ISSN 0917-7388

COMMUNICATIONS IN

CMO Since 1986

MARS

No.408

25 March 2013

OBSERVATIONS

No.34

Published by the International Society of the Mars Observers

With a View to the Classical Observations of Mars

By

Masatsugu MINAMI

We should say it is now needful to re-find a way to make out what the Mars observations by means of telescopes from the Earth do imply; that is, we should seek the way to make the classical observations very valuable in a modern style. It is however not easy to put forward the aptest way to precisely define what the true and valuable "classical" observations of Mars should be. On the contrary it is easier to find what are not to be said "classical" (if it is classical-like).

Any of true "classical" observations may be synonymous to the telescopical observations made by a group of observers who can make "right" statements on Mars based on the observations. It should however be remarked that unfortunately any classical observer is not necessarily "classical". Otherwise there are lots that have been regarded as the classical-like statements hitherto, but some assertions were readily denied and some were refused by further scrutinies.

As an example, we here would like to pick out again the case treated before, in 1995 in a column of CMO (Ref. [1]): This is an example where a statement made by a classical-like observer turned out to be false and so it was not any "classical" statement.

The case was concerned with a statement given by Patrick MOORE in Ref. [2] in which he discussed that the major dust obscuration on the Martian surface might be caused by the activity of volcanoes on the planet to the effect that the phenomenon occurred just when Mars and the Earth made a great approach near the perihelion of the red planet under the influence of the Earth: MOORE was then made to speculate that there occurred the major obscurations only every 15 or 17 years. MOORE went on thus to write in the following way:

> Generally speaking, such dust-storms do not occur in preceding or following oppositions; thus there were no major obscurations in 1941, 1926 or 1958, and ***I venture to predict that there will not be one in 1973*** (the bold-italics are ours).

In the very year of 1973, however, there

occurred a very vast dust storm on Mars which started from the area of Solis Lacus, so that MOORE's conjecture proved readily collapsed. Probably in his mind such large volcanoes as Olympus Mons, which were detected just before in 1971, might have been imaged, but he must have known that the size of Mars is not large enough to maintain the active volcanoes for these several million years, not to say about 4.6 billion years, and otherwise Mars is not so tiny to become active as a result of tidal heating from friction generated within its interior; without any big gravitational matter near Mars. So MOORE's speculation has not been classic in any sense.

It is of course permitted for anyone to make any plausible conjecture on Mars. However, the reason why the present writer picked out this anecdote in Ref. [1] was not simple, but because the story did not end with the above episode.

In 1980/81, the present writer had occasion to drop in the so-called world's largest bookstore called Foyles* near the Tottenham Court Road station of the London Tube: In the bookstore he came across a book entitled "Guide to MARS" whose author was specified as Patrick MOORE.

*The receipt really says "The World's Greatest Bookshop FOYLES, stock of over four million volumes, 119-126 Charing Cross Road London WC, open 9-6 inc. Sat (Thursday 9-7)."

A copy was bought to make it a present to Takashi NAKAJIMA, a friend of Mars observations ever since 1954, whereas there was still plenty of time to go back to Japan, and so several pages were skimmed in London. The present writer was then very surprised when he found the following passage in Chapter 5 which treated the main dust storm in 1971 and also shrewdly the 1973 dust storm.

It began in mid-September, and was first photographed by Gregory Roberts, using the 27-inch refractor at Johannesburg. Observers at the Lowell Observatory at Flagstaff reported that it spread out from an initial streak-like core around 1500 miles long, and expanded until by 27 September it covered a large area touching the eastern edge of the famous circular feature Hellas. On 28 September I recorded well-marked dark features in their familiar guise; then came two cloudy nights from Selsey observatory, and when I could observe again, on 1 October, there was a striking transformation. All I could see were vague indications of the south polar cap and a few indefinite shadings. Within a week I had lost even these, and it was not until the end of December that anything positive could be made out once more --- by which time Mars receded so far from the Earth that details were by no means easy to see even without the added disadvantage of Martian dust.

This, of course, was the period when Mariner 9 was in the neighbourhood of Mars. When it arrived it could do little more than photograph the top of the dust-layer, but the tops of some of the giant volcanoes poked out, which gave a good idea of the altitude of the layer itself.

Because the storm was so violent, ***I rather expected that another would occur near the next opposition, that of 1973; and it did.*** For a long period fol-

> lowing mid-October the disk, as seen with my 15.5-inch reflector and also with the Johannesburg 27-inch refractor, was either blank or virtually so. Yet only a few days before the onset of the storm, the surface features had been absolutely normal in appearance. As so often happens, the planet was covered in a surprisingly short time----less than a week (page 79 of Ref. [3]).

Again the bold-faced italics are our own. It is apparent that the paragraph indicated contradicts a paragraph in the preceding citation from Ref. [2].

How can we say about this contradiction? Did this person forget what he issued previously in 1972? If not, was this person double tongued or a liar? Or, existed there two persons whose name was equally Patrick Moore? The titles of the latter Patrick Moore were written O.B.E., D. Sc. (Hon.), F.R.A.S. and so quite definite. But as to the former we have no data.

We should remark that when the former MOORE wrote about his conjecture, if he was a well-learnt observer, he could hesitate to issue such an idea, because there were already several reports which stated about the initial stages of the great dust storms (including the foregoing 1956 dust storm): It had been suggested the initial one was made partly of condensates and looked "whitish" bright. The second MOORE (1923 - 2012) could have been aware of some reports of William Alvin BAUM (1924 - 2012) and others. In Ref. [4], W A BAUM wrote impressively: "*In September 1971, …, there was no visible evidence of any unusual activity on September 21st, but early the following morning as Noachis emerged from the morning terminator, it was brighter and whiter than any features of the storm during the days that followed.*" It should here be noted there was the word *whiter* which implied that the initial stage was occupied by a condensate made of water vapour.

MOORE's book is entitled "Guide to Mars", but not "Guide to the Mars Observations", and in fact there is not found any guiding principle which may be useful to Mars observers including beginners. MOORE's pages throughout are full of his own personal discontinuous observations among the rumour-like descriptions, but they are not organised with observations made at other places or other countries. Note that there is a great difference between what MOORE wrote and what BAUM wrote about the beginning of the 1971 dust storm. The clear cut description of the occurrence of the initial dust by BAUM is apparently far more valuable than the duller personal description of the latter MOORE concerning the initial stage. The latter did not recognise the importance of the initial stage: It was (also is) really very important to observe the occurrence of the dust break in the morning side.

It should be recalled that the description by BAUM was not based on the data obtained at Lowell Observatory (the first report of the appearance of the 1971 dust cloud arrived at the Lowell Observatory from D. MILON at Harvard on 25 September 1971. [10]), but the data came from the results of the *International Planetary Patrol* (IPP) Programme which started in 1969: About the Programme, see Ref. [5]. The network was

spanned world-widely by the observatories at Mauna Kea, Flagstaff, Cerro Tololo (Northern Chile), Johannesburg, Kavalur (southern India), Perth (western Australia) and at Mt Stromlo (eastern Australia). In the case of around 21st September, the phase angle ι was already so large as 30° (after opposition) that it was very preferable to check the morning terminator since it was quite inside. At that time, because of the rotations of Mars and the Earth, the pertinent place must have been at the Republic Observatory (formerly Union Observatory) which worked by the use of a 26.5 inch telescope (possibly stopped down to 13.25 inches) where the Blue-light images produced the whiter aspect of the morning dust.

BAUM must have not been any Mars observer at the eyepiece position, but he was deeply related with the project of the IPP programme, and so he could obtain the occurrence just like on a bird-eye view.

Here we would like to add incidentally that he was also known to have cooperated to investigate the images of the polar caps obtained from the Lowell plate collection covering more than 60 years, plus more recent data from the IPP films. And then BAUM *et al* found a period where the thawing of the north polar cap stands still (from λ=010°Ls to λ=060°Ls): This was a revolutionary finding so that we named later this aspect of the period of the npc as the Baum Plateau. See Ref. [7]. A schematic curve of the npc thawing with the Baum Plateau refigured by Masami MURAKAMI is found at page Ser2-1075 of Ref. [8].

The present draft was intended to show how we can make out the true classical Mars observations which make use of the terrestrial telescopes. That is, we wish to find the way to make the classical observations valuable.

We believe now that apparently the way taken by the IPP Programme gives one of the most plausible hints. It aimed at the hour-to-hour observations around the world, and its plan looked successful, but unfortunately by a foolish changeover of the policy of the Lowell Observatory, the IPP Programme was stuck in 1976. We of course know the reason why the IPP Programme was thrown away: It was because the Martian orbiters and the surface rovers were considered to take the place of the classical world-wide observations, but at least at present (in 2013) we should say the modern machines are still impotent to overcome the traditional observational methods: Have they succeeded in detecting the hour-to-hour (or 40 minutes-to-40 minutes) changes on Mars? Did they look down the morning terminator to unearth the enigmas at the early morning?

Here we should be aware of the difference between the writing of a person who made no more than a blank personal statement about the initial stage of the 1971 dust storm and the writing of BAUM who was based on the lots of information from the IPP Programme and could pin down the occurrence and its aspect as well as its aftermath. The information of the former (who might have been regarded as very learnt) was no more than a silly brag, while the latter brought about the precise information which was obtained by a sole use of the “classical” means. Even if we compile much up such closed and personal observations as stated by

MOORE, there will not be produced any definite results, and they are regarded as those by dilettante or layman, and will be thrown away.

As to the detailed account of the dust phenomena derived from the IPP data in 1971 and 1973, see Refs. [9], [10], [11] and some other references therein.

Finally, since Charles F CAPEN (1926 -1986) and Leonard J MARTIN (1930 - 1997) alluded to the observations in 1956 by Shotaro MIYAMOTO (1912 - 1992) who worked at Kwasan Observatory, Kyoto University in Refs. [9], [10], [11], we here refer to his first paper on Mars published in 1957 as [12], in which he analysed the great "yellow cloud" in 1956 based on his own visual observations of the cloud with which he met at 44 of age. His observations on 20 August, and on 26 August were elaborated and conspicuous, but he could not deliver further observations until 23 September because the occurrence area soon went away at the rear side seen from his place. In this respect, for example the observations by W S FINSEN at South Africa may supplement the MIYAMOTO observations: FINSEN brought about the images of the relevant areas on 29, 31 August, 1, 2, 4, 5, 6, 7 September although he could not encounter the initial scene of the dust occurrence. In *Note Added in Proof* of [12], MIYAMOTO acknowledged the courtesies of E C SLIPHER (1883-1964) and S L HESS (1920-1982) for their informational offers. Thus, even if it is said the "expansion" is rapid or slow, any one station cannot chase out the phenomenon within its own permitted time. In 1971, MIYAMOTO [14] also expected much to see the occurrence (on 22 September), while the area was not visible from Japan until he just witnessed the tail on 27 September.

As such any method of the classical observations is not easy to pursue and reveal the entire picture by an isolated personal effort. These facts equally suggest that we should be correlated with other diligent observers spread around the world at appropriate intervals. This will be at least a clever way to make shut the outfielders' mouth who otherwise might say as if our observations are out of date or obsolete.

References

[1] Masatsugu MINAMI, Are There Two MOOREs? *CMO* No.170, 25 December 1995.

[2] Patrick MOORE, *J BAA* **83** (1972) 31.

[3] Patrick MOORE, "Guide to Mars" (Lutterworth Press, 1977).

[4] William A. BAUM, "Result of Current Mars Studies at the IAU Planetary Research Centre", *Exploration of the Planetary System, (Woszczyk and Iwaniszewska, eds)* 241-251.

[5] William A. BAUM, "The International Planetary Patrol Program: An Assessment of the First Three Years" *Planet. Space Sci.*, **21** (1973) 1511.

[6] Masatsugu MINAMI, CMO 2005 Mars Note (7): Miracles Occurred on 18 October 2005, *CMO* No.324, 25 October 2006.
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn3/CMO324.pdf

[7] Masatsugu MINAMI, The North Polar Cap in Spring (Coming 1992/93 Mars), *CMO* No.130, 24 February 1993.

[8] Masatsugu MINAMI, Masami MURAKAMI and Akinori NISHITA, Mars in 2009/ 2010. I , *CMO* No.357, 25 April 2009.
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn5/CMO357.pdf

[9] Charles F CAPEN and Leonard J MARTIN, The Developing Stages of the Martian Yellow Storm of 1971, *Lowell Observatory Bulletin* No. 157, 30 November 1971.

[10] Leonard J MARTIN, The Major Martian Yellow Storm of 1971, *Icarus* **22** (1974) 175.

[11] Leonard J MARTIN, The Major Martian Yellow Storms of 1971 and 1973, *Icarus* **23** (1974) 108.

[12] Shotaro MIYAMOTO, The Great Yellow Cloud and the Atmosphere of Mars Report of Visual Observation during the 1956 Opposition, *Contributions from the Institute of Astronomy and Kwasan Observatory, Kyoto University,* No. 71, March 1957.

[13] W S FINSEN, Photographic Observations of Mars, *Circular No.116, April 1957, of the Union Observatory* (later called Republic Observatory) at Johannesburg.

[14] Shotaro MIYAMOTO, Meteorological Observations of Mars during the 1971 Opposition, *Contributions from the Kwasan and Hida Observatories, Kyoto University,* No. 206, 1972.

□

ISMO 11/12 Mars Note (10)

The Ascræus Cloud in 2012

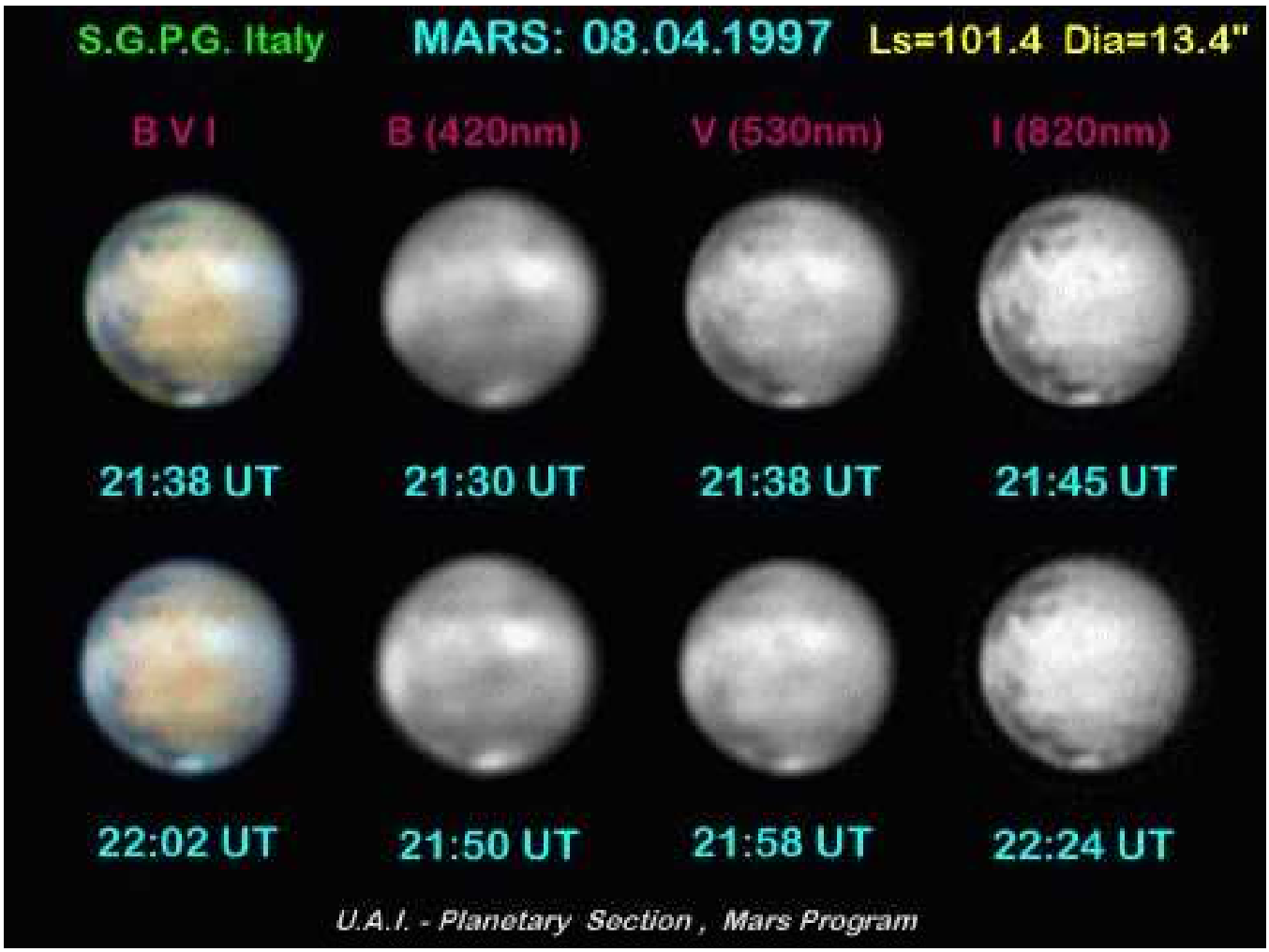
Masatsugu MINAMI

This Note may overlap with the content of the article written by Christophe PELLIER as 2011/2012 CMO Note (7): *Bright Morning Radiation Fog inside Tharsis,* Ref. [1]
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn4/CMO405.pdf
while the present Note is a genuine sequel to the preceding Note entitled *Trend of the Ascræus White Cloud* which reviewed the case in 1997, Ref. [2].
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn0/99Note11/index.htm

As to the "Ascræus Cloud", we already defined it in CMO #215 (10 April 1999):
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn0/97Note16.htm
The motif why we considered the case and gave a new nomenclature to the cloud was raised by our visual observations of the Tharsis ridge on 31 March 1997 (λ=098°Ls) at the Fukui City Observatory, though we had known its existence since 1982. Our successive observations on 31 March 1997 were recorded in (Mn-464D ~ Mn-473D/1996_1997), and some of the drawings were cited in Ref. [3]. Fortunately we were later aware that the HST had taken a clear image set of Mars at ω=094°W on 30 Mar 1997: These images were introduced in CMO #191 and #211:
http://www.hida.kyoto-u.ac.jp/~cmo/cmo/click/cl08/c8.html
http://www.hida.kyoto-u.ac.jp/~cmo/cmomn0/97Note14.htm

In [2], the cloud was characterised as "*a roundish white cloud/mist which was seen at the following outskirts of Ascræus Mons through the valley upto the preceding area of Olympus Mons.*" The longitudinal position of Ascræus Mons was assumed at Ω=104°W, while the position of the Ascræus Cloud was about at Ω=120°W. This cloud is not related with the southern area of Arsia Mons: It is well known that Arsia Mons meteorologically behaves differently from other northern Tharsis volcanoes.

Reference [2] also reports "*The valley cloud diurnally forms thickly at dawn and is weakened in the afternoon, and will be taken the place by the evening orographic cloud covering Ascræus Mons. In 1997 for a time being this process was observed to repeat every Martian day.*" It also reports "*This Ascræus Cloud can also be identified with the ones observed in the early 1980's. The present writer (Mn)'s drawings made on 18 and 19 April 1982 (λ=114°Ls) by the use of 450×15cm refractor at Fukui show the phenomenon. The phase angle was 15° after opposition. The ω=092°W so implied 9:10 LMT when the cloud was conspicuous. The cloud was visible also at ω=132°W near noon. The drawing on 18 Apr 1982 at ω=092°W is found in CMO #201 p2247.*" The URL of the image is given by
http://www.hida.kyoto-u.ac.jp/~cmo/cmo/image/mn/201fig7.gif



In 1997, the Ascræus Cloud is also apparent as in the above plate:

http://www.hida.kyoto-u.ac.jp/~cmo/cmo/image/gqr/m970408.jpg

which shows the images taken by Gianni QUARRA (*GQr*) on 8 April 1997 (λ=101°Ls) at =091°W & near.

Furthermore on 18 April 1997 (λ=106°Ls) at ω=090°W, Don PARKER (*DPk*) clearly shot the Ascræus Cloud as its brightest part. The local time was around 9:20 LMT. See the first image of the following plate.

Incidentally the drawings of the Ascræus cloud made by the present writer on 31 March 1977 (λ=098°Ls , δ=14.0", ϕ=24°N, ι=11°) are partly shown in Ref. [3]

To check the trend of the Ascræus Cloud in 1999, see *DPk*'s successive images at the preceding page (the first one is from 1997).

http://www.hida.kyoto-u.ac.jp/~cmo/cmomn0/99Note11/frame1.files/image003.jpg

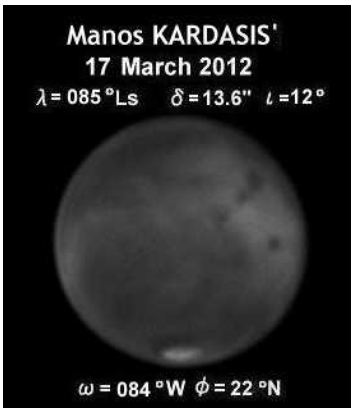
This is a re-citation of the image set used in CMO #232 (25 June 2000) Ref. [2]. The cloud looked to become weaker after around λ=120°Ls.

According to the description in Ref. [2], "the second one of the sequence is on 27 Feb 1999 (λ=103°Ls) at ω=052°W when the apparent diameter was only 10.2": The image is not sharp enough, but we may say the cloud is thick (especially in B). The third image is on 3 Apr 1999 (λ=119°Ls) ω=071°W. The time was 9:50 LMT, but the cloud is still thick. Notable however is that the image on 5 May 1999 (λ=134°Ls) at ω=091°W (at 9:30 LMT) shows a less thick cloud. The observations by *DPk* on 7 May 1999 (λ=135°Ls) show that at ω=072°W (at 8:00 LMT) the cloud looked still thick, but soon it became rapidly weaker. Finally the image on 10 June 1999 (λ=152°Ls) does not prove the existence of the Ascræus Cloud at 9:30 LMT."

The rise and fall depend not only on the seasons, but also on the diurnal procession and maybe on other conditional elements. Naturally we may say it must be strongest when it is located near the morning terminator side and it decays gradually as the Sun moves higher, but the situation will appear to be different depending on some reflecting conditions even if the phenomenon itself repeats in the same way every Martian year.

Let us now look for the similar cases in 2012 (planet being at opposition on 3 March 2012), following the CMO/ISMO Mars Gallery: A tentative list of data we extracted is shown in the Appendix.

Before opposition, the cloud must have been weak even if it looked well inside. At the end of 2011, the npc was larger, and so the water vapour was not enough to constitute the morning cloud near the equatorial zone. An example of faint aspect is given by on 19 Feb (λ=073°Ls) at ω=090°W, ι=11° before opposition by Efrain MORALES (*EMr*). We here cite his B image on 22 Feb (λ= 074°Ls) at ω=063°W ι=09°. To see the aspect after opposition we may pick out the B image by Tomio AKUTSU on 06 Mar (λ=080°Ls) at ω=082°W ι=03° and another image by Manos KARDASIS (*MKd*) on 16 Mar (λ= 084°Ls) at ω=090°W, ι=11° or on 17 Mar (λ=085°Ls) at ω=084°W ι=12° after opposition where the cloud was rather faint. It may look still rather plain on the images by Damian PEACH (*DPc*) on 18 Mar (λ=085°Ls) at ω=086°W ι=12° (here cited) or on 19 Mar (λ=085°Ls) at ω=069°W ι=13°. On the very 19 Mar (λ=086°Ls) at ω=081°W, 088°W, 097°W, 105°W, 111°W, ι=13°, Christophe PELLIER (*CPl*) continued to shoot, and showed how the cloud varied inside as the Sun altitude rose. Additive violet 400nm image at ω=091°W shows how it was like a white core. See the following site:



http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120319/CPl19Mar12.jpg

On 27 Mar (λ=089°Ls) at ω=071°W and 080°W ι=18°, Don PARKER (*DPk*) showed that the bright core is visible near the morning terminator (see the

B image on 27 Mar here). Here is also shown below the case produced by *EMr* on 30 Mar.

On 01 Apr (λ=091°Ls, ι=21°), Freddy WILLEMS (*FWl*) observed successively seven times at ω=087°W, 103°W, 112°W, 122°W, 128°W, 138°W, 146°W and proved how the core dispersed as time went by. In the process he also showed that the western flank of Ascræus Mons became thickly covered by the noon orographic cloud. See the following site:

http://www.hida.kyoto-u.ac.jp/~cmo/cmons/2011/120401/FWl01Apr12.jpg

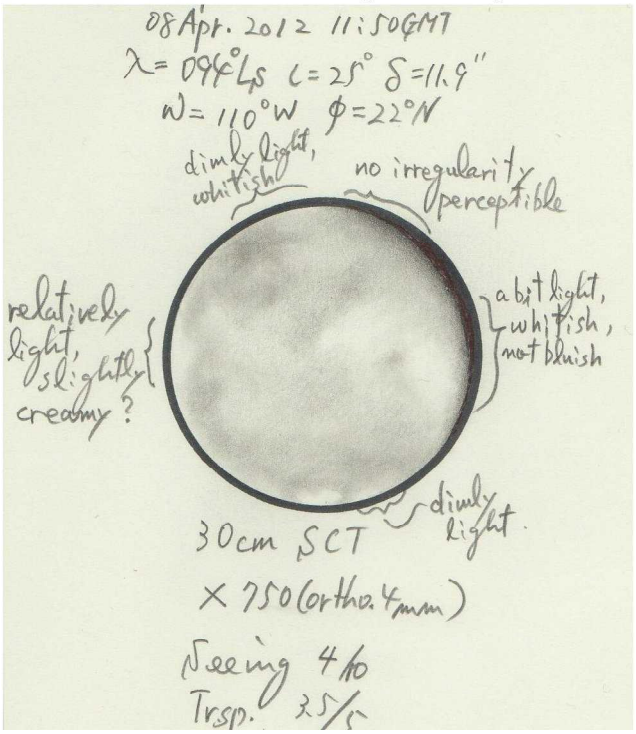
On 02 Apr (λ=091°Ls,ι=22°) at ω=135°W and 143°W, *FWl* showed that no more than the orographic-like cloud was conspicuous.

The orographic cloud of Ascræus Mons was already apparent on the images on 13 Mar (λ=083°Ls, ι=09°) at ω=139°W taken by Jaume CASTELLA (*JCt*) and at ω=145°W taken by Jean-Jacques POUPEAU (*JPp*) and so on.

At the Japan side, Yukio MORITA (*Mo*) on 07 Apr (λ=094°Ls) caught the core at ω=109°W ι=25° (here cited), Teruaki KUMAMORI (*Km*) on 08 Apr (λ=094°Ls) showed it at ω=091°W ι=25°, and on the same day Reiichi KONNAÏ (*Kn*) caught the core at ω=110°W, ι=25° by visual observation (see one of his drawings on the rhs).

On the image by Tomio AKUTSU (*Ak*) on 11 Apr (λ=095°Ls) at ω=094°W ι=27°, the core is well seen. However the images of *Mo* on 12 Apr (λ=096°Ls) at ω=073°W ι=27° and on 14 Apr (λ=097°Ls) at

Reiichi KONNAI's Drawing on 08 April 2012



ω=054°W ι=28° tell that the morning mist was largely thick but not particularly at the place of possible core. *Ak*'s image on 14 Apr (λ=097°Ls) at ω=101°W, also shows the core looks dull, though its B-ingredient shows the core thickly (as here shown).

Here if we recall the images in 1997, Gianni QUARRA (*GQr*)'s core on 8 Apr 1997 (λ=101°Ls) at ω=091°W looks much thicker, and also Don PARKER (*DPk*)'s image on 18 Apr 1997 (λ=106°Ls) at ω=090°W shows much denser core. The season λ=101°Ls or λ=106°Ls in 2012 came in later half of April and the first half of May and the diameter became not enough. On the image of *MKd* on 22 Apr (λ=101°Ls) at ω=097°W, ι=32°, the valley is just misty. The image by *EMr* on 02 May (λ=105°Ls) at ω=117°W, ι=34° may show the core. On Ed GRAFTON (*EGf*)'s image on 04 May (λ=106°Ls, δ=9.7") at ω=086°W, ι=35°, the place is quite near the terminator, but not so conspicuous, perhaps since the phase angle is large.

Therefore the brightness must depend, not only on the season and the local Martian time, but also on the reflection angle of the place from the Sun to the Earth of the core.

Before closing this Note, we should like to give a message as a caution that any Red images are useless to check and evaluate the water-vapour clouds, and instead every image set should be accompanied by the Blue image of Mars.

Appendix: Ascræus Cloud Observed in 2012

28 Jan (λ=063°Ls) at ω=090°W ι=25°: *Ak*
28 Jan (λ=063°Ls) at ω=090°W ι=25°: *SBd*
12 Feb (λ=069°Ls) at ω=091°W ι=16°: *DPc*
19 Feb (λ=073°Ls) at ω=073°W ι=11°: *SWk*
19 Feb (λ=073°Ls) at ω=090°W ι=11°: *EMr*
20 Feb (λ=073°Ls) at ω=094°W ι=11°: *DPk*
21 Feb (λ=073°Ls) at ω=069°W ι=10°: *PGr*
21 Feb (λ=073°Ls) at ω=083°W ι=10°: *FMl*
21 Feb (λ=073°Ls) at ω=088°W ι=10°: *EMr*
22 Feb (λ=074°Ls) at ω=038°W ι=09°: *DPk*
22 Feb (λ=074°Ls) at ω=063°W ι=09°: *EMr*
23 Feb (λ=074°Ls) at ω=047°W ι=08°: *EMr*
26 Feb (λ=076°Ls) at ω=051°W ι=06°: *WFl*
02 Mar (λ=078°Ls) at ω=047°W ι=03°: *FWl*
02 Mar (λ=078°Ls) at ω=105°W ι=03°: *Ak*
03 Mar (λ=078°Ls) at ω=041°W ι=03°: *FWl*
05 Mar (λ=079°Ls) at ω=076°W ι=03°: *Ak*
06 Mar (λ=080°Ls) at ω=082°W ι=03°: *Ak*
08 Mar (λ=081°Ls) at ω=054°W ι=05°: *Ak*
12 Mar (λ=082°Ls) at ω=128°W ι=08°: *PEd*
14 Mar (λ=083°Ls) at ω=092°W ι=09°: *MKd*
15 Mar (λ=084°Ls) at ω=097°W ι=10°: *MKd*
15 Mar (λ=084°Ls) at ω=118°W ι=10°: *CPl*
16 Mar (λ=084°Ls) at ω=090°W ι=11°: *MKd*
17 Mar (λ=085°Ls) at ω=084°W ι=12°: *MKd*
18 Mar (λ=085°Ls) at ω=080°W ι=12°: *DTy*
18 Mar (λ=085°Ls) at ω=086°W ι=12°: *DPc*
18 Mar (λ=085°Ls) at ω=092°W ι=12°: *ISp*
18 Mar (λ=085°Ls) at ω=097°W ι=12°: *MLw*
19 Mar (λ=085°Ls) at ω=062°W ι=13°: *MKd*
19 Mar (λ=085°Ls) at ω=063°W ι=13°: *JPp*
19 Mar (λ=085°Ls) at ω=069°W ι=13°: *DPc*
19 Mar (λ=085°Ls) at ω=074°W ι=13°: *MLw*
19 Mar (λ=085°Ls) at ω=077°W ι=13°: *JWr*
19 Mar (λ=086°Ls) at ω=081°W ι=13°: *CPl*
20 Mar (λ=086°Ls) at ω=128°W ι=13°: *SKw*
20 Mar (λ=086°Ls) at ω=070°W ι=14°: *MLw*
20 Mar (λ=086°Ls) at ω=083°W ι=14°: *SKd*
21 Mar (λ=086°Ls) at ω=055°W ι=15°: *DPc*
22 Mar (λ=086°Ls) at ω=098°W ι=15°: *SKw*
23 Mar (λ=087°Ls) at ω=119°W ι=15°: *EMr*
23 Mar (λ=087°Ls) at ω=056°W ι=16°: *MLw*
24 Mar (λ=087°Ls) at ω=112°W ι=16°: *DPk*
24 Mar (λ=088°Ls) at ω=035°W ι=17°: *SKd*
24 Mar (λ=088°Ls) at ω=044°W ι=17°: *DPc*
24 Mar (λ=088°Ls) at ω=051°W ι=17°: *MLw*
26 Mar (λ=088°Ls) at ω=056°W ι=17°: *SKw*
27 Mar (λ=089°Ls) at ω=071°W ι=18°: *DPk*
28 Mar (λ=089°Ls) at ω=057°W ι=19°: *EMr*
28 Mar (λ=089°Ls) at ω=090°W ι=19°: *FMl*
28 Mar (λ=089°Ls) at ω=095°W ι=19°: *RHl*
30 Mar (λ=090°Ls) at ω=065°W ι=20°: *DPk*
30 Mar (λ=090°Ls) at ω=070°W ι=20°: *EMr*
01 Apr (λ=091°Ls) at ω=087°W ι=21°: *FWl*
02 Apr (λ=091°Ls) at ω=135°W ι=22°: *FWl*
06 Apr (λ=093°Ls) at ω=113°W ι=24°: *Km*
07 Apr (λ=094°Ls) at ω=109°W ι=25°: *Mo*
08 Apr (λ=094°Ls) at ω=091°W ι=25°: *Km*
08 Apr (λ=094°Ls) at ω=110°W ι=25°: *Kn*
11 Apr (λ=095°Ls) at ω=094°W ι=27°: *Ak*
12 Apr (λ=096°Ls) at ω=071°W ι=27°: *Is*
12 Apr (λ=096°Ls) at ω=073°W ι=27°: *Mo*
14 Apr (λ=097°Ls) at ω=054°W ι=28°: *Mo*
14 Apr (λ=097°Ls) at ω=101°W ι=28°: *Ak*
19 Apr (λ=099°Ls) at ω=108°W ι=31°: *MKd*
19 Apr (λ=099°Ls) at ω=113°W ι=31°: *SGh*
19 Apr (λ=099°Ls) at ω=123°W ι=31°: *JWr*
21 Apr (λ=100°Ls) at ω=111°W, 121°W ι=31°: *DPc*
21 Apr (λ=100°Ls) at ω=124°W ι=31°: *ISp*
22 Apr (λ=101°Ls) at ω=097°W ι=32°: *MKd*
22 Apr (λ=101°Ls) at ω=108°W ι=32°: *JWr*
23 Apr (λ=101°Ls) at ω=090°W ι=32°: *JWr*
24 Apr (λ=101°Ls) at ω=078°W ι=32°: *DTy*

02 May (λ=105°Ls) at ω=117°W ι=34°: *EMr*
04 May (λ=106°Ls) at ω=086°W ι=35°: *EGf*
06 May (λ=107°Ls) at ω=128°W ι=35°: *FWl*
11 May (λ=109°Ls) at ω=086°W ι=36°: *FWl*
12 May (λ=109°Ls) at ω=079°W ι=37°: *FWl*
13 May (λ=110°Ls) at ω=068°W ι=37°: *FWl*
13 May (λ=110°Ls) at ω=124°W ι=37°: *Mo*
14 May (λ=110°Ls) at ω=110°W ι=37°: *Kn*
16 May (λ=111°Ls) at ω=119°W ι=37°: *Mo*
18 May (λ=112°Ls) at ω=108°W ι=38°: *Mo*
19 May (λ=113°Ls) at ω=073°W ι=38°: *Ak*
27 May (λ=116°Ls) at ω=131°W ι=39°: *DPc*
28 May (λ=117°Ls) at ω=121°W ι=39°: *DPc*
28 May (λ=117°Ls) at ω=137°W ι=39°: *MDc*
30 May (λ=118°Ls, δ=8.0″) at ω=110°W ι=39°: *DPc*,

where *Ak* is the code of Tomio AKUTSU, *SBd* of Stefan BUDA, *DPc:* Damian PEACH, *SWk:* Sean WALKER, *EMr:* Efrain *MORALES*, *DPk:* Don PARKER, *PGr:* Peter GORCZYNSKI, *FMl:* Frank MELILLO, *WFl:* Bill FLANAGAN, *FWl:* Freddy WILLEM, *PEd:* Peter EDWARDS, *CPl:* Christophe PELLIER, *MKd:* Manos KARDASIS, *DTy:* David TYLER, *ISp:* Ian SHARP, *MLw:* Martin LEWIS, *JPp:* Jean-Jacques POUPEAU, *JWr:* Johan WARELL, *SKw:* Silvia KOWOLLIK, *SKd:* Simon KIDD, *RHl:* Richard HILL, *Km:* Teruaki KUMAMORI, *Mo:* Yukio MORITA, *Kn:* Reichi KONNAÏ, *Is:* Tsutomu ISHIBASHI, *SGh*: Sadegh GHOMIZADEH, *EGf:* Ed GRAFTON.

References

[1] Christophe PELLIER, *Bright Morning Radiation Fog inside Tharsis*, in 2011/2012 CMO Note (7): *CMO* #405 (25 December 2012)

[2] Masatsugu MINAMI, *Trend of the Ascræus white cloud*, in 1998/99 Mars CMO Sketch (11): *CMO* #232 (25 June 2000)

[3] Masatsugu MINAMI, *Ascræus Cloud and Ascræus Lacus*, in 1996/1997 Mars Sketch (16): *CMO* #215 (10 Apr 1999 issue) at p2465. □

Letters to the Editor

●·····***Subject: shot from an angle impossible***
Received; 8 February 2013 at 23:17 JST

Dear Dr. Minami, Christophe, all, Attached here is an image by ESA's MEX VMC on 30 Sept 2012 from an angle we can never get from our planet showing great spiraling dust/cloud streaks over NPR. The most conspicuous arm of the spiral seems to be originated in Hyperboreus Lacus, entered NPC through Chasma Boreale, then veered south to across Baltia and north-western Acidalium, all the way to Nilokeras; the area has often shown distinctive greenish tint in some seasons.

You can access to many more fantastic recent VMC images:

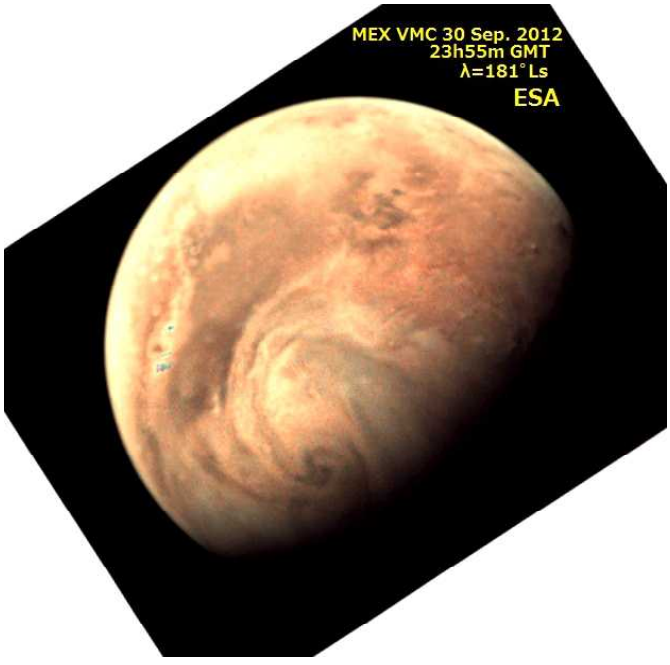
http://www.flickr.com/photos/esa_marswebcam/sets/

http://www.planetary.org/blogs/emily-lakdawalla/2012/12190600-mars-express-vmc.html

Best Regards,

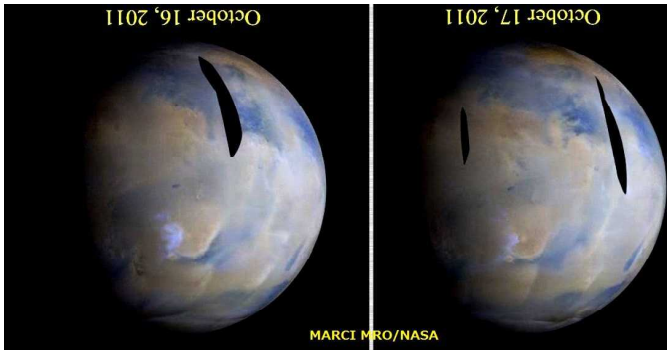
○····***Subject: Re: A bit of help for the #CMO 407***
Received; 14 February 2013 at 01:38 JST

Dear Christophe, I am looking forward to reading



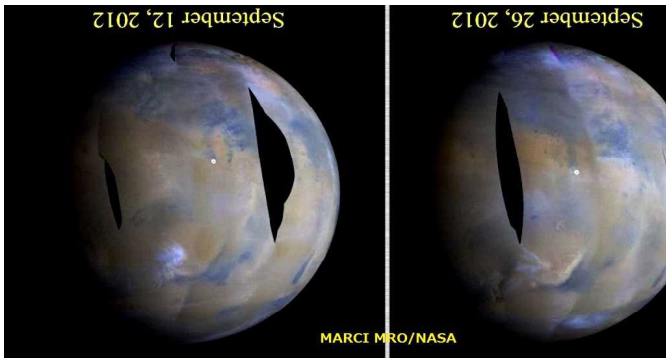
(and translating for Japanese readers) your coming Note! For the reason of the absence of the trailing effect over Elysium Mons you have mentioned, I

believe that the "Elysium trailing clouds"are just too small to be observable from our Earth-based stations.



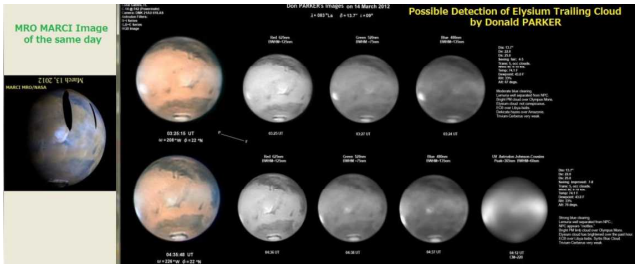
I have saved all the downloadable images by the Mars-orbiting satellites to review the Martian volcanoes in every season (I am an areovolcanoholic, as you know). And as far as could be checked through the MRO MARCI Weekly Weather Reports, it seems that every larger volcano on Mars shows orographic trailing clouds in some seasons. Attached are some MRO MARCI images showing the possible "trailing effects" over the Elysium volcanoes:

The 2011 ones were about a month after the seasonal first emergence of the orography over the area, and the 2012 ones were within a month before the ceasing of the orographic cloud activity over the Elysium rise—available amount of water vapor during either period was not so abundant. In the season with enough amount of water vapor, in the local late afternoon, the cloud over the small Elysium rise (of course compared to the gigantic Tharsis bulge!) might develop to be dense and widespread



to obscure individual volcanoes' subtler matters.

Finding trailing Elysium clouds in the CMO Mars Gallery may be extremely hard; also attached Don Parker's superb images on 14 March 2012 seems to show some nice-directioned (SE to NW) elongation, but quite uncertain (still too early in the local afternoon?). Best Wishes,



○····***Subject: Re: Your essays***
Received; 2 March 2013 at 00:11 JST

Dear Bill, This time I am deeply moved by your "well-planned program" of stimulation therapy to encourage our irreplaceable Masatsugu in his failing health, and to reactivate CMO/ISMO with hosts of pending problems such as the chronic shortage of writers/analysts, uncertain successors to the present editorial board, and etc.,etc….. You are certainly an admirable psychiatrist, as well as an exquisite astronomy historian!

I remember your writing in your LtE the other day that my ARGUS essay might offer a more optimistic assessment of the situation than your ones. Actually however, I am rather (not quite) pessimistic about the future of CMO/ISMO. CMO is, as you know well, an unprecedented and probably the last singular field which had been created some thirty years ago by Masatsugu MINAMI as an antithesis of the previous defective observing/analysing systems of Mars, with which the dream of well-planned program of classical Mars observation finally came true, to which visual/digital observers world over could have been submitting their records to find their *raisons d'etre* promptly. It's astonishing (and it feels unstable at the same time/on the other hand) that the integrity of the Martians' *Shangri-La*ish zone have been preserved practically solely by Masatsugu, an unprecedented and presumably the final PURE MARTIAN/visual sketcher on this blue planet. As for your phrase in your Night Thoughts essay Part One, "Can replacements even be found?"… Can't at all, I dare say for now. So, I believe, we have to be confronted with some

changes in the system of CMO/ISMO in the near future.

In my future essay I'm going to classify the astronomers (both amateur and professional) constitute the CMO/ISMO according to the motivations of continuing their observations to seek ways for the individualistic "loners" to coexist peacefully and fruitfully as have been proven unimpossible by Dr. Masatsugu MINAMI. Best Wishes,

Reiichi KONNAÏ (Fukushima, JAPAN)

●·····***Subject: FW: Some Mars examples***
Received; 9 February 2013 at 05:50 JST

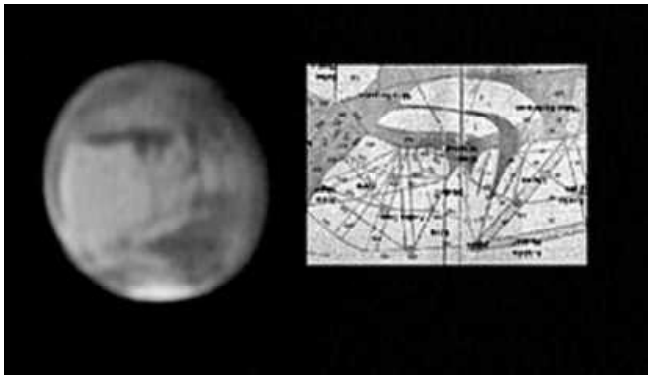
Dear fellow Martians, I have just resumed contact with Leo Aerts, an old friend who is now retired after many years and is devoting himself to astronomy which has always been his passion.

I commend to you his recent CCD work. Note especially the first one, where on a disk of only 11".5 many "canali" appear (he is right to use this term, since the markings look much more like those on Schiaparelli's 1878 map than the spiderwebs of Lowell. This illustrates the paradox, known since Schiaparelli's time, that the visibility of the canals is not merely a function of distance.

The others show very nice comparisons between images and drawings by Antoniadi and Dollfus.

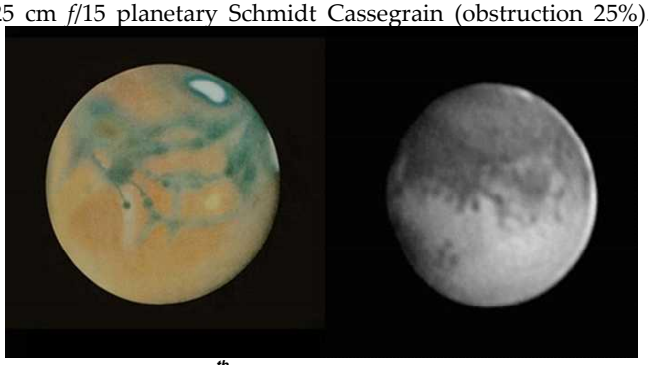
Best, Bill

From: Aerts Leo
Sent: Friday, 08 February 2013 11:12 AM
Subject: Some Mars examples

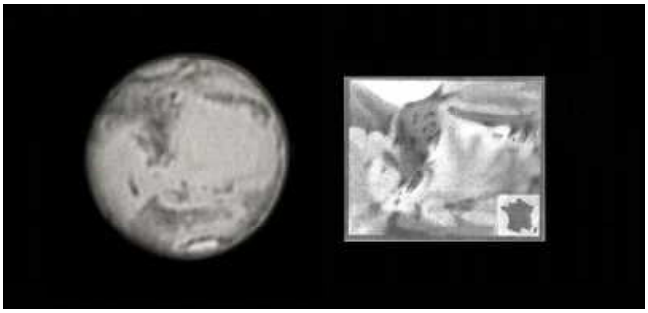


Hello Bill, Only 3 examples on Mars. As already mentioned in my previous email I can forward you the most interesting results from the past 3 apparitions if you are interested.

Mars March 7th 2010. The apparent disc was only 11"5 but showed in good seeing conditions many "canali". It was the first time that they were so prominent to see. I used my 25 cm *f*/15 planetary Schmidt Cassegrain (obstruction 25%).



Mars at October 11th 2005. The apparent disc was a "big 19". I also used the 25 cm *f*/15 Schmidt Cassegrain telescope. I was amused to compare it with a wonderful Antoniadi drawing of 1909.



Mars at the recent apparition : February 27th 2012 at 2h59 UT. The apparent disc was 13"8. I used my C14 at good seeing conditions and compared it with a Dollfus drawing of April 10th 1982.

I Photo shopped my result in such a way that it came out as a black and white result, resembling a drawing. It seemed to a good idea to compare it with the Dollfus visual result.

Note : of course it must have been great and much, much more rewarding to observe those minute Mars details by eye. Kind regards. **Leo AERTS**

○····***Subject: Re: SAHEKI's observations of Tithonius L***
Received; 11 February 2013 at 03:32 JST

Dear Masatsugu, Interesting about Saheki--I am glad you are writing him up. I do remember Akinori NISHITA very well.

I will see about an essay for CMO#4**, but unfortunately, Springer is bringing the hammer down on me to finish a Galaxies book, and so I have pledged no distractions till I have it done. Best

○····***Subject: your mars essay***
Received; 28 February 2013 at 07:08 JST

Dear Masatsugu, I am glad that my rather hastily prepared and premature essays, "*Night Thoughts on a Classical Mars Observer*," led to such a thoughtful and insightful response from you. I think your

points are well made-and it was a pleasure to see such a succinct reprise of the history of quantum mechanics. I haven't studied the mathematical formalism of it since I was an undergrad in physics almost four decades ago. (And I note that this year is the *centennial* anniversary of the Bohr atom!)

I can only briefly respond your comments, but it seems to me the important points, which have rarely been considered in this context, include:

1) the fact that we must carefully define what is meant by a classical Mars observer, that this refers to something more rigorously defined than just the old visual telescopic methods and the search for non-existent details;

2) a planned program of observations, with specific research projects in mind, in which the Earth-based observations complement those of the spacecraft needs to be laid out beforehand and carefully brought to fulfillment by trained and experienced observers.

This is, I would add, from what has typically been the method of amateur observers who have often just thrown together lots of disparate and somewhat random observations by many inexperienced observers.

***I especially approve of your last paragraph, about the human brain having no ability to describe anything that is very unfamiliar. The human eye is a so-so astronomical instrument (detector), and the brain was developed through natural selection for the specific purpose of achieving tasks needed for survival, searching for and finding food, mating, fleeing predators. It was not devised for the purpose of analyzing telescopic images of remote planets and when applied to such a remote-from-everyday-life purpose, it is bound to be easily led astray. One sees some of these aspects in which the eye-brain-hand system, evolved for other purposes, falls into various default modes in the history of the canals of Mars, as you suggest. So even in quantum mechanics, for instance, we still end up most of the time struggling with a description that is "non-classical" and goes against "commonsense."

Another value of Earthbased observations is related to the sheer volume of information that we are being asked to process from the spacecraft on Mars (or those exploring other planets, like Cassini at Saturn). It is impossible for anyone to keep abreast of all the details, and many specialists are involved in analyzing such data from the viewpoint of their special fields. Thus George Rieke, University of Arizona infrared astronomer, who helped to design the Spitzer space telescope, noted:

> "The various fields of space science-space physics, space biology, microgravity, astronomy, planetary studies-touch on nearly the entire range of science. Successful researchers need a high degree of focus and specialization. Few have any understanding or appreciation of the activities, aspirations, and potential scientific importance of fields far from their own. That is, the space 'community Balkanized into groups without a common language."

That this is so there can be no doubt; perhaps the "classical" Mars observer you describe is indispensable to our capturing the "Big Picture" in an age of increasing fragmentation (quantization?).

I hope you will continue to instruct us in to how we can formulate a "*planned program of observations in which the Earthbased observations complement those of the spacecraft,*" but your essay is a very important start on refining an approach to what is really a key problem.

I hope that I may infer from the depth of thinking - and the length of this essay - that you have had some upsurge from the more incapacitating aspects of your health problems.

Let us hear from other members of CMO/ISMO their views as to these intriguing questions. Best,

Bill SHEEHAN (Willmar, MN)

●·····***Subject: Re: shot from an angle impossible***
Received; 10 February 2013 at 21:43 JST

Thank you Reiichi ! In the MGS studies (Wang et al.) they say that fall begins in the northern hemisphere by great spiral storms above the NPR. Although the season is a bit later here, the storm should still be active. However, the colour aspect of

the photo does not help to discriminate dust and water vapour, as the latter component should already be important in this season.

The links show very well the development of the NPH...

In a way or another, maybe later or not, perhaps we could write a review of this for the CMO ?

Best wishes

○····***Subject: A bit of help for the #CMO 407***
Received; 10 February 2013 at 21:51 JST

Dear Masatsugu and Reiichi, As I told to Masatsugu I'm going to write a short note for the next CMO (and should not for the again next one due to other commitments), and it will be a review of the trend of the Elysium cloud, similar to that of the Tharsis ones.

I'm facing a problem of analysis however: looking closely at images, it is evident that the "trailing effect" so prominent over Tharsis, is completely absent over Elysium, and the cloud looks to stay roundish even at late afternoon hours.

Do you have informations to explain this ?

The Elysium cloud is a bit higher in latitude than Olympus, so maybe the afternoon cell is not active, but the difference in latitude is weak. Maybe some local circulation of winds, but this could be hard to explain... Best wishes

○····***Subject: RE: Re: A bit of help for the #CMO 407***
Received; 19 February 2013 at 06:02 JST

Dear Reiichi, Many thanks for the inputs. I'm not making a full answer because I am currently completely busy but I'm making a reference to your opinion in the note (your answer does not currently appear in LtE, it could be a good idea, Masami please ?).

Masatsugu, the text is complete and only remain the figures; I must get it all done on 20th feb by the end of the day, so you would find it in your e-mails on the morning of the 21st ! Best wishes,

Christophe PELLIER (Nantes, FRANCE)

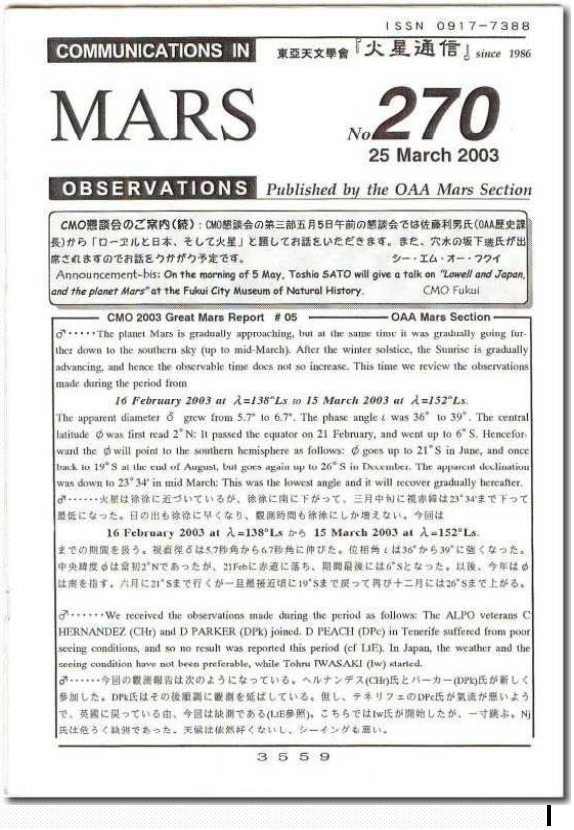
☆ ☆ ☆

TEN YEARS AGO (215)

---- ***CMO #270 (25 March 2003)*** *pp3559~3582* ----

http://www.hida.kyoto-u.ac.jp/~cmo/cmomn3/cmo270/index.htm

The 5th Observation Report treated the work done from 16 February 2003 to 15 March 2003, during the period the season was λ=138°Ls to λ=152°Ls, and the apparent diameter increased from δ=5.7" to δ=6.7". The tilt went southward from φ=2°N to φ=6°S. The phase angle was from ι=36° to ι=39°. In March, the apparent declination became so lowest that the altitude became slow to rise, and furthermore the dawn came faster and hence the observation time did not increase. The observers were six from the domestic area, one from Europe and two from the US. In Japan the weather as well as the seeing was so poor that several days existed without observations. The contents were reported in order of days, and the information increased as the angular diameter increased. Seasonally the dark markings were not so conspicuous, while Hellas and the south polar cap looked well whitish.



ISSN 0917-7388

COMMUNICATIONS IN 東亞天文學會『火星通信』since 1986

MARS No.270

25 March 2003

OBSERVATIONS Published by the OAA Mars Section

CMO懇談会のご案内(続):CMO懇談会の第三部五月5日午前の懇談会では佐藤利男氏(OAA歴史課長)から「ローエルと日本、そして火星」と題してお話をいただきます。また、穴水の坂下地氏が出席されますのでお話をうかがう予定です。 シー・エム・オー・ワクイ

Announcement-bis: On the morning of 5 May, Toshio SATO will give a talk on "Lowell and Japan, and the planet Mars" at the Fukui City Museum of Natural History. CMO Fukui

CMO 2003 Great Mars Report # 05 — OAA Mars Section

♂·····The planet Mars is gradually approaching, but at the same time it was gradually going further down to the southern sky (up to mid-March). After the winter solstice, the Sunrise is gradually advancing, and hence the observable time does not so increase. This time we review the observations made during the period from

16 February 2003 at λ=138°Ls to 15 March 2003 at λ=152°Ls.

The apparent diameter δ grew from 5.7" to 6.7". The phase angle ι was 36° to 39°. The central latitude φ was first read 2°N; It passed the equator on 21 February, and went up to 6°S. Henceforward the φ will point to the southern hemisphere as follows: φ goes up to 21°S in June, and once back to 19°S at the end of August, but goes again up to 26°S in December. The apparent declination was down to 23°34' in mid March: This was the lowest angle and it will recover gradually hereafter.

♂·····火星は徐徐に近づいているが、徐徐に南に下がって、三月中旬に視赤緯は23°34'まで下って最低になった。日の出も徐徐に早くなり、観測時間も徐徐にしか増えない。今回は

16 February 2003 at λ=138°Ls から 15 March 2003 at λ=152°Ls.

までの期間を扱う。視直径δは5.7秒角から6.7秒角に伸びた。位相角ιは36°から39°に強くなった。中央緯度φは当初2°Nであったが、21Febに赤道に落ち、期間最後には6°Sとなった。以後、今年はφは南を指す。六月に21°Sまで行くが一旦最接近頃に19°Sまで戻って再び十二月には26°Sまで上がる。

♂·····We received the observations made during the period as follows: The ALPO veterans C HERNANDEZ (CHr) and D PARKER (DPk) joined. D PEACH (DPc) in Tenerife suffered from poor seeing conditions, and so no result was reported this period (cf LtE). In Japan, the weather and the seeing condition have not been preferable, while Tohru IWASAKI (Iw) started.

♂·····今回の観測報告は次のようになっている。ヘルナンデス(CHr)氏とパーカー(DPk)氏が新しく参加した。DPk氏はその後順調に観測を延ばしている。但し、テネリフェのDPc氏が気流が悪いようで、英國に戻っている由、今回は缺測である(LtE参照)。こちらでは Iw氏が開始したが、一寸跡ぶ。Nj氏は危うく缺測であった。天候は依然好くないし、シーイングも悪い。

3559

http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/2003repo/05/05.html

2001 Mars CMO Note (#17) was entitled "A Possible Trigger of the 2001 Great Yellow Cloud – Big X Flare at AR#9393" where the possible relation of the Great dust storm in 2001 with the Solar activity of AR#9393 was suggested. There were picked out several large X flares and CME (Coronal Mass Ejections) which might have ejected to the space. It was considered that this kind of activity of the Sun must have been the cause of the early rise of the 2001 dust cloud. There were shown several linkages to the Solar activity data: http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/270Note17/index.html

In LtE, cited were several emails from TAN W-L (Singapore), B SHEEHAN (MN), P C SHERROD (AR), T DOBBINS (OH), S WHITBY (VA), J H ROGERS (the UK), C HERNANDEZ (FL), W.-Y. LAI (Taiwan), D PARKER (FL), D MOORE (AZ), D PEACH (the UK) who came home back from Tenerife. Domestically we received from S KIMURA (Tokyo), Toshio SATO (Tokyo), Y MORITA (Hiroshima), K OKANO (Tokyo), M UMEDA (Fukui City Museum of Natural History), K OSA (Ishikawa), R TAKANARI† (Toyama). H ISHADOH (Okinawa), S ITO (Tokyo), T IWASAKI (KitaKyushu), Y YABU (Shiga), T HIKI (Nagano). Several were concerned with the Meeting in May.

As "Great 2003 Mars Coming (10)", "Grid Disks with Relative Sizes and Phases in 2003. II" was given by A NISHITA, where the grid data were shown from April to July.

http://www.hida.kyoto-u.ac.jp/~cmo/cmohk/coming2003/10.html

The 10th "Shin-Saijiki" by Mk was about the Kamakura Road near him in spring.

Toshiaki HIKI's TYA #91 dealt with CMO#131 (25 March 1993): Twenty years ago the planet Mars was going away after the "small" opposition in January, and the angular diameter was under 10". The season was from λ=040°Ls to 053°Ls so that the npc was bright. There was a column noted NOTE where it was reported that on 12 Feb 1993 (λ=039°Ls) a bright steak was shot from Elysium to Cebrenia by Yukio MORITA. This was recorded later as the Morita Phenomenon in1992/93 CMO Note (13) in CMO#140.

M MURAKAMI (Mk) and M MINAMI (Mn)

International Society of the Mars Observers (ISMO)

Advisory Board: **Donald PARKER, Christophe PELLIER, William SHEEHAN, and Tadashi ASADA, Reiichi KONNAÏ, Masatsugu MINAMI**

Bulletin: Kasei-Tsûshin CMO (**http://www.mars.dti.ne.jp/~cmo/ISMO.html**)

CMO #408/ ISMO #34 (25 March 2013)

Editorial Board: **Tadashi ASADA, Masatsugu MINAMI, Masami MURAKAMI, Takashi NAKAJIMA and Akinori NISHITA**

☆ *Any e-mail to CMO/ISMO is acknowledged if addressed to*

cmo@mars.dti.ne.jp (Masami MURAKAMI at Yokohama)

vzv03210@nifty.com (Masatsugu MINAMI at Mikuni-Sakai)

☆ *Usual mails to CMO are acknowledged if addressed to*

Dr Masatsugu MINAMI, 3-6-74 Midori-ga-Oka, Mikuni, Sakai City, Fukui, 913-0048 JAPAN