspicuous. Hellas is never bright. Libya is a bit light. At ω=225°W, M Sirenum or the east end of M Cimmerium is faint under the evening mist. At a good seeing moment, Novus Mons is still seen. The preceding part of the spc is a bit light (or faded). There is a parallel light streak along the spc (to the north). Elysium looks narrow. The nph's boundary is gradual. There is a bright core in the nph. Hellas looks a bit light in a cream colour. The southern continents are dull. M Chronium is in a wine-colour. At ω=234°W (made after the sunrise), the morning Hellas is still in a different colour. Eridania is clear though not bright. The spc is narrow. Novus Mons is faint but clearly visible. Syrtis Mj is now fully dark. On 7 Aug (λ=265°Ls) at ω=156°W, near the terminator to the east of M Sirenum, there is a shadowy area (Solis L?). The Arsia cloud is unknown. Olympus Mons looks dark as a spot (another spot is there). Cerberus is appearing. Already the eastern part of M Cimmerium is dark. At ω=166°W, the Arsia cloud looks to exist following a dark spot. Ausonia is lit at the morning side, in different colour from other preceding continents. The nph patch is very whitish bright. The southern hemisphere evening mist is visible; some may be down from the spc area. The rapidly faded part of the spc is still considerably light, having a protrusion? At ω=176°W, M Sirenum is now fainter. M Tyrrhenum is now coming. Configuration of the nph is different from the preceding case: No patch at the bottom any longer. The terminator is not smooth. Maybe Olympus Mons is on the edge. Amazonis looks ruddy. Eridania and Ausonia look hazy light. At ω=186°W (18:20 GMT), Again a bit of the bright nph is at the bottom. Now a protrusion is near the latitude of Arsia Mons at the terminator. After 18:25 GMT the protrusion disappeared and the Ætheria dark patch is near the morning limb. The desert on the northern hemisphere is reddish. At ω=195°W, Hesperia is clear cut. The Ætheria dark patch is now inside, and darker than Cerberus. M Sirenum is quite weak. Tiphys Fr is brownish while M Cimmerium shows a rather blue darkish tint. At ω=205°W, the evening haze on the southern hemisphere may be whitish up to the limb of the spc. M Sirenum is almost concealed. Hesperia is clear cut. M Tyrrhenum is parallel to M Cimmerium. At ω=215°W, under the moderate to good seeing, the Ætheria dark patch is quite evident in the same form as seen in 2003. There is no dust to the north of the spc, just appearing faint. The Novus Mons remnant looks to exist (δ=11.9"). Hellas looks bright near the limb. M Hadriacum is evident preceding Hellas. The western side of M Tyrrhenum is darker than the eastern part. At the end of this session, Syrtis Mj was seen finely near the limb. (*To be continued*. The observations from 8 August to 15 August are lacking. The last observation on 7 August was numbered 201st , counted from the first observation on 22 November 2004.)

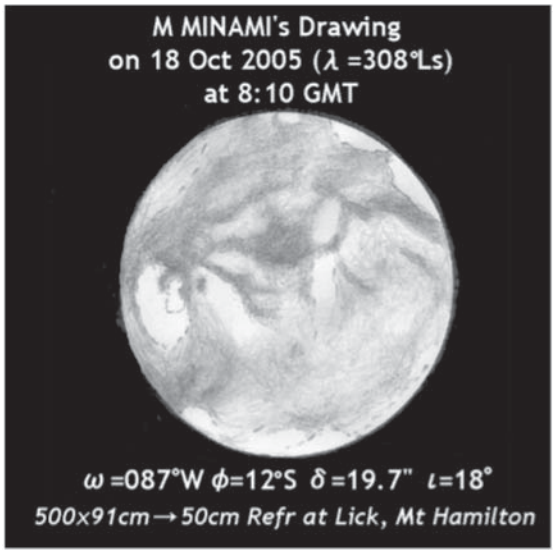
Appendix I.

Here we record an international chasing of a dust storm which occurred on 18 Oct 2005 (λ=308°Ls). Here we cite a part of the article written by the present author in CMO #324 (25 Oct 2006). This new significant dust was first observed in Europe from the early Martian morning, and after safely crossing the Atlantic Ocean, it was caught also by the present author at the Lick Observatory. The first person who performed a nice contribution to us is Silvia KOWOLLIK (*SKw*), Ludwigsburg, Germany. She used a 15 cm Newtonian equipped with a ToUcam camera. She readily communicated about it to the CMO on 18 Oct at 01:55 GMT by email. It was received by MURAKAMI (*Mk,* at Fujisawa, Japan) and MINAMI (*Mn,* at Mt Hamilton, CA), and soon we were on the alert though *Mn* needed to wait for a few hrs to catch the planet. *SKw* sent her second email to us at 3:47 GMT, and *Mn* sent emails to MURAKAMI (*Mk*) to prepare to send out an Alert to the CMO members and *SKw* (to confirm and to chase further) around 4:17~4:20 GMT. It was very fortunate that she was a member of our CMO and she knew the CMO

method of the Mars observations. She obtained a total of eleven precious images every 20 minutes from 01:45 GMT to 05:04 GMT (at 01:45 GMT ω=353°W, 02:04 GMT ω=358°W, 02:24 GMT ω=002°W, 02:44 GMT ω=007°W, 03:04 GMT ω=012°W, 03:24 GMT ω=017°W, 03:44 GMT ω=022°W, 04:04 GMT ω=027°W, 04:24 GMT ω=032°W, 04:44 GMT ω=037°W, and at 05:04 GMT ω=041°W).

From the east coast of the USA at NY, Sean WALKER (*SWk*) took an image at ω=012°W (at the same time as the fifth observation of *SKw*). This was made at 3:04 GMT. Then Joel WARREN (*JWn*) produced a set of image at Tx at 3:23 GMT (ω=017°W) which corresponded to the 6th observation of *SKw*. So we shall say the Atlantic Ocean was not any obstruction. Also at the same time with the ninth observation of *SKw,* Don PARKER (*DPk*) produced an R image of ω=032°W at 04:24 GMT. Also Bill DICKINSON (*WDc*) at VA took at 04:20 GMT (ω=031°W), Martin GASKELL (*MGs*) at NE at 04:41GMT (ω=036°W). *JWr* sent out an alert to his mail list on 04:20 GMT: His shots were made as follows: At 03:23 GMT ω=017°W, 04:40 GMT ω=036°W, 06:50 GMT ω=067°W.

The present writer (*Mn*) sent an email of confirmation to *JWn* as well as those on his list at 04:58 GMT and informed them of *SKw*'s earlier observations. *JWn*'s 04:40 GMT image arrived at 05:12GMT, but at that time *Mn* had moved to the 91cm big dome and prepared to begin to observe. The third great contributor was Dr Clay SHERROD (*CSr*), Arkansas Sky Observatory, AR, and gave images as follows; at 05:01 GMT ω=041°W, 05:40 GMT ω=050°W, 06:22 GMT ω=060°W, 07:02 GMT ω=070°W. Miraculously, *CSr* in the middle of the US caught Mars just when *SKw* in Germany saw off the planet low in the west, and *CSr* claims his clock exactly ticked out every 40 minutes. During the angles ω=050°W~ω=070°W, *WDc* took an R image at ω=051°W, Frank MELILLO (*FMl*) at NY at ω=052°W, Ed GRAFTON (*EGf*) at ω=065°W, Bill FLANAGAN (*WFl*) at ω=066°W, 072°W (both at Houston), Jim PHILLIPS (*JPh*) at SC at ω=070°W, all produced good images.



The present writer (*Mn*) was expectantly waiting at the Lick Observatory, and just after *SKw* was forced to stop, he could start to observe by the use of the grand refractor: Yes, the dust was very apparent, and looked visually to show a whitish-yellow tinge and roundish. The first observation succeeded the last of *SKw*'s ω=037°W as follows:

Mn 05:30 GMT ω=048°W
Mn 06:10 GMT ω=057°W
Mn 06:50 GMT ω=067°W
Mn 07:30 GMT ω=077°W
Mn 08:10 GMT ω=087°W
Mn 08:50 GMT ω=096°W

After *Mn*'s last observation, Laurie HATCH (*LHt*) produced a colour drawing of the dust which was near the terminator around at 09:30GMT or at ω=106°W.

We should also here refer to the observations made earlier than the start time of *SKw*. Especially the images of Damian PEACH (*DPc*), the UK, on 17 Oct at ω=318°W, Dave TYLER (*DTy*), the UK, at ω=329°W, David ARDITTI (*DAr*), the UK, at ω=336°W, and finally Jan ADELAAR (*JAd*) from the Netherlands at ω=344°W all show the morning dust near the limb and so they are very precious.

Thus we can say we obtained at least a series of the observations made almost every 10°W (every 40 minutes) on the day as shown in the following Table:

DPc	23:56 GMT	ω=328°W	or *DTy*
ADr	00:36 GMT	ω=336°W	
JAd	01:07 GMT	ω=344°W	
SKw	02:04 GMT	ω=358°W	
SKw	02:44 GMT	ω=007°W	
JWn	03:23 GMT	ω=017°W	or *SKw*
SKw	04:04 GMT	ω=027°W	
SKw	04:44 GMT	ω=037°W	or *JWn, MGs*
Mn	05:30 GMT	ω=048°W	
Mn	06:10 GMT	ω=057°W	
FWl	06:45 GMT	ω=066°W	or *JWn, Mn, EGf*
Mn	07:30 GMT	ω=077°W	
Mn	08:10 GMT	ω=087°W	
Mn	08:50 GMT	ω=096°W	
LHt	09:30 GMT	ω=106°W	

Otherwise from the other branch of *SKw*'s work, we may also choose another series as follows:

SKw	01:45 GMT	ω=353°W	
SKw	02:24 GMT	ω=002°W	
SWk	03:02 GMT	ω=012°W	or *SKw*
SKw	03:44 GMT	ω=022°W	
DPk	04:25 GMT	ω=032°W	or *SKw, WDc*
SKw	05:04 GMT	ω=041°W	or *CSr*
WDc	05:43 GMT	ω=051°W	or *CSr, FMl*
CSr	06:22 GMT	ω=060°W	
JPh	07:01 GMT	ω=070°W	or *CSr, WFl*

(Please don't confuse *SWk* with *SKw* as we do frequently.)

Note that the pursuit on the day ranged nearly ten hours, and the angles were covered about 140°W: Furthermore the chase started from the time when the dust was still quite near the morning limb, and this kind of observations of the dust storm should be said rare hitherto. Taking into account a disadvantageous condition ι=18°, we should say the present sequences of the observations may belong to the best ones ever obtained.

The present writer has long been of the opinion that it is at the early morning or dawn for any dust storm to be caused and the dust could stay stationary in the day time, though it has been usually claimed that the cloud could receive big disturbance energy at the daytime: As to our conjecture, see for example

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn0/01Note02/index.htm

Hence this year's phenomenon brings another proof to our conjecture. Any dust storm will be inactive at night, and will vanish or appear in a deformed shape on the following day. This case of the dust on the next 19 October proved to show quite a different configuration than the aspect of the dust on the preceding day.

2005年の火星観測報告（その1）

南　政次*

（要旨）2005年の火星は10月30日に地球に最接近したが，福井市自然史博物館天文台では前年（2004年）の11月22日から2006年の6月29日まで一年八ヶ月ほど火星観測を連続で遂行した．これは1954年から続く福井市自然史博物館の恒例の観測行事である．ただし，この報告は紙数の関係で，2004年11月22日から2005年8月半ばまでに限って報告し，その後は次号以降にまわす．なお，最接近直前10月に筆者はカリフォルニアのリック天文台に20日間滞在し，リックの世界第二位の91㎝屈折望遠鏡で観測する機会があったが，リックに滞在中の10月18日GMTに火星面に黄塵が発生し，ヨーロッパからアメリカ西海岸にかけて，国際的な追跡が行われ，成功したが，筆者は最初からリックでemailを使って追跡をリードしていたので，付録にその様子を記しておく．火星の早朝から黄雲が綿密に追跡されたのは，火星観測史上，初めてである．

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