

MARS

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**A Scientific Paper about the Cooperation
between Amateurs and Professionals in Planetary Astronomy**

By

Christophe PELLIER

*E*xperimental Astronomy is a scientific journal whose purpose is to publish articles about the techniques, methods and instruments used to conduct astronomical studies. In a coming issue, the journal will publish an article that is worth describing in *Communications in Mars Observations*. "Instrumental Methods for Professional and Amateur Collaborations in Planetary Astronomy" presents a wide scale of domains of cooperation between professionals and amateurs in planetary studies.

I - Genesis of the Article

The idea of the article has been launched during an international arena of common work that takes place in France every three years: *La 4ème école ProAm du CNRS* (fourth issue of the Pros/Amateurs school of the National center of scientific research), that took place in La Rochelle in May 2012. This arena has been directed both by the CNRS and the AUDE association (Association of the electronic detectors users) since

2003 and was primarily working with spectroscopy or astrometry subjects.

For the fourth session in 2012, surfing on the recent increase in amateur contributions to planetary studies due to their successes in the past years, the school opened for the first time a specific session dedicated to planetary observations (with three conferences by Ricardo Hueso-Alonso (who gave a description of the atmospheres of giant planets), Marc Delcroix (the great 2010 storm on Saturn), and Jean-Luc Dauvergne (planetary imaging) - the writer was attending the meeting but did not speak). The school was closed with a *table ronde* of discussion between everyone during which Olivier Mousis, professional astronomer at the Besançon Observatory launched the idea of publishing a paper that would describe the different possible topics of cooperation with the amateurs for planetary astronomy.

This work has been directed by Olivier during the following year and the

paper is currently being reviewed for publication. It has been co-written by no less than 59 co-authors from both communities. They are too numerous to be all cited here but the amateurs well known for CMO readers are Christophe Pellier, Jean-Luc Dauvergne, Marc Delcroix, and Anthony Wesley, to whom we should add close scientists like John Rogers (Director of BAA Jupiter section), Richard Schmude (ALPO coordinator), Ricardo Hueso-Alonso and Agustin Sanchez-Lavega (University of Basque country), François Colas (Institut de mécanique céleste et de calcul des éphémérides - IMCCE), Glenn Orton (Jet Propulsion Laboratory), Paolo Tanga (Nice - Sophia Antipolis University), or Leigh Fletcher (University of Oxford).

II - A Short Thematic Review

Considering the strict planetary domain, the most fruitful areas of cooperation are found with planets Venus, Jupiter, Saturn, and Uranus. On Venus we will try to monitor long-term evolution of cloud features, measure the rotation on various wavelengths and image ground details thanks to the 1-micron thermal emission. On Jupiter, we will follow as well the evolution of clouds both at short and long term, same things on Saturn with a focus on special activity like the Great 2010 storm, and on Uranus, since last year a new area has opened for amateurs in imaging belt and possibly, bright spots in near infrared.

To these topics we will add studies of comets, interplanetary matters (dust, meteors, fireballs), the well known giant planets impacts (or on the Moon - the lunar flashes),

the asteroids, stellar occultations, and exoplanet detections. Of course, some chapters review the techniques and instrumentations necessary to perform good observations. The paper is dense and contains an incredible wealth of information for both scientists and amateurs to work together where it is interesting to do so.

III - The Case of Mars

The case of Mars is of course of special interest to CMO readers. During most of the work, the planet was not even considered as a topic worth of interest, due to the excellent coverage of the planet by space probes as true martian meteorological satellites and ground landers. However, we finally add a short section for Mars because its absence in such a (we hope so) cornerstone article would have been a shame, and because the studies of Mars from the ground are not that obsolete.

The necessary long-term survey of the planets regarding climatic activity reintroduces the importance of the whole history of observations from the ground, since the last century and a half, when the studies of the other planets became a subject of systematic astronomical observation. This is true for every planet of course and especially for the gas giants. A planet like Jupiter for example, has long-term and possibly very long-term cycles of activity and in this respect, the century and a half of observations realized before the space age did not lose their scientific interest.

This is also partly true for Mars that must know, as any planet granted with an atmosphere, long-term variations of its cli-

mate, or short-term variations from year to year. In that way, a global monitoring of the planet at low resolution (from the modern area point of view) still makes sense and we are encouraged to keep on observing white

cloud activity, dust storm activity or the so-called “limb clouds” phenomena.

We will keep informing the CMO readers when the article is published in *Experimental Astronomy*. □

ISMO 11/12 Mars Note (14)

Densely Reddish Areas Which Appear to Be Rather Dark in B Masami MURAKAMI & Masatsugu MINAMI

0° A preceding apparition similar to the 2012 case occurred in 1997. On that occasion the scenes seen from the angles around $\omega=100^\circ\text{W}$ were well observed from Japan and some characteristic points were interestingly recorded. In what follows, we shall pick out the corresponding cases in 2012 to compare.

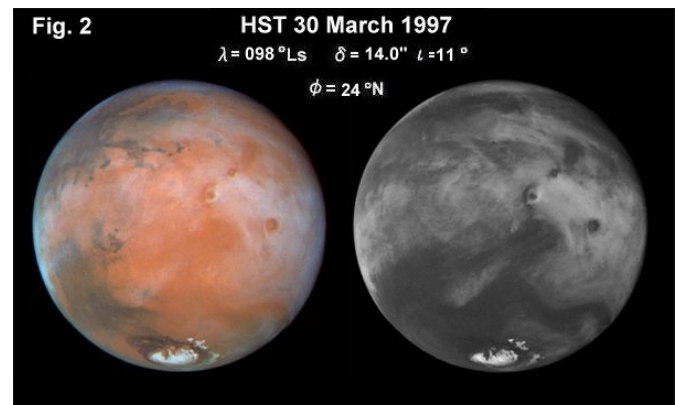
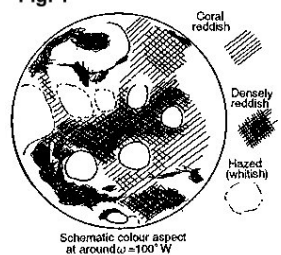
1° In 1997, the planet Mars was closest to the Earth on 20 March, 15 years before the apparition in 2012 and its maximal apparent diameter attained $14.2''$. Around the 1997 apparition, the atmosphere of our sky happened to be rather stable in Japan, and many observations were carried out: For instance one of us (*Mn*) in Fukui produced a total of 112 drawings during a fortnight of (17~20, 22, 24, 25, 27, 28, 30, 31 March) by the use of 400, 480×20cm refractor. There were born several observational points at this period, and they were described in Fortnight Report #10 published in CMO No 188 (10 April 1997), and can also be read in <http://www.hida.kyoto-u.ac.jp/~cmo/cmo/sec96/010/sec010.html>

Among several results, the most impressive one was the case seen on the surfaces observed from the angles around $\omega=100^\circ\text{W}$, and in the above reference a report was issued and subtitled (6) Densely Reddish Bands and Areas. This was concerned with the vivid colours of the surfaces under preferable seeing conditions. Figure 1 here is from the above reference and shows schematically of the colour distribution of the areas seen in the Integrated Light (not

B light).

As to this observation in 1997, it was described by *Mn* in somewhat detail later in Mars Sketch (14) in CMO #211 (25 January 1999) under the title “Densely Reddish Areas: Solis L, Nilokeras and Tempe in Blue”:

<http://www.hida.kyoto-u.ac.jp/~cmo/cmomn0/97Note14.htm> where especially *Mn* depended on the HST images taken on 30 March 1997 which were released later in May 1997 (the images are ones here reproduced as Fig. 2. In the above reference we especially pick-



ed out the following two points by comparison:

(1) A vast area which follows M Acidalium showed a particular tinge with densely reddish colour including the area of Tempe to Alba. This was caught by the naked eyes in the integrated light without any colour filters. This area appeared darkish in B light quite independent of the usual dark markings. In Red light the darkness disappeared.

(2) Especially on the images of HST, the shape of Solis L in B proved different from the one appearing on the RGB image. That is, the resolution

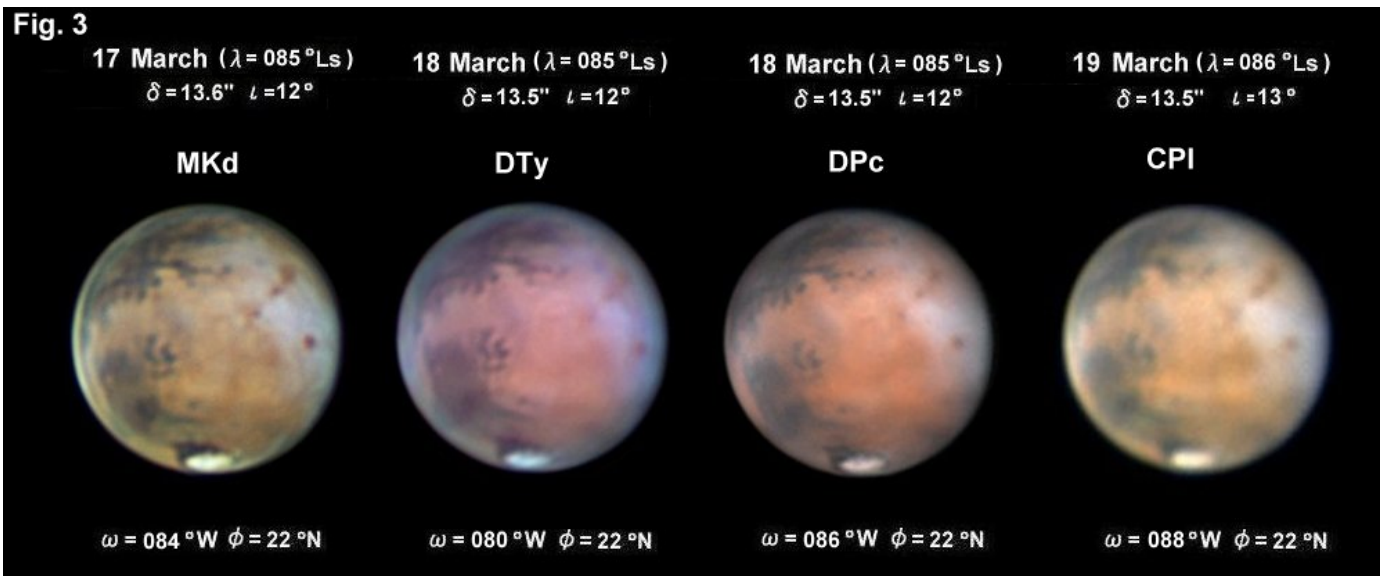
power of HST clearly showed if Solis L were not bluish, it must have been dark on the RGB image, while HST showed as if the structure of Solis L was different in B from RGB. The fake Solis L in B consisted of the southern part of the true Solis L, whereas the northern part looked faded because of a subtle presence of a whitish mist.

The densely reddish area was clearly seen so, while if the seeing is not up to the standard, the area appeared just dusky. This was supposed also to hold when Ganges and Deuteronilus were ↗

observed as shadowy bands without a blue filter.

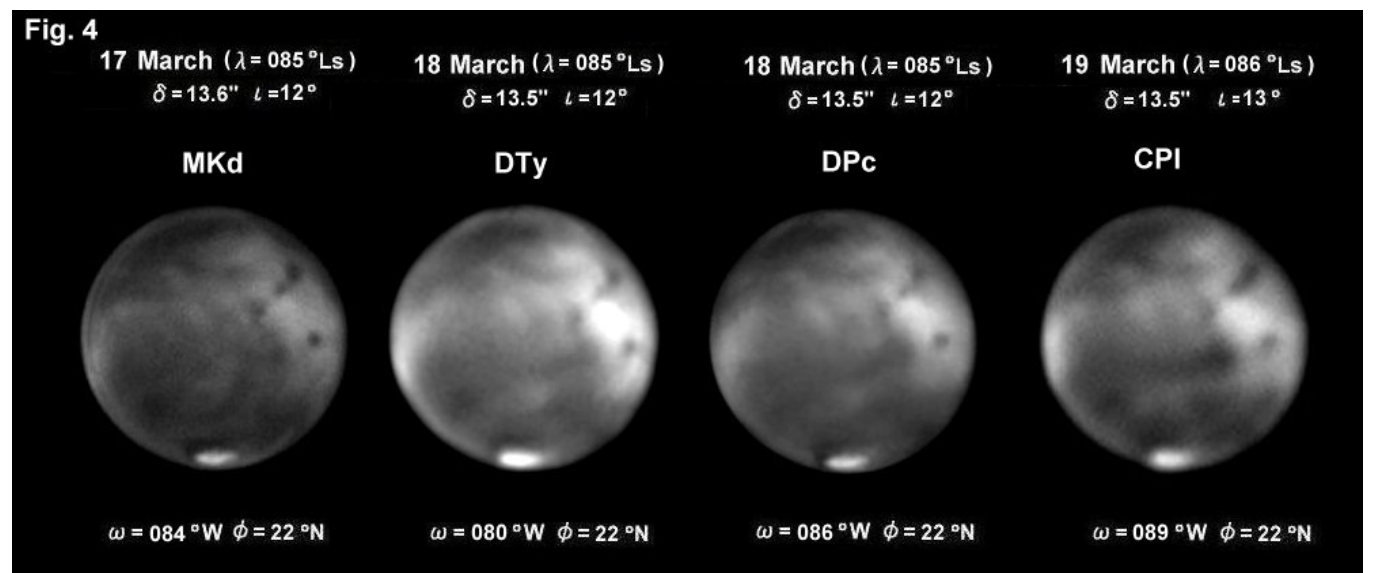
2° We are now in a position to squeeze the previously observed phenomena (1) & (2) within our CMO results of the 2012 observations. The images here we employ are those obtained in Europe and the ones another of us (*Mk*) chose as appropriate. Figure 3 shows a set of RGB images: The season was $\lambda=085^\circ\text{Ls}\sim 086^\circ\text{Ls}$, slightly earlier than the data in 1997 but no images at the corresponding season:

Here *MKd* is the code of Manos KARDASIS



(*MKd*) who lives at *Glyfada-Athens, GREECE*, and the image was obtained on 17 March 2012 ($\lambda=085^\circ\text{Ls}$, $\iota=12^\circ$) at 21:17 GMT ($\omega=084^\circ\text{W}$, $\phi=22^\circ\text{N}$). He used a 28cm SCT equipped with the DMK21-618 and Astronomic filters. ↗

DTy is of David TYLER (*DTy*) who lives at *Flackwell Heath, Buckinghamshire, the UK*. He took this image on 18 March 2012 ($\lambda=085^\circ\text{Ls}$, $\iota=12^\circ$) at 21:37 GMT ($\omega=080^\circ\text{W}$, $\phi=22^\circ\text{N}$) by the use of a 36cm SCT equipped with Point Grey Flea3 cam-



era.

DPc implies Damian PEACH from *Selsey, West Sussex, the UK*. The date coincides with *DTy*'s. That is, on 18 March 2012 ($\lambda=085^\circ\text{Ls}$, $\tau=12^\circ$) at 22:01 GMT ($\omega=086^\circ\text{W}$, $\phi=22^\circ\text{N}$). There is no description of the telescope he used, but supposed a 36cm SCT.

Finally *CPl* is the code of Christophe PELLIER from *Nantes, FRANCE*. He took several images on 19/20 March 2012 ($\lambda=086^\circ\text{Ls}$, $\tau=13^\circ$) at 22:06~00:29 GMT ($\omega=081^\circ\sim 112^\circ\text{W}$, $\phi=22^\circ\text{N}$), while here we have chosen the one at $\omega=088^\circ\text{W}$. He used a 25cm spec @f/32 together with a PLA-Mx camera.

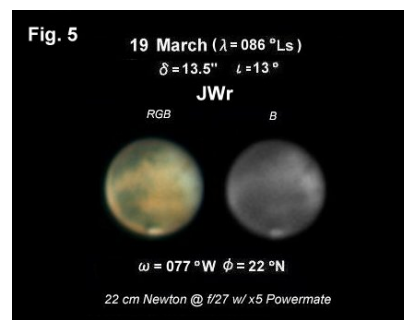
Next in Fig. 4 we show (see the preceding page) the corresponding set of B images which have been processed slightly enhanced.

In Figs. 3 and 4, we can easily check that the area to the west of M Acidalium has a deep reddish tendency which was caught in 1997, and the area which turned shadowy in B was also produced. *Mk* here considers that the white mists at Tempe look subtle, and look varied day by day: *MKd*'s image on 17 Mar shows a white mist whose west part is bent southward, and shows a slit between Alba. The images of *DTy* and *DPc* on 18 Mar, like the HST 1997 image, look to show a core and it is connected with Alba. *CPl*'s image on 19 Mar seems to

be shown two cores. This is also connected with Alba, and so on.

On the other hand, the description of the white mists is so weak that the aspect of the area around Solis L is subtle. Solis L itself is definite in 2012 RGB, but once the images are reduced to B as in Fig. 4 the set does not show contents enough to be compared with the HST 1977 B image. Several expansions of the white mists are visible, while to the north of Solis L it is not easy in B to check how the mist flows: We should say we need further development and careful processing of the B images. It may however be said that since the mist was well described which exists to the north-western of Solis L, in the corresponding 2012 season the mist flow to the north of Solis L must have been comparatively weak.

Finally we shall cite a set of the images obtained by Johan WARELL (*JWr*) on 19 Mar as Fig. 5.



His image size is too small to be compared with the preceding images, while his does show a general tendency of the reddish areas which are shadowy in B. \square

Letters to the Editor

●.....*Subject: Looks Red, must be a Mars instrument*
Received; 21 May 2013 at 02:36 JST



Telescopes and music..... I found a Sanshin today (<http://en.wikipedia.org/wiki/Sanshin>) in a music store going out of business!

Now to find a teahouse.

Jeff BEISH (FL, the USA)

●.....*Subject: Re: ISMO 2012 note 13*
Received; 22 May 2013 at 07:01 JST

Dear Masatsugu,

Many thanks for all the kind words... You can trust me, I'll do my best to maintain the CMO publication. It's a particular media among the amateur world and I think it has a good format for communicating. Moreover, it has now an incredible density of papers !

I'm quite happy to meet Reiichi and Reiko. Maybe we are going to visit the Paris Observatory, as we did for the IWC MO four years ago.

Since last year, I have begun to taste red wine

and now I'm beginning to differentiate them and know which one I appreciate most. With moderation as we say in France, it has also a nice dimension of "culture"...

You would appreciate Nantes quite a lot. The city is marvellous, and I'm very happy with my life here. I always discover new things and I'm missing 90% of all there is to see...

Best wishes,

Christophe PELLIER (Nantes, FRANCE)

●.....*Subject: Wearing Percival Lowell's straw hat
Received; 31 May 2013 at 00:54 JST*

Dear Masatsugu and Richard,

Here I am wearing Percival Lowell's straw hat



in the Lowell archives. Either he didn't have as big a head as I always thought, or I have a bigger one than I realized.

Bill

*On 26 May 2013, at 2:36 PM, Bill SHEEHAN wrote:
Back from Lowell*

Hi, Jan,

Back from two weeks in Flagstaff (my wife joined me this time). I'd planned this long ago, though my social schedule was more laid back since Kevin Schindler had to leave for Chicago on a family matter and Klaus was nursing Margaret who had shoulder surgery the day after I arrived. That was actually okay, since I've been under quite a lot of stress at work-in fact, I resigned my position at the Child and Adolescent Behavioral Hospital the day before I left for Flag; I was feeling physically, emotionally and mentally drained. Flag was just what I needed, and getting away gave me a chance to reconsider the matter. Since I've come back everyone there has been extremely responsive to try to make things work out. Not to brag, but I'm pretty indispensable to them, and leaving would be tantamount to pulling a "Samson" on them. So I'll probably stay here after all.

I didn't stay in the Slipper apt. this time, but instead in the Mars Hill Lodge, where Kevin lived for a while after he got married. It actually was more comfy than the Slipper apt., since it wasn't so much in the center of things and more off to the side, and there's good bird watching from the picture window and deck looking south over the woods.

I always love it at Lowell. I did a lot of research on V.M. and tried on Percy's straw hat. I also seized the chance to get away to Grand Canyon and Monument Valley, just for change of scene.

My heart seems to be in great shape after the pulmonary vein ablation procedure, and I wasn't bothered with atrial fibrillation as I was last time you saw me (!). I actually had fairly good endurance for hiking and even jogging; despite the altitude.

I'm making a hard push on the Galaxies book now - just finished writing about V.M., whose radial velocity measure of the "Sombrero" galaxy (NGC 4594) was obtained a century ago last month,

and am now writing about Hale and the founding of what Don Osterbrock described in our little paper "Hale's 'Little Elf,' published in 2000 when I was still living in New Zealand. It seems to me the main reason Hubble eventually got most of the credit for the "expanding universe" was that he was the face of extragalactic astronomy at Mt. Wilson, and the founder of the observatory, Hale, had set it up as "a monopolistic observatory, the biggest and most successful in the world." He was more than anyone else who transformed American astronomy from a confused and fragmented activity, in which individuals such as E. E. Barnard, George W. Ritchey, Hale's own optician, and Percival Lowell could still play an important role, to big science, corporate science, in which "the individual was subordinate to, if not crushed by, large institutions and massed resources." Unfortunately, that's the state of things we're still in today; we can never go back, but one of the things that appeals about the Lowell Observatory is that it still partakes of the romance of the earlier period, when individuals still mattered, and someone like Percival Lowell could follow his dreams wherever they took him.

I have already gone through most of the earlier chapters and taken heed of your advice - a lot of outtakes are now littering the floor of my study.

The book is better for all that, and I will never forget your comment that my first drafts tend to resemble a filmmaker gone wild with footage.

Kevin Schindler mentioned he ran into you at Chabot, when he was looking at the telescope there in anticipation of the Clark restoration project at Lowell (and Antoinette was able to raise the last \$100,000 needed while I was there), and was impressed with what you were doing.

Meanwhile, how go other things--"Venus on Mars," and the book on "seeing."

Best, Bill

Bill SHEEHAN (Willmar, MN)

☆☆☆

TEN YEARS AGO (218)

--- CMO #273 (25 June 2003) ---

<http://www.hida.kyoto-u.ac.jp/~cmo/cmomn3/cmo273/index.htm>

From this issue the printed version of the CMO was stopped, and the CMO shall be reviewed from its Web Versions because the Editor (*Mn*) went to Okinawa to observe Mars facing to the great apparition in 2003 and he continued to be busy in preparing the Lowell conference at Noto in 2004. The printed version was restored as a Second Series from CMO#300 (25 December 2004).

CMO #273, ten years ago, dealt with three articles, Report, LtE and TYA. The 2003 Great Mars CMO Report was 8th and reviewed the one-month period from 16 May 2003 ($\lambda=186^\circ\text{Ls}$) to 15 June 2003 ($\lambda=204^\circ\text{Ls}$). The δ already exceeded 10 arcsecs, and the number of the joined observers increased and was counted 34 with 314 observations: Domestically 12 observers were active with a total of 157 observations, and 8 observers in Europe with 42 observations, 8 observers in the US with 82 observations and 6 observers from Hong-Kong and Oceania with 33 observations.

During the period, the planet moved from Cap to Aqr, and the apparent declination quite recovered, and the height of the planet increased in the morning. The period ($\lambda=186^\circ\text{Ls}$ to $\lambda=204^\circ\text{Ls}$) already passed the point $\lambda=185^\circ\text{Ls}$ when the global dust was entrained in 2001. The apparent diameter was from $\delta=10.7''$ to $14.2''$ and the tilt was largely southward and moved from $\varphi=19^\circ\text{S}$ to 21°S , good for the observation of the spc. The phase angle was still large ($\tau=41^\circ$), and so the afternoon side was prominent.

The rainy season at Okinawa began in mid-May, and it came at the main lands as June turned in. Rainy days at Okinawa ended in mid-June, and MINAMI (*Mn*) took a flight to Naha on 23 June, and constantly observed Mars until the end of August.

We heard regrettably on 4 June that Tom CAVE (*TCv*) passed away. Sam WHITBY wrote to us on 16 June that "In regard to the death of Tom Cave, Tom DOBBINS wrote an appreciation of Tom which has been on the *Sky and Telescope* internet page (http://skyandtelescope.com/news/article_974_1.asp), and he attributed Tom's death to congestive heart failure. I am glad to see his passing gain some notice, for he has been a very important figure in amateur astronomy." (LtE in #273.)

According to the Mars report in #273, the internal shadowy details of the spc inside began to show some details: the peripheral line of the spc was bright, and the zig-zagged fringe became darker. No big dust cloud was caught, while a local, small but bright, dust was witnessed at the area of Syria Planum following Solis L on 25 May ($\lambda=189^\circ\text{Ls}$): This was observed by *Mn* and Teruaki KUMAMORI (*Km*) from Japan, and alerted, but it did not develop further. Later it was shown on the MGS image;

http://www.msss.com/mars_images/moc/2003/06/02/

As the disk diameter increased, some further details were caught: the east and northern sides of M Erythræum have become weaker, so that there looked to exist a gap between Margaritifer S and M Erythræum. This was ascribed to a fallout of dust in 2001. The area of Solis L was also detailed (especially by D PARKER (*DPk*)) including a darkening of Araxes. The afternoon white cloud activities at Arsia Mons and Pavonis

Mons were also described, and also attention was paid to Elysium, the Ætheria dark patch, the evening mist of Syrtis Mj, Hellas and its surroundings, the continents and dark markings at the southern hemisphere, the nph and so on. See more details in <http://www.hida.kyoto-u.ac.jp/~cmo/cmomn3/273OAA/index.htm>

We received a lot of LtEs: From abroad, Larry ADKINS (Prof. of Astronomy at Cerritos College, CA), Jeff BEISH (FL), Nicolas BIVER (France), Tom DOBBINS (OH), Mario FRASSATI (Italy), Ed GRAFTON (TX), Phil HARRINGTON (Astronomy magazine), Carlos HERNANDEZ (FL), David KLASSEN (Rowan University, NJ), Silvia KOWOLLIK (Germany), Paolo LAZZAROTTI (Italy), Richard McKIM (the UK), Dave MOORE (AZ), Eric NG (吳偉堅, Hong-Kong), Ben PACE (Australia), Don PARKER (FL), Tim PARKER (JPL/CIT, CA), K C PAU (鮑國全, Hong-Kong), Damian PEACH (the UK), Christophe PELLIER (France), TAN Wei-Leong (陳章龍, Singapore), Maurice VALIMBERTI (Australia), Sam WHITBY (VA), Johan WARELL (LPL, AZ), Ferruccio ZANOTTI (Italy) communicated and domestically we heard from Tomio AKUTSU (Tochigi), Tadashi ASADA (Fukuoka), Toshiaki HIKI (Nagano), Hiroshi ISHADOH (Okinawa) Tohru IWASAKI (KitaKyushu), Teruaki KUMAMORI (Osaka), Yukio MORITA (Hiroshima), Kunihiro OKANO (Tokyo), Kanehiro OSA (Ishikawa), Yasuo YABU (OAA, General Secretary).

TYA #94 was written by HIKI (Hk) about CMO #134 (25 June 1993) where the opening essay was written by Mn as "Sometimes Something Old" #6 on the seasonal activities of Hellas, Elysium and Nix Olympica based on SMITH-SMITH's paper which appeared in *Icarus* 16 (1972) 509. The paper looks still classic and valuable.

The observations of the planet Mars twenty years ago was at the final stage, and reported data were from 4 persons domestically and two observers from abroad: The disc diameter was around 5.0 arcsecs: Martian season was from $\lambda=080^\circ$ Ls to 093° Ls. In that apparition Takashi NAKAJIMA (Nj) and Mn secured a total 1200 drawings.

Reported also was how the members at Fukui welcomed the SIEGELs (from Denmark to Takefu, Fukui, Mikuni) in May 1993. *M MURAKAMI (Mk) and M MINAMI (Mn)*

International Society of the Mars Observers (ISMO)

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CMO #411/ ISMO #37 (25 June 2013)

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