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Journal of the Association of Lunar & Planetary Observers

Founded in 1947

The Strolling Astronomer

Volume 49, Number 4, Autumn 2007

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Inside. . .

- ***The official record of our board meeting in Calgary***
- ***Index to Volume 48 of your ALPO journals***
- ***A review of a new Saturn observing guide by our own Julius Benton***
- ***A report on the Venus 2003-2004 Venus apparition***
- ***"X" marks the spot (on the Moon, that is)***
- ***A report on the Mars dust storm of 2007***

. . . plus reports about your ALPO section activities and much, much more

Christophe Pellier, winner of the 2007 ALPO Observing Award, given each year for excellence in amateur astronomical observations. The award was presented on July 1 during the ALPO Convention at Calgary, Alberta,Canada.

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Journal of the Association of Lunar & Planetary Observers

The Strolling Astronomer

Volume 49, No. 4, Autumn 2007
This issue published in October 2007 for distribution in both portable document format (pdf) and also hardcopy format.

This publication is the official journal of the Association of Lunar & Planetary Observers (ALPO).

The purpose of this journal is to share observation reports, opinions, and other news from ALPO members with other members and the professional astronomical community.

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Visit the ALPO online at:
http://www.alpo-astronomy.org

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Point of View
Introducing Our New Executive Director!

By Mike D. Reynolds, Ph.D., executive director, Assn of Lunar & Planetary Observers

Greetings, Fellow ALPOers! For those of you who don't already know me, let me introduce myself. The first ALPO meeting I attended was in Memphis, Tennessee, in 1971. Even though this was 36 years ago (I was 2 years old, of course!), I clearly remember the impact that this meeting and the ALPO members in attendance had on me. I would have never thought that I would have the opportunity to serve on the ALPO Board or as a section coordinator, nonetheless as its executive director – something I took a little time to reflect upon at this summer's ALPO meeting in Calgary as I was spending some time with Walter Haas.

My personal interests (besides nearly everything Solar System!) include eclipse astronomy, meteoritics, and most-recently, lunar meteoroid impact research and monitoring. Usually we eclipse observers – known amongst total solar eclipse observers as *eclipse chasers* – do not get the same recognition, press or notoriety as many of our fellow ALPO Solar System observers and sections. However having observed 15 total solar eclipses, and a larger number of lunar eclipses, along with a plethora of partial and annular solar eclipses, I can tell you I still am awe-struck by the majesty and beauty of a total eclipse and enjoy submitting my observations. I still research atmospheric effects which occur around a total solar eclipse (both the Moon's shadow and the horizon colors, what I call the sunrise-sunset effect) and I am working on new Photoshop and Registax techniques for stacking total solar eclipse images.

(Continued on page 18)

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News of General Interest

New Webmaster, New Home, New Name for ALPO Website

Report by Mike D. Reynolds, executive director, ALPO

After 12 years online, changes have come to the website of the Association of Lunar & Planetary Observers.

First, Rik Hill, founder of the ALPO website, is leaving the post of ALPO web master (but NOT the ALPO). We, the ALPO, are indebted to Rik for establishing a web presence for our organization, and for seeing through the many changes and refinements required to keep the website up-to-date.

Second, it is my pleasure to announce the appointment of ALPO member Larry Owens as acting web master.

No stranger to astronomy or websites, Larry, who resides in suburban Atlanta, Georgia, has been a lunar and planetary imager for over 40 years, and presented an image processing workshop at the 2006 ALPO conference in Atlanta. His day job is dominated by technology and computers. Currently, Larry spends much of his time as a programmer for a major telecommunications firm, maintaining and creating internal websites and writing code in support of UN IX-based applications.

New ALPO web master Larry Owens with his C14.

After hours, it's out to his Celestron C14 to image the planets or to participate in astronomy club activities as the director of the Charlie Elliott Chapter of the Atlanta Astronomy Club. Several of Larry's images have been published in this Journal

"Websites today serve many purposes," says Larry. "They are a means of communication among members, they have become repositories of important information, but most importantly, websites have become the public persona of an organization and can play a major role in shaping its future. I am honored to have the opportunity to participate and I am certain we can use our new public persona to ensure a strong future for the ALPO."

And finally, we have secured a new domain name (also called a "URL" or website address), one that truly states what we are. From now on, look for us at *http://www.alpo-astronomy.org*

ALPO Instruments Section Staff Change

Following discussions at the ALPO board meeting in Calgary, ALPO Executive Director Mike Reynolds has been named acting coordinator of this section with hopes of growing it into a more interactive section.

Reminder: Address changes

Unlike regular mail, electronic mail is not forwarded when you change e-mail addresses unless you make special arrangements.

More and more, e-mail notifications to members are bounced back because we are not notified of address changes. Efforts to locate errant members via online search tools have not been successful.

So once again, if you move or change Internet Service Providers and are assigned a new e-mail address, please notify Matt Will at will008@attglobal.net as soon as possible.

Please see the ALPO Board Meeting Minutes article later in this JALPO for complete details.

ALPO Publications Staff Changes

Report by Ken Poshedly, Publications Section coordinator

The following staff changes have been made in the ALPO Publications Section:

- Because General Editors Bob Garfinkle and Roger Venable are already performing other editorial duties, that group title has been retired.
- Roger Venable has been formally added to the Science / Peer Reviewers

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group (formerly the Science Editors) where he had already been assisting for some time.

- ALPO member Richard Jakiel of suburban Atlanta, Georgia, USA, has joined the Science / Peer Reviewers group.
- Bob Garfinkle remains as Acting Book Review Editor.
- The Staff Writers group (Jim Lamm and Dick Wessling) has been dissolved due to lack of activity.
- Remaining in place is Spanish-language translator Guido E. Santacana.
- Also remaining in place is graphics staffer John Sanford.

Richard Jakiel will work with the JALPO Science / Peer Reviewers staff (formerly the Science Editors) of Klaus Brasch, Robert Garfinkle, Richard Ulrich, Roger Venable and John Westfall who assist general editor Ken Poshedly with production of this journal by actively peer reviewing and editing manuscripts submitted for publication.

Originally hailing from Buffalo, New York, Rich Jakiel has lived in metro Atlanta for nearly 20 years. He holds a bachelor of science degree in Geology and Biology (1979), a master of science degree in Isotope Geochemistry (1983) and was a PhD candidate at the Georgia Institute of Technology (Georgia Tech). From 1997 to 2002, he was an adjunct astronomy/physics professor at West Georgia College, and is currently employed as a Research Scientist II with the Georgia Dept. of Natural Resources.

Rich Jakiel and a 5-inch refractor while on a lecture tour in southern England several years ago.

Rich has written over 50 articles in astronomy, covering a diverse array of topics ranging from observational astronomy (observing and techniques), historical pieces, biographies, archaeo-astronomy, and book reviews to planetary geology.

He has contributed chapters in several books and is the co-author of *Galaxies and How to Observe Them* (published by Springer, December 2006; click *here* to order).

Jakiel is an active lunar & planetary observer as well, and has previously contributed to this journal.

As stated in JALPO49-3, finding and downloading a number of ALPO publications is now easier with the addition of an ALPO Publications Section web site.

The new site includes access to the following:

- The online library of *The Strolling Astronomer*
- Most of the ALPO Monographs (with the exception of the Wilkins Moonmap)
- Selected presentations from the 2006 ALPO Conference in Atlanta, GA
- The publication guidelines for authors to follow when submitting manuscripts
- A listing of the ALPO Publications Section volunteer staff

Work is in progress to include links to various ALPO observing sections and interest section publications, as well.

All are available for downloading for free and are in portable document format (pdf) — thus, no photocopying fees; however, those fees remain in place if hard-copies of the ALPO Monographs or *The Strolling Astronomer* are requested.

Currently, JALPO43-1 (Winter 2001) through JALPO48-2 (Spring 2006) pdf issues of *The Strolling Astronomer* are available without password protection.

Newer issues remain password-protected and are available only to those whose ALPO memberships specifically include the online version of this Journal as a club benefit.

The library of online issues of *The Strolling Astronomer* can be accessed directly at *http://www.justfurfun.org/djalpo* or via the new ALPO Publications web site.

Finally, Astrophysics Data System (*http://adswww.harvard.edu/*), a service provided by the Smithsonian Astrophysical Observatory, is currently scanning the entire library of ALPO Journals to make them available for online viewing and printing as well.

Additional details about that project will be published as they become available. Many thanks go out to all who contributed their own time and effort to producing the various publications and papers included on this new feature for ALPO members.

ALPO Online Membership Payments are Back

We are pleased to announce that ALPO memberships can once again be purchased online. Direct your web browser to:

http://www.galileosplace.com/ALPO/

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The ALPO wishes to thank *Telescopes by Galileo* for hosting the ALPO and accepting ALPO membership payments on our behalf.Their support of the ALPO is most appreciated. See the ALPO membership application form near the back of this issue of your Journal for dues and other details.

ALPO Resources Updates

There's a myriad of changes in the *ALPO Resources* at the back of this Journal, including website addresses for our various ALPO sections.

Please check it before corresponding with any of the ALPO staff or board members.

ALPO Interest Section Reports

Web Services

Report by Larry Owens, acting coordinator

See article earlier in this section regarding changes here.

Visit the ALPO home page on the World Wide Web at *http://www.alpo-astronomy.org*

Computing Section

Report by Kim Hay, coordinator

Visit the ALPO Computing Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Computing Section.

Lunar & Planetary Training Program

Report by Tim Robertson, coordinator

For information on the ALPO Lunar & Planetary Training Program on the World Wide Web, go to *http://www.cometman.net/alpo/*; regular mail to Tim Robertson at 2010 Hillgate Way #L, Simi Valley CA, 93065; e-mail to *cometman@cometman.net*

Instruments Section

Report by Mike Reynolds, acting coordinator

Visit the ALPO Instruments Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Instruments Section.

ALPO Observing Section Reports

Eclipse Section

Report by Mike Reynolds, coordinator

The 28 August 2007 total lunar eclipse will be history by the time ALPO members read this column. Please submit observations you made of the eclipse, including as many of the following points as possible:

- Eclipse visibility (even a simple "yes, I observed the eclipse" or "no, it was cloudy at my location…" will be useful for the ALPO Eclipse Section Report)
- Location of where you made your observations and overall sky conditions (city, state, country);
- Timings of shadow contacts (in UT, please), both visual and telescopic;
- Crater contact timings (again, in UT, please);

Digital photograph by Dr. Mike Reynolds of the 27 October 2004 Total Lunar Eclipse, 80 mm William Optics APO—Canon EOS 10D digital camera at 1/8th second exposure.

- Estimates of totality's darkness and color, using the Danjon scale if possible;
- Photographs/ images of the eclipse; and
- Other observations you made (such as occultations timed during the eclipse, etc.).

I will be preparing a full section report on the 28 August 2007 total lunar eclipse for this Journal based on observations submitted by ALPO members. Please e-mail your observations and reports to me at *alpo-reynolds@comcast.net* or send paper reports via regular mail to Dr. Mike Reynolds, Associate Dean of Mathematics and Natural Sciences, Florida Community College, 3939 Roosevelt Blvd, Jacksonville FL 32205.

Note that the e-mail address given here is new and was set up for ALPO matters.

Visit the ALPO Eclipse Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Eclipse Section.

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Comet McNaught (C/2006 P1) as imaged by ALPO Comets Section Coordinator Gary W. Kronk at St. Jacob, Illinois, USA, on 2007 January 10.98 UT. Equipment included a Canon Digital Rebel camera (FL300 mm, f/3.5); four 1 second exposures at ISO 100, stacked using RegiStax 3.0.

Comets Section

Report by Gary Kronk, acting coordinator

Activity within the comet section has been slow, despite the appearance of several nice comets during the last couple of months. Visual observations have been received from Gary T. Nowak, while images were received from Mike Mattei (LPO Observatory, Massachusetts, USA), John D. Sabia and Thomas G. Cupillari (Keystone College Thomas G. Cupillari Observatory, Pennsylvania, USA), and Gary W. Kronk (Kronk Observatory, Illinois, USA). The comets observed were C/2006 P1 (McNaught), C/2006 VZ13 (LINEAR), and C/2007 E2 (Lovejoy).

The next comet of interest to observers will be the periodic comet 8P/Tuttle. First discovered by P. F. A. Méchain (Paris, France) on 1790 January 9, it was observed for less than a month and the periodic nature was not recognized. The comet was rediscovered by H. P. Tuttle (Harvard College Observatory, Cambridge, Massachusetts, USA) on 1858 January 5. Several astronomers then determined elliptical orbits which ultimately revealed a period of 13.7 years and successfully linked the comet to the 1790 apparition.

The comet has been seen at every subsequent return except that of 1953. Although the comet has had several apparitions where the magnitude exceeded 8, the 2007-2008 apparition should be one of the best. The comet was recovered by C. W. Hergenrother (Catalina Sky Survey, Arizona, USA) on 2007 April 22 at about magnitude 20. The comet is now steadily brightening and will pass perihelion on 2008 January 27. Expectations are that the comet will attain a magnitude of 6.0-6.5 because of a close approach to Earth (0.25 AU) early in January.

Visit the ALPO Comets Section on the World Wide Web at http://www.alpo-astronmomy.org, then Comets Section.

Meteors Section

Report by Robert Lunsford, coordinator

Since the 2006 Orionid outburst, the meteor scene has been fairly quiet.

- The Leonids in 2006 peaked under good conditions, but rates were unimpressive. The weather in mid-November was also uncooperative as only three observers submitted observations of the Leonids. The highest hourly count was that of Robin Gray who recorded 10 Leonids in one hour on the morning of November 18.
- The Geminids in 2006 peaked on December 14 with a Last Quarter Moon in the sky. ALPO observers George Gliba and Robert Hays Jr. covered the maximum well with George recording 50 Geminids in two hours and Robert recording 100, also during two hours time. Robert's highest hourly count for the Geminids was 53.
- The Ursids in 2006 peaked under ideal conditions, yet the highest hourly count was only 5, recorded by Robert Hays Jr.
- On January 4, 2007, the Quadrantids reached maximum activity under a Full Moon and very little data was received under these poor conditions.
- The Lyrids in 2007 peaked on April 22 under much better conditions with the Moon setting well before the prime time morning hours. George Gliba had a fine view of the Lyrids, recording 23 during three hours of observing from West Virginia. His highest hourly count was 11 between 2 and 3 a.m. on April 22.
- Like the Quadrantids, the Eta Aquariids of May and the Delta Aquariids of

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July 2007 were spoiled by the Full Moon.

- Early Perseid results for 2007 indicate an average or slightly sub-par return of this shower. Many observers commented that the Perseids were brighter than normal this year, with several fireball class meteors being reported.

- Several observers also mentioned that the little-known Kappa Cygnids produced several fireballs during and after the Perseid maximum.

As for the remainder of 2007:

- The next major shower will be the Orionids, expected to peak on October 21. Discussions seem to indicate another year of better than average rates although nothing is certain. It is certainly too much to expect the Orionids to equal or exceed last year's exceptional display. The waxing gibbous Moon will interfere up until 2 a.m., but after that, dark skies will be available to view the Orionids.

- In 2005, the Taurids produced rates of 10-15 per hour, with numerous fireballs equaling the light of the Full Moon. While nothing quite that dramatic is expected this year, the Moon is favorable during the first half of November for viewing these meteors.

- The Leonids are expected to peak on November 18. On that night a First Quarter Moon will set as the radiant is rising in the east. Although no outbursts are expected from the Leonids, 10-15 swift meteors per hour should be visible on this morning.

- The Geminids peak on the night of December 13/14. The waxing crescent Moon will set during the evening hours, allowing an excellent view of this impressive display. Rates near midnight on this date should exceed 60 meteors per hour as seen from rural locations. The Geminids should also be strong on the nights before and after maximum in case you are clouded out on the peak night.

- The Ursid maximum coincides with a Full Moon this year, therefore, not much is expected to be seen from this shower.

- Lastly the Quadrantids, which actually peak on January 4, 2008, should end the meteor season for the northern hemisphere on a high note. The waning crescent Moon will provide little interference, plus the display is predicted to peak over North America. Rates can vary considerably, but this shower has the potential to produce in excess of 100 meteors per hour at the hour of maximum activity under dark, rural conditions.

Many thanks to the ALPO observers who made the effort to contribute their data in 2006 and I look forward to more of your valuable data during the remainder of 2007!

Visit the ALPO Meteors Section on the World Wide Web at http://www.alpo-astronomy.org, then Meteors Section.

Solar Section
Report by Kim Hay, coordinator

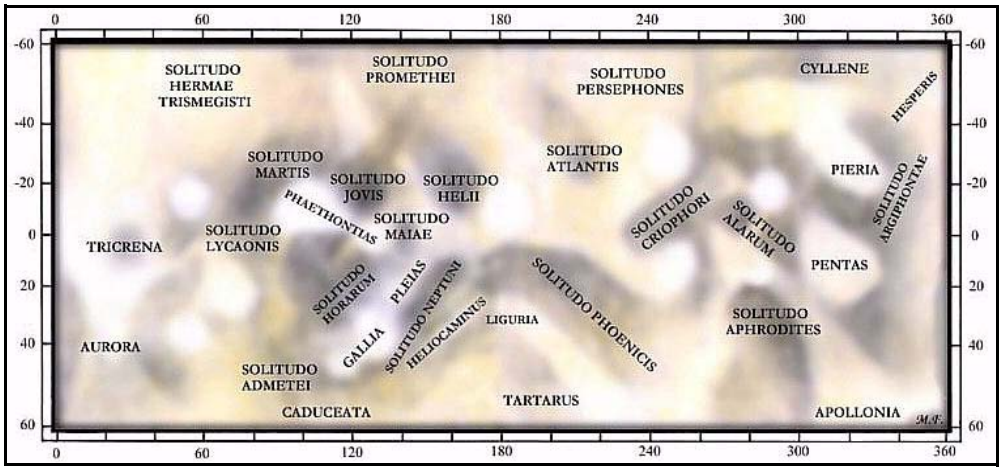
Visit the ALPO Solar Section on the World Wide Web at http://www.alpo-astronmomy.org, then Solar Section.

Mercury Section
Report by Frank J. Melillo, coordinator

The flow of incoming Mercury observing reports during the first half of 2007 has been slow, but with at least some observers still contributing. For instance, Carl Roussell continues to draw Mercury, while Ed Lomeli is still taking excellent images. I am now hoping that many of you will follow their examples and observe Mercury when it is visible during each apparition. More observing reports are always needed.

I'm looking forward to the next favorable morning apparition of Mercury this November when it will appear very much like it did in November and December 2006, with most of the unmapped portion of the surface facing us.

There are some white spots (crater ejecta rays?) between 260° and 360° longitude,



Mercury as mapped by Mario Frassati, based on 54 visual observations between 1997 and 2001. Equipment: 203 mm (8 in.), f/10 Schmidt-Cassegrain, 250x - 400x magnifications used.

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and a very dark feature at 280° longitude. I would like to confirm these features one more time before the first MESSENGER spacecraft flyby of Mercury in January 2008 and time is running out! I ask that as many observers as possible follow the example of dedicated observers like Ed Lomeli, Andy Allen, Carl Roussell and me and continue to monitor that portion of the longitude not covered by the Mariner 10 probe.

As for the MESSENGER spacecraft, the second Venus flyby last June was successful. All instruments are in good working order. The probe is slowing down to match the speed with Mercury in 2011 in order to achieve the proper orbit.

Visit the ALPO Mercury Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Mercury Section.

Venus Section

Report by Julius Benton, coordinator

The Eastern (Evening) Apparition of Venus came to conclusion as the planet reached Inferior Conjunction with the Sun on August 18, 2007. A full report for this apparition will be presented in this Journal in early 2008 after all observations have been received and studied. Some highlights of the 2006-07 observing season are as follows:

- 275 digital images of Venus have been submitted so far
- 220 drawings and intensity estimates of dusky features suspected on Venus have been received
- Numerous UV images have shown dusky banded and amorphous atmospheric features
- Only a few instances of dark hemisphere phenomena (e.g., Ashen Light) have been reported

Geocentric Phenomena of the 2007-08 Western (Morning) Apparition of Venus in Universal Time (UT)

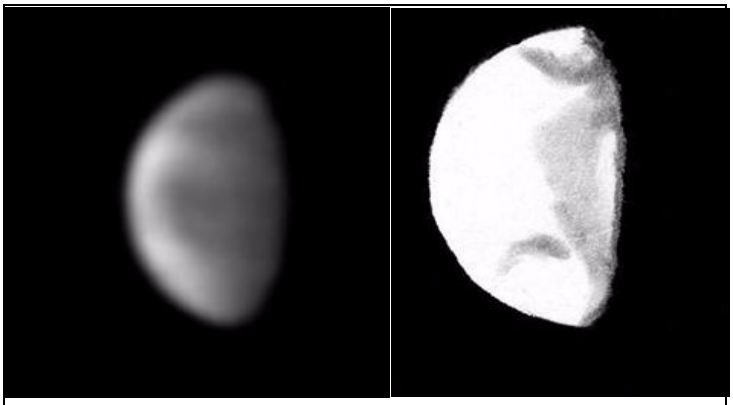
Inferior Conjunction	2007	August 18^d 04^h (angular diameter = 59.2 arc-seconds)
Greatest Brilliancy		Sep 23d 23h (m_v = – 4.8)
Predicted Dichotomy	2007	Oct 27d 15.36^h (exactly half-phase predicted)
Greatest Elongation West		Oct 28^d 15^h (45º west of the Sun)
Superior Conjunction	2008	June 9^d 00^h (angular diameter = 9.6 arc-seconds)

- Pro-Am collaboration in association with the Venus Express (VEX) mission has continued
- Incidence of simultaneous observations of Venus increased during 2006-07

Venus began as a brilliant object visible in the morning sky just before sunrise in late August, and is now progressing through its waxing phases (a gradation from crescentic through gibbous phases) as the apparition continues. The disc of Venus started out about 60 arc-seconds across, attaining greatest brilliancy the third week of September, then slowly decreasing in angular diameter and diminishing in brightness as it heads toward Superior Conjunction on June 9, 2008 at 9.6 arc-seconds in extent.

Note that Venus will reach theoretical dichotomy (half-phase) on October 27, just a day before reaching Greatest Elongation West. Observers are viewing the trailing hemisphere (dawn side) of Venus at the time of sunrise on Earth. Observers are always encouraged to try to view Venus simultaneously (as close to the same time and date as circumstances allow) to improve confidence in results and reduce subjectivity.

The Venus Express (VEX) mission began systematically monitoring Venus at UV, visible (IL) and IR wavelengths in late May 2006. As part of an organized Professional-Amateur (Pro-Am) effort, a few ALPO Venus observers have submitted high quality digital images of the planet taken in the near-UV and near-IR, as well as other wavelengths through polarizing



Two simultaneous observations of Venus. The first observation is an image taken on April 15, 2007 at 17:55 UT by Daniele Gasparri in Italy using a 23.5 cm (9.25 in.) SCT, W47 (violet) and Schott BG38 filters, and a ToUcam webcam in fair seeing. The second observation is a drawing made in integrated light by Detlev Niechoy in Germany on the same date but at 17:50 UT using a 20.3 cm (8.0 in.) SCT at 225X. Compare the similarity of features recorded in both observations, which stresses the importance of simultaneous observations for corroborating visual and digital impressions. The diameter of the disc in both observations is 14.9 arc-seconds and gibbous phase of k = 0.740 (74.0% illuminated).

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Lunar Calendar, October thru December 2007 (All times are UT)

Oct. 02	20:00	Moon 4.7° N of Mars
Oct. 03	10:07	Last Quarter
Oct. 07	06:00	Moon 3.1° NNE of Venus
Oct. 07	15:00	Moon 1.1° SSW of Saturn
Oct. 11	05:01	New Moon (Start of Lunation 1049)
Oct. 13	00:00	Moon 1.2° SSW of Mercury
Oct. 13	09:54	Moon at Apogee (406489 km - 252581 miles)
Oct. 16	05:00	Moon 5.3° S of Jupiter
Oct. 19	08:33	First Quarter
Oct. 23	01:00	Moon 1.6° NNW of Uranus
Oct. 26	04:52	Full Moon
Oct. 26	11:52	Moon at Perigee (356,754 km - 221,677 miles)
Oct. 30	20:00	Moon 3.2° N or Mars
Nov. 01	21:19	Last Quarter
Nov. 04	01:00	Moon 1.6° SSW of Saturn
Nov. 04	17:00	Moon 2.7° SSW of Venus
Nov. 08	05:00	Moon 6.2° SSW of Mercury
Nov. 09	12:33	Moon at Apogee (406,670 km - 252,693 miles)
Nov. 09	23:03	New Moon (Start of Lunation 1050)
Nov. 12	21:00	Moon 5.0° S of Jupiter
Nov. 17	12:00	Moon 0.91° SSE of Neptune
Nov. 17	22:32	First Quarter
Nov. 19	09:00	Moon 1.8° NNW of Uranus
Nov. 24	00:13	Moon at Perigee (357,195 km - 221,951 miles)
Nov. 24	14:30	Full Moon
Nov. 27	06:00	Moon 1.7° N of Mars
Dec. 01	11:00	Moon 2.1° SSW of Saturn
Dec. 01	12:44	Last Quarter
Dec. 05	18:00	Moon 6.5° SSW of Venus
Dec. 06	16:55	Moon at Apogee (406,234 km - 252,422 miles)
Dec. 09	08:00	Moon 4.4° S of Mercury
Dec. 09	17:40	New Moon (Start of Lunation 1051)
Dec. 10	16:00	Moon 4.6° S of Jupiter
Dec. 12	22:00	Moon 0.43° SE of asteroid Vesta
Dec. 14	19:00	Moon 0.65° SE of Neptune
Dec. 16	00:00	Moon 0.95° NNW of asteroid Pallas
Dec. 16	16:00	Moon 2.1° NNW of Uranus
Dec. 17	10:17	First Quarter
Dec. 22	10:12	Moon at Perigee (360816 km - 224,201 miles)
Dec. 24	01:15	Full Moon
Dec. 24	03:00	Moon 0.92° N of Mars
Dec. 28	20:00	Moon 2.5° SSW of Saturn
Dec. 31	07:50	Last Quarter

(Table courtesy of William Dembowski)

filters. The observations should continue to be contributed in JPEG format to the ALPO Venus Section Coordinator as well as to the VEX website at: *http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=38833&fbodylongid=1856*.

Routine observations of Venus are needed throughout the period that VEX is observing the planet, which continues in 2007-08 and a couple of years henceforth, as well as after completion of the mission. Since Venus has a high surface brightness, it is potentially observable anytime it is far enough from the Sun in the sky to be seen without threat of eye damage.

Key observational endeavors:

- Visual observations and drawings in dark, twilight, and daylight skies to look for atmospheric phenomena, including dusky shadings and features associated with the cusps of Venus
- Visual photometry and colorimetry of atmospheric features and phenomena
- Monitoring the dark hemisphere for Ashen Light
- Observation of terminator geometry (monitoring any irregularities)
- Studies of Schröter's phase phenomenon near date of predicted dichotomy
- Routine CCD and webcam imaging of Venus at visual, UV, and IR wavelengths
- Special efforts to accomplish simultaneous observations
- Contribution of observation data and images to the Venus Express mission is encouraged

The ALPO Venus Section invites interested readers worldwide to join us in our projects and challenges ahead.

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Complete details can be found about all of our observing programs in the ALPO Venus Handbook. Individuals interested in participating in the programs of the ALPO Venus Section are cordially invited to visit the ALPO Venus Section on the World Wide Web at http://www.alpo-astronmomy.org, then Venus Section.

Lunar Section:

Lunar Topographical Studies / Selected Areas Program

Report by William M. Dembowski, FRAS, coordinator

Dembowski@zone-vx.com

During the second quarter of 2007, the ALPO Lunar Topographical Studies Section (LTSS) received a total of 295 new images from 19 observers in 7 countries and 7 states of the United States.

In the January issue of the Lunar Section newsletter, the LTSS announced its revival of the Banded Craters Program. Although at this writing (mid-July) only three observers (Wayne Bailey, Howard Eskildsen and myself) have contributed formally documented observations, a total of 180 images have already been logged. Other members wishing to participate in the study of craters having bright and/or dark bands on their inner walls are encouraged to visit the Banded Craters WebPage at http://www.zone-vx.com/alpo-bcp.html for additional information. A report on the Banded Craters Program is also being prepared for an upcoming issue of this Journal.

The ALPO-LTSS continued to promote the various observing projects within the Selected Areas Program via this section's newsletter, *The Lunar Observer*. Although some interest has been shown, it is yet unclear how viable these programs will be. Web pages for two of the programs have been established and interested members are encouraged to visit them.

Visit the following web sites on the World Wide Web for more info:

- ALPO Lunar Topographical Studies Section http://www.zone-vx.com/alpo-topo
- ALPO Lunar Selected Areas Program http://www.alpo-astronmomy.org, then Lunar Section.
- ALPO Lunar Topographical Studies Smart-Impact WebPage http://www.zone-vx.com/alpo-smartimpact
- *The Lunar Observer* http://www.zone-vx.com/tlo.pdf
- Selected Areas Program: http://www.zone-vx.com/alpo-sap.html
- Banded Craters Program: http://www.zone-vx.com/alpo-bcp.html

Lunar Domes Survey

Report by Marvin Huddleston, FRAS, coordinator

Participants are encouraged to contact Harry D. Jamieson, e-mail harry@persoftware.com in order to obtain a copy of the *Lunar Observers Tool Kit*, (Windows edition).

Visit the ALPO Lunar Domes Survey on the World Wide Web at http://www.geocities.com/kc5lei/lunar_dome.html

Lunar Transient Phenomena

Report by Dr Anthony Cook, coordinator

Visit the ALPO Lunar Transient Phenomena program on the World Wide Web at

- http://www.alpo-astronmomy.org , then Transient Phenomena
- http://www.ltpresearch.org/

Lunar Meteoritic Impact Search

Report by Brian Cudnik, coordinator

For information on impact-related events, please visit the ALPO Lunar Meteoritic Impact Search site on the World Wide Web at http://www.alpo-astronmomy.org.

Mars Section

Report by Roger Venable, acting assistant coordinator

(Editor's Note: Features named in this article and accompanying photo captions can be found on the "Mars Albedo Map" at http://mars.jpl.nasa.gov/MPF/mpf/marswatch/marsnom.html)

As it does at the start of every apparition, Mars appeared tiny in telescopes early this year. This, coupled with its southern declination, prevented all but the most stalwart observers from bothering with it in the first few months of the apparition. Fabio Carvalho and Robert Heffner submitted these fine images during this time (Figures 1 and 2.)

Jim Melka became the star of the Mars show on June 25 when he pointed out the dust cloud obscuring part of Noachis, as shown in his image of that morning (Fig-

Figure 1. Mars with an apparent diameter of 4.1 arcseconds, imaged on January 24, 2007, at 08:39 UT, by Fabio Carvalho. Central meridian (CM) is 332.3°. A blue color at the terminator corresponds to Syrtis Major. Philips ToUcam Pro II camera, 180-mm Newtonian. For this and all other images, areocentric south is at the top, and the right figure, when present, is a simulation of the expected appearance.

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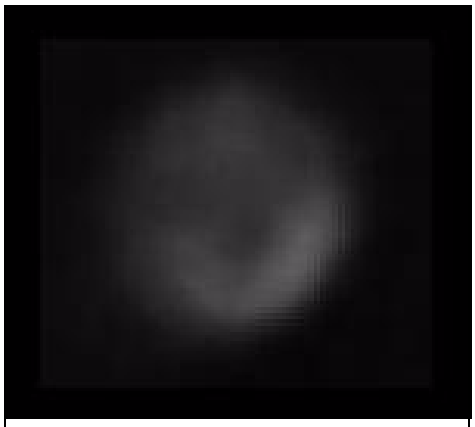

Figure 2. Mars with an apparent diameter of 4.4 arcseconds, imaged on February 18, 2007, at 21:54 UT, by Robert Heffner. CM is 280.9°. Syrtis Major and Hellas are prominent, and the South Polar Cap can be glimpsed. LU075c camera, IR only, 280-mm Schmidt-Cassegrain.

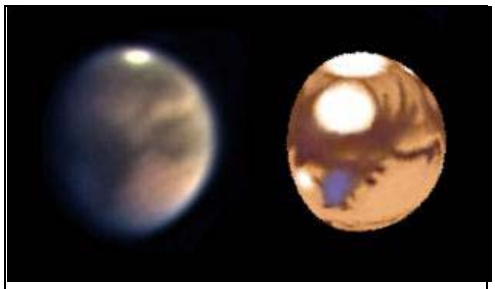

Figure 3. Apparent diameter of 6.2 arcseconds, imaged on June 25, 2007, at 10:31 UT, by Jim Melka. CM is 298.1°. The light streak appearing radially on the disc at 2 o'clock is the dust cloud. ToUCam840 with UV and IR blocking filters, 30-cm Newtonian.

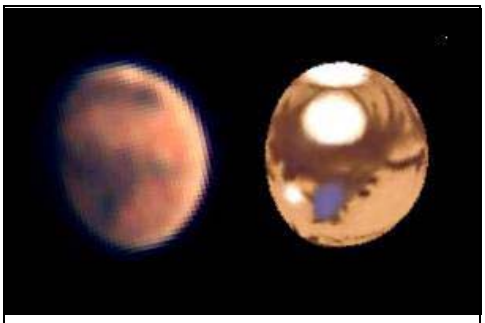

Figure 5. Apparent diameter of 6.3 arcseconds, imaged on June 29, 2007, at 12:38 UT, by Paul Maxson. CM is 289.7°. Dust has moved eastward, covering Hellespontis, Yaonis Fretum, Mare Serpentis, probably part of southern Iapygia Viridis, and all of Hellas. It extends past Hellas into Mare Hadriacum and Mare Tyrrhenum, and to the terminator. Sinus Meridiani is also covered. Lumenara 075C camera, 250-mm Dall-Kirkham.

ure 3.) Although this image precipitated a worldwide frenzy of imaging, Dave Moore had imaged the dust the previous day (Figure 4.) We watched the dust cloud spread rapidly to the east (Figure 5.)

On June 30, Robert Heffner imaged Mars from Japan, and thus observed a side of the planet that was not visible to North American observers. His image shows Solis Lacus to be obscured by bright material (Figure 6.) Did this indicate that the dust had spread westward as rapidly as it had spread to the east? Or, could it have originated at a site further west, such as Solis Planum, undetected by observers in Europe and North America?

It may take us some time to figure all this out, but the first impression from THEMIS data suggests that the dust started near Argyre and spread to both the east and the west. Meanwhile, congratulations are due to Jim and Dave for their discovery images.

To borrow a phrase from observer Joel Warren, the dust was "popping up all over the place" for the next few weeks. This image by Don Parker (Figure 7) shows numerous new dust cores in and near Solis Planum. Images like this demonstrate that large dust storms are multicentric, although much spreading does occur in a monolithic way. This image shows Olympus Mons to appear dark, at the 5 o'clock position near the bright limb. This appearance of the volcano is typical when low-level dust brightens the surrounding Tharsis plains, making the upper reaches

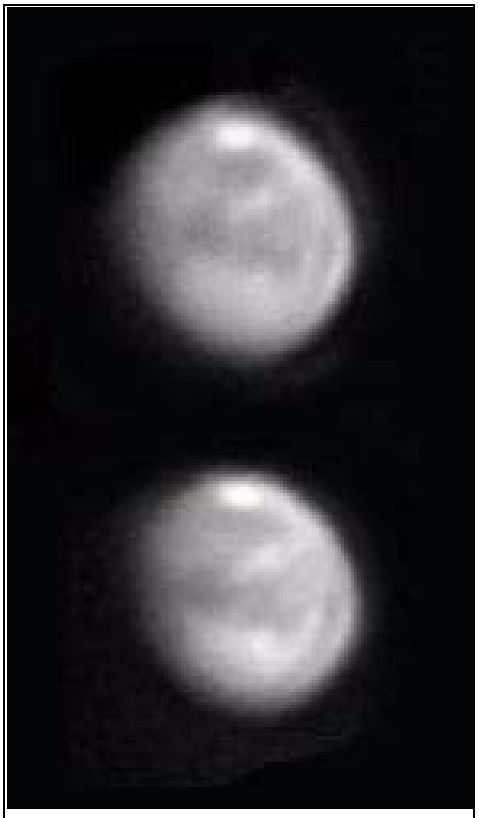

Figure 4. Images made on June 24, 2007, by David Moore. The top image was at 11:59 UT (CM = 329°), passing IR and red wavelengths longer than 620 nm, while the bottom image was at 12:18 UT (CM = 344°), passing only IR wavelengths longer than 820 nm. The dust is the bright feature slightly above center. (Compare with Melka's image in Figure 3.) DMK21AFO4 camera, 36.2-cm Cassegrain.

Figure 6. Mars with an apparent diameter of 6.3 arcseconds, imaged on June 30, 2007, at 18:21 UT (CM = 3°), by Robert Heffner. Mare Erythraeum is partly obscured, while bright dust completely hides Protei Regio, Bosporus, Thaumasia, and Solis Lacus at the upper right (southwest) part of the image. Argyre is covered, and in the east, Noachis and Meridiani are obscured while the northern part of Hellespontis is seen but faintly through the dusty haze. DMK21AF04 camera, 280-mm Schmidt-Cassegrain.

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Figure 7. Apparent diameter 6.6 arcseconds, imaged on July 13, 2007, at 09:18 UT, by Don Parker. CM is 103.8 °. There are numerous dust cores near the center of the image, in the Solis Planum area, as well obscuration of northern Mare Sirenum and Mnemonia. There is a subtly mottled appearance of Tharsis, and Olympus Mons is dark, at the lower right. A bright dust cloud is at the upper right limb (SW limb) and the SPC is visible through a shroud of haze. Skynyx 2-0 camera, tricolor filters, 400-mm Newtonian.

of the mountain appear relatively dark in contrast.

The image shows how difficult it can be to detect dust, especially in the featureless northern plains. Rather than appearing as a moving obscuration that is bright in red light, it is detectable here in the Tharsis area by virtue of its contrast with the uncovered mountain. However, the image does show a subtle mottling of the Tharsis plateau, probably due to dust.

Although the dust storm generated much excitement, it also caused some disappointment. There are still plenty of visual observers, some of whom commented on the difficulty of seeing the familiar albedo features of the planet. Here is a drawing by Denis Fell (Figure 8,) showing Meridiani and Sabeus Sinuses, Pandorae Fretum, Margaritifer and Aurorae Sinuses, and part of Mare Acidalium. Even the SPC is shrouded with bright haze, and everything else is either covered with dust or visually indistinguishable from dust clouds!

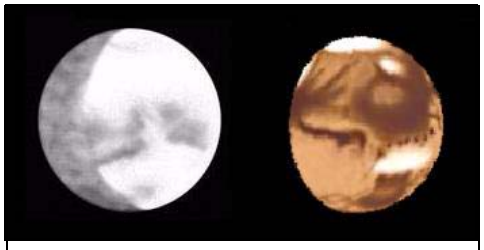

Figure 8. Apparent diameter 6.9 arcseconds, drawn on July 25, 2007, near 10:27 UT, by Denis Fell. CM is about 3°. 80-mm refractor.

Join us on the Yahoo Mars observers' message list at *http://tech.groups.yahoo.com/group/marsobservers* . There you can share in discussions of observing Mars and post your images and drawings.

The article "Early Report on the Mars Dust Storm of 2007" appears later in this issue of *The Strolling Astronomer.*

Visit the ALPO Mars Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Mars Section.

Minor Planets Section

Report by Frederick Pilcher, coordinator

Minor Planet Bulletin Vol. 34, No. 3, contains by far the largest number of lightcurves and rotation period determinations, and the most pages, 42, in its entire history of publication. We congratulate the many contributing observers and welcome a landmark in the growing maturity of CCD photometry of minor planets. Most of the lightcurves were obtained by amateurs, and we applaud the high level of cooperation between amateurs and professionals.

Lightcurves and period determinations (some as yet very uncertain due to incomplete lightcurve coverage, especially for long period rotators) are published for 100 different asteroids. Some of these are the first ever published for the asteroid; some are improvements from earlier determinations; some are at new aspects to aid in shape modeling, and a few are in support of radar observations. Asteroids included are No. 22, 24, 25, 26, 36, 57, 66, 67, 78, 81, 89, 92, 108, 143, 154, 159, 170, 179, 242, 275, 298, 340, 381, 386, 416, 468, 482, 503, 522, 536, 551, 563, 572, 578, 623, 665, 708, 741, 799, 834, 865, 888, 947, 1046, 1072, 1087, 1094, 1164, 1241, 1301, 1321, 1323, 1348, 1489, 1502, 1602, 1621, 1696, 1790, 2086, 2152, 2328, 2449, 2839, 2910, 3105, 3225, 3258, 3410, 3411, 3497, 3850, 3851, 4374, 4764, 4765, 4898, 5129, 5142, 6263, 6555, 6646, 6870, 7783, 9554, 9873, 12696, 12735, 13006, 16585, 16681, 29337, 30856, 34777, 40250, 66146, 69350, 101549, 138666, 2001BE10.

We remind all users and inquirers that the *Minor Planet Bulletin* is a refereed publi-

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cation and that it is available on line at *http://www.minorplanetobserver.com/mpb/default.htm*.

In addition, please visit the ALPO Minor Planets Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Minor Planets.

Jupiter Section

Report by Richard W. Schmude, Jr., coordinator
schmude@gdn.edu

With Jupiter placed low in the southwestern sky in the late evening (by late September), observing this object is getting more difficult.

The North Temperate Belt is coming back, the equatorial zone has gotten darker during the past year and part of the South Equatorial Belt has also grown faint. Please be sure to continue imaging and drawing Jupiter.

I am planning to finish up the 2004-05 Jupiter apparition report by mid-October and submit it for review and publication. The 2002-2003 Jupiter apparition report is already in the pipeline and is due for publication at any time. Due to a situation beyond my control, I will not be able to post Jupiter images on the ALPO website. However, your images are still requested so that I can continue to produce the reports valuable to all planetary rsearchers.

Online posting will continue shortly.

Visit the ALPO Jupiter Section on the World Wide Web at *http://www.alpo-astronmomy.org*, then Jupiter Section.

Galilean Satellite Eclipse Timing Program

Report by John Westfall, Jupiter Section assistant coordinator

After having basked in uninterrupted sunlight since 2004, Jupiter's outermost Galilean satellite will again dip into Jupiter's shadow as the planet's 2006-7 Apparition ends and the 2007-9 Apparition begins.

Jupiter's equator and (approximately) the Galilean satellites' orbital planes are inclined only about 3° to the planet's orbital plane. Such a small tilt ensures that

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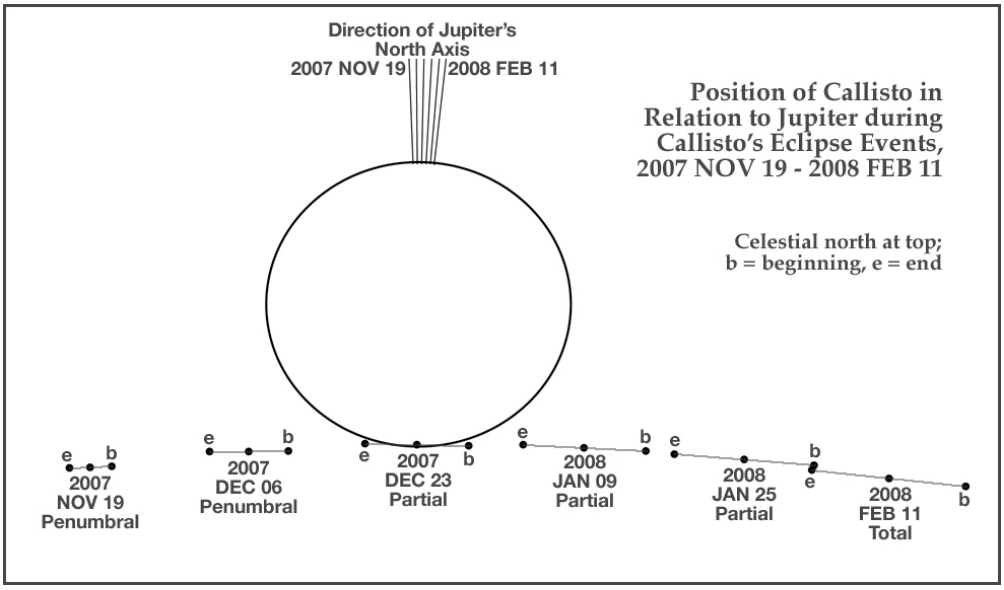
the three inner Galilean moons – Io, Europa and Ganymede – are eclipsed by Jupiter every time they orbit Jupiter.

But every Jovian year, Callisto has two three-year eclipse seasons which are separated by two three-year uneclipsed periods. Callisto also is unique in experiencing penumbral and partial eclipses as it passes from an eclipse-free period to an eclipse period, and then back again.

Thus the satellites' 2007-2011 eclipse season commences with a rather feeble penumbral eclipse on 2007 Nov 19, followed by a deeper penumbral event on Dec 06, then by three partial eclipses (2007 Dec 23 and 2008 Jan 09 and 25), and finally by its first total eclipse on 2008 Feb 11. Details are given in the accompanying table.

Those in tune with Jupiter's motions have by now realized the bad news. Jupiter will be in conjunction with the Sun on 2007 Dec 23 — right in the middle of these interesting penumbral/partial events. Thus, at least three events will be unobservable and the other two will take place low in the evening or morning twilight. (To rub it in, the Dec 23 event will be the epitome of unobservability; Jupiter will be occulted by the Sun during the partial eclipse of Callisto while Callisto itself will be occulted by Jupiter.)



Difficult as these penumbral and partial eclipses of Callisto may be to observe, they signal the beginning of a new eclipse season for the satellite; one that will last until 2010-11, when its partial/penumbral eclipses will be centered on Jupiter's opposition, with all five transitional events observable for those in favorable terrestrial longitudes.

New and potential observers are invited to participate in this worthwhile observing program. Contact John Westfall via regular mail at P.O. Box 2447, Antioch, CA 94531-2447 USA; e-mail to *johnwestfall@comcast.net* to obtain an observer's kit, which includes Galilean satellite eclipse predictions for the 2007-9 apppa-rition.

UT Date	2007			2008		
	NOV 19	DEC 06	DEC 23	JAN 09	JAN 25	FEB 11
Eclipse Type	Penumbral	Penumbral	Partial	Partial	Partial	Total
Penumbral Magnitude	0.134	0.463	0.798	1.147	1.502	1.862
Umbral Magnitude	0.000	0.000	0.104	0.453	0.807	1.167
Penumbral Eclipse Begins	19:56	13:42	07:33	01:27	19:21	13:16
Partial Eclipse Begins	-	-	08:05	01:50	19:40	13:32
Total Eclipse Begins	-	-	-	-	-	14:09
Mid-Eclipse	20:17	14:20	08:23	02:27	20:29	14:31
Total Eclipse Ends	-	-	-	-	-	14:53
Partial Eclipse Ends	-	-	08:41	03:03	21:18	15:30
Penumbral Eclipse Ends	20:37	14:58	09:13	03:26	21:37	15:46
Elongation from Sun	26° Eve	13° Eve	0°	13° Morn	27° Morn	40° Morn

Notes: (i) Eclipse terms (penumbral, partial, total and magnitude) are used as they are with lunar eclipses.
(ii) Callisto will also be occulted by Jupiter from 2007 DEC 23 08:03-08:47
(iii) Data have been computed and compiled based on output from the JPL HORIZONS website.

Saturn Section

Report by Julius Benton, coordinator

The 2006-07 observing season came to a close as Saturn entered conjunction with the Sun on August 21, 2007. Below are some of the highlights of the apparition that will be discussed in detail in a forthcoming apparition report in early 2008 once all observations are collected and analyzed:

- 403 digital images of Saturn have been submitted as of the date of this report
- 125 drawings and intensity estimates of Saturn have arrived
- Several extremely subtle white mottlings were suspected visually in the EZs during the apparition
- A number of small, transient dark features were imaged occasionally in the SEBZ, emanating from the N edge of the SEBs, as well as in the SPR
- Very small white spots were imaged in the STeZ, STrZ, SEBZ, and SPR periodically during the apparition
- Pro-Am collaboration in association with the Cassini Mission continued during 2006-07

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Interest Abbreviations
0 = Sun, 1 = Mercury, 2 = Venus, 3 = Moon, 4 = Mars, 5 = Jupiter, 6 = Saturn, 7 = Uranus, 8 = Neptune, 9 = Pluto, A = Asteroid, C = Comets, D = CCD Imaging, E = Eclipses, H = History, I = Instruments, M = Meteors, O = Meteorites, P = Photography, R = Radio Astronomy, S = Astronomical Software, T = Tutoring

- Incidence of simultaneous observations of Saturn steadily increased this observing season

Saturn will emerge in the East before sunrise during September 2007, and interested parties should begin planning their observing programs right away. To help prepare for the forthcoming apparition, the Geocentric phenomena are presented here in tabular format for the convenience of observers.

The southern hemisphere and south face of the rings will remain visible from Earth during 2007-08. More and more of the northern hemisphere of Saturn will come into view now that the tilt of the rings to our line of sight is only -8.4°, with the next edgewise orientation of the rings of Saturn upcoming on September 9, 2009.

For 2007-08, the following are activities that will be underway by ALPO Saturn observers:

- Visual numerical relative intensity estimates of belts, zones, and ring components
- Full-disc drawings of the globe and rings using standard ALPO observing forms
- Central meridian (CM) transit timings of details in belts and zones on Saturn's globe
- Latitude estimates or filar micrometer measurements of belts and zones on Saturn
- Colorimetry and absolute color estimates of globe and ring features
- Observation of "intensity minima" in the rings plus studies of Cassini's, Encke's, and Keeler's divisions
- Systematic color filter observations of the bicolored aspect of the rings and azimuthal brightness asymmetries around the circumference of Ring A
- Observations of stellar occultations by Saturn's globe and rings
- Visual observations and magnitude estimates of Saturn's satellites
- Multi-color photometry and spectroscopy of Titan at 940nm - 1000nm
- Regular imaging of Saturn and its satellites using webcams, digital and video cameras, and CCDs

Observers are encouraged to perform digital imaging of Saturn at the same time that others are imaging or visually watching Saturn (i.e., simultaneous observations). All observers should compare what can be seen visually with what is apparent on their images, without overlooking opportunities to make visual numerical intensity estimates using techniques as described in the author's new book, "Saturn and How to Observe It", available from Springer, Amazon.com, etc.

The Saturn Pro-Am effort that began back on 2004 Apr 01, when Cassini started observing the planet at close range, is still underway, and observers are encouraged to participate in this effort during the 2007-08 apparition and beyond. Employing classical broadband filters (Johnson UBVRI system) on telescopes with suggested apertures of at least 31.8 cm (12.5 in.), Saturn should be imaged as often as possible, as well as through a 890nm narrow band methane (CH_4) filter. Observers should make note of any features, their motions and morphology, and report such observations promptly. Resulting data serve as input to the Cassini imaging system, thereby suggesting

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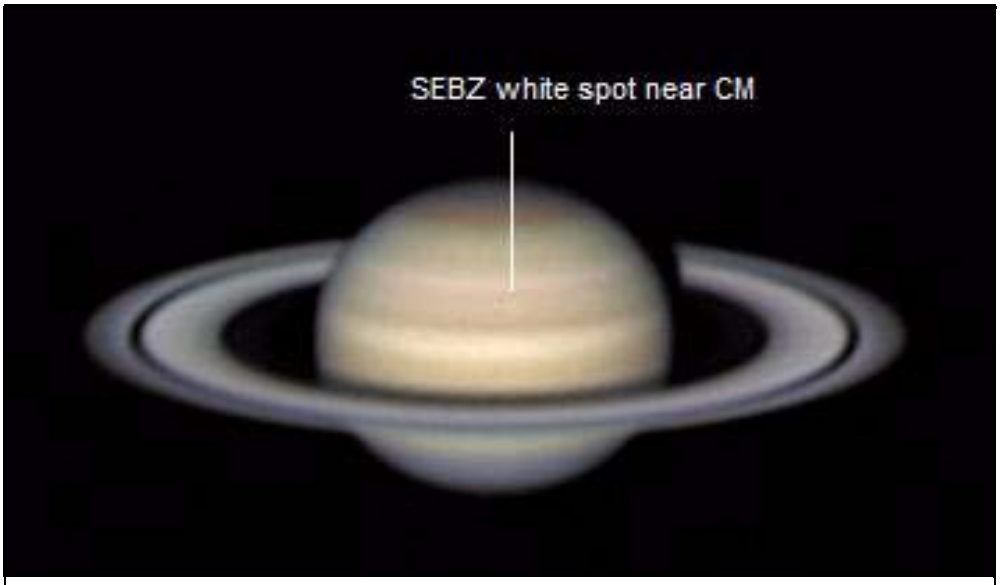
Geocentric Phenomena for the 2007-2008 Apparition of Saturn in Universal Time (UT)	
Conjunction	2007 Aug 21^d
Opposition	2008 Feb 24^d
Conjunction	2008 Sep 4^d
Opposition Data:	
Equatorial Diameter Globe	20.0 arc-seconds
Polar Diameter Globe	17.8 arc-seconds
Major Axis of Rings	45.2 arc-seconds
Minor Axis of Rings	6.6 arc-seconds
Visual Magnitude (m_v)	–0.2m_v (in Leo)
B =	–8.4°

where interesting (large-scale) targets exist. Suspected changes in belt and zone reflectivity (i.e., intensity) and color will be also useful, so visual observers can play a vital role by making careful visual numerical relative intensity estimates in Integrated Light (no filter) and with color filters of known transmission.

The Cassini team will combine ALPO images with data from the Hubble Space Telescope and from other professional ground-based observatories. Observations should be immediately dispatched to the ALPO Saturn Section throughout 2007 and 2008 for immediate dispatch to the Cassini team. Be sure to include all supporting data such as time and date (UT), instrumentation used, observing conditions and location, etc., since without such fundamental information, observations are essentially useless.

The ALPO Saturn Section appreciates the work of so many dedicated observers who continue to submit observations and images, prompting more and more professional astronomers to request drawings, digital images, and supporting data from amateur observers around the globe.



Digital image of Saturn by Paolo Casquinha of Massa, Italy, using a 25.4 cm (10.0 in.) Newtonian on March 17, 2007 at 21:17UT. Captured in the image was a subtle, small white spot in the SEBZ near the CM in reasonable seeing conditions. CMI = 238.6º, CMII = 51.6º, and CM III = 50.9º. The tilt of the rings is -15º. South is at the top in the image.

Information on ALPO Saturn programs, including observing forms and instructions, can be found on the Saturn pages on the official ALPO Website at*http://www.alpo-astronmomy.org*, then Saturn Section.

All are invited to also subscribe to the Saturn e-mail discussion group at *Saturn-ALPO@yahoogroups.com*

Remote Planets Section

Report by Richard W. Schmude, Jr., coordinator
schmude@gdn.edu

Many of you should have received the Remote Planets Newsletter in June. If you haven't received it by now or would like another copy, please send me your e-mail address and I'll forward an electronic copy of the newsletter.

The newsletter contains finder charts for Uranus and Neptune, along with the times of a few transits and satellite events.

Uranus and Neptune are both visible in the eastern sky shortly before sunrise. Uranus will reach equinox in December of this year. Look for a polar flattening and any irregularities in that planet's limb darkening. When sending in drawings and images, be sure to indicate the north, south, east and west directions in your sky.

The 2006-07 Remote Planets apparition report has been completed and submitted for review and publication in this Journal.

Visit the ALPO Remote Planets Section on the World Wide Web at *http://www.alpo-astronmomy.org,* then Remote Planets.

Membership Report

Report by Matthew L. Will, ALPO Secretary/Treasurer

The ALPO wishes to thank those members listed in the tables earlier in the Journal for voluntarily paying higher dues.

The extra income helps in maintaining the quality of this *Journal,* while also helping to keep the overall cost of the *Journal* in check. Thank you!

Inside the ALPO
Member, section and activity news

Introducing Our New Executive Director! (from page 3)

Meteors and meteorites are something I became interested in as a child. I bought my first meteorite as a 3rd grader at Jacksonville (Florida) Children's Museum in 1963 – a small 50-cent Canyon Diablo fragment. My first meteor shower was the 1966 Leonids; not a bad start. And by the way, my first comet was Ikeya-Seki! While pursuing my Ph.D. at the University of Florida, my meteorite research expanded as it still continues today.

As a college professor of astronomy (my "real job" is Associate Dean of Mathematics and Natural Sciences; they just let me teach because the College knows I would be miserable otherwise and those who have known me over the years would agree with that assessment!), I require my students to observe. I know, what a concept! Have college astronomy students put their eye to an eyepiece and look at something. All of you know what objects get the *oh's* and *ah's*.

But we need to learn how to turn these *oh's* and *ah's* into new observers. You've certainly heard the statistics of the "graying" (that is, aging) of today's amateurs, as one of our challenges. As with other organizations, the ALPO has seen a membership drop over the recent years. We always joke that we need a bright comet to help turn things around for us, and there is a lot of truth to that statement. Other events like outstanding Mars oppositions bring in new people, both as amateurs and as ALPO members. So we do have challenges, yet we also have a solid and dedicated ALPO staff to not only meet these challenges but grow ALPO for the future.

This year's ALPO meeting in Calgary was terrific; the Royal Astronomical Society of Canada was a wonderful host for not only ALPO, but the AAVSO. We will not wait another 44 years before we meet with the RASC again! (Our last joint meeting with the RASC was in 1963…) I hope many of you will plan on joining us next July for the ALPO meeting in Des Moines, Iowa, where we will be meeting with the Astronomical League.

Let me take this opportunity to thank Dr. Julius Benton for his leadership as ALPO Executive Director. Julius and I go back many, many years (too many, Julius) and we appreciate his leadership, as we do the entire ALPO Board and Staff.

I have set up an e-mail account specifically for my ALPO correspondence: *alpo-reynolds@comcast.net*. With all of my e-mail volume, this will hopefully allow me to better respond to you. You can also e-mail me at my college e-mail address: *mreynold@fccj.edu*. I get about 100 college e-mails a day (another story of dealing with a few of our whiny college students!) so that's the reason I wanted to establish a new e-mail address specifically for ALPO correspondence. And if you want to correspond with me via snail mail, please us my college address as listed in the *ALPO Resources* section of this Journal. I will always try to respond to your correspondence as quickly as possible.

We do have challenges as an organization beyond building our membership and are working on a number of these issues. But we also have many good things going on: a number of our sections are strong due to our terrific coordinators, our Journal is first class thanks to the efforts of Ken Poshedly and our many JALPO contributors, and the ALPO Board is there to keep us – *me!* – out of trouble.

Please feel to contact me at any time with your ideas, concerns, or issues. I look forward to working with you. And, as always…

Keep Looking Up,

Mike D. Reynolds, Ph.D.
Executive Director
alpo-reynolds@comcast.net

Feature Story: Astronomy Roundup 2007

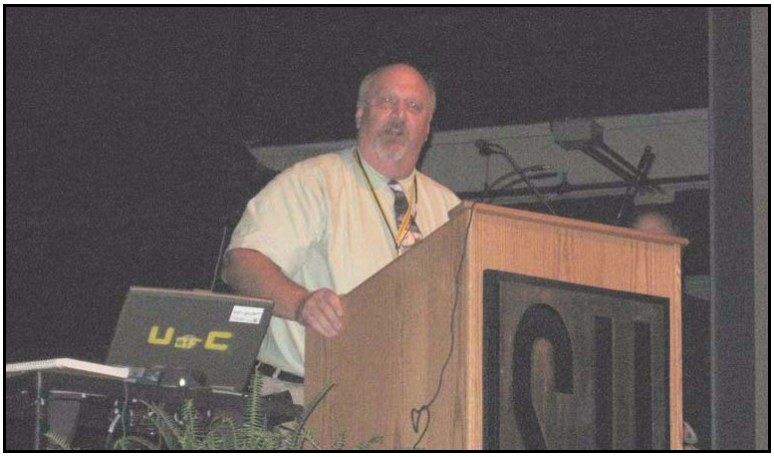
ALPO Board Meeting Minutes, June 29, 2007, Calgary, Alberta, Canada

Minutes provided by Matt Will, ALPO Secretary / Treasurer

(All photos courtesy of Kevin Kell & Kim Hay)

At 7:26 p.m. MDT (Mountain Daylight Time), Associate Executive Director, Michael D. Reynolds called the ALPO Board to order at MacEwan Hall, on the campus of the University of Calgary, in Calgary, Alberta, Canada.

Present were: ALPO Board members, Walter Haas, Sanjay Limaye, Michael Reynolds, Richard Schmude, John Westfall, and Matthew Will. Board members Julius Benton, Don Parker and Ken Poshedly could not attend this year's convention and, therefore, could not attend the board meeting in person. It was the intent of Executive Director and Chairman, Julius Benton to chair this meeting via telephone from his home in Savannah, Georgia. Unfortunately, technical difficulties with the phone system maintained by the University of Calgary prevented Julius or any other Board members not personally attending the meeting from calling in. Mike Reynolds chaired this meeting in Julius' absence. As previously designated, in the event that Julius could not participate in the meeting, Matthew Will was asked to be Julius's proxy on any votes of the Board. Likewise, Richard Schmude acted as Don Parker's proxy.



ALPO Executive Director Dr. Michael Reynolds giving his Saturday Morning (June 30) talk, "Introduction to Meteoritics." (

Finding Venus outside the Rothney Astrophysical Observatory (University of Calgary) just after a thunderstorm had ripped through. This stop of the Thursday evening bus trip included a tour of and talk about the facility, plus an introduction to astronomy.

ISSUE ONE: Approval of the Board Meeting Minutes of 2006 (Introduced by Matthew Will)

Board meeting minutes for our 2006 ALPO Board meeting were approved by all the present Board members.

ISSUE TWO: Location for the ALPO to Convene in 2008 (Introduced by Mike Reynolds)

Mike Reynolds opened discussion concerning the ALPO's prospects for a meeting site next year. Richard Schmude announced to the ALPO Board the Astronomical League's intention to meet in Des Moines, Iowa, in July 2008. Also, Mike Reynolds reported to the Board the League's interest to invite the ALPO to a future Astronomical League convention in the context of resolving problems that have occurred at past conventions that the AL has sponsored. Richard said that Jo Ann Halley of the League would be coordinating the convention in Des Moines and would be our point-of-contact to make arrangements for participation. Mike agreed to talk to Ms. Halley, to express our concerns, and to ascertain the

The Rothney Astrophysical Observatory (University of Calgary) on Thursday night. The building houses the Baker Nunn Telescope (smaller dome) and the 1.8 metre ARCT (A.R.Cross Telescope) one of the three largest telescopes in Canada (larger dome). The inset of the rocks are used as seats for outside talks and lectures.

scheduled dates for this convention. Mike suggested that our concerns could also be better addressed if a Board member were to serve to oversee our needs at the convention. The timing of this convention is important in light of the upcoming August 1, 2008 total solar eclipse that Mike and John Westfall will be observing from Asia. Mike has offered to host the ALPO in a convention of its own, in Jacksonville, Florida, if the dates of the League convention conflict. Since the ALPO board meeting, Mike has learned that the dates for the League's convention are July 17, 18 and 19, 2008. This should not interfere with travel plans for the upcoming eclipse. Mike's offer to host a future ALPO convention is a standing offer that the ALPO may want to accept for a future year. The ALPO has also received an invitation to participate in a convention marking the International Astronomy Year in 2009, to be hosted by the Amateur Observers Society of New York. Many astronomical organizations, including the Astronomical League, have been invited to this gathering. More details about this proposed convention will be provided to the ALPO in the upcoming months.

ISSUE THREE: Membership and Finances (Introduced by Matthew Will)

The ALPO Secretary and Treasurer Matthew Will, reported to the ALPO Board the ALPO's finances and filing activities to governmental agencies in an annual report submitted to the Board in February of this year and an interim report concerning this year's activities issued this past June. The ALPO has $4127.04 in the Springfield account and $3012.15 in the Las Cruces account, as of June 9, 2007. The current value of the ALPO Endowment is $22,359.78 as of May 31, 2007.

The ALPO is basically "breaking even" with its finances currently. Increases in postage cost along with increases in printing cost through the expanded size in the page count of some issues of the Journal could force the ALPO to raise its member-

The ultralight, ultracompact scope with aluminium construction Genstar 10-inch Travel Scope Homemade Telescope, designed and manufactured by Dwight Hansen (shown here), a member of the Edmonton Centre-RASC. There are two varieties of Genstar scopes, one with regular optics and one with Barry Arnold mirrors (the latter a bit more expensive but worth the cost).

ship rate in the near future. The ALPO Secretary recommended that the Board take a "wait-and-see" approach before making a final decision which could come as early as this fall.

Currently the ALPO has 425 members. This contraction in ALPO membership as compared to last year's 486 was probably due to the temporary loss of online purchasing of memberships because of the closing of the Astronomical League's online store. Since mid-May 2007, the ALPO has resumed this service through Galileo Telescopes. Galileo is providing this service for us and we are already receiving positive benefits from it, with many renewals from past expired members streaming in. The ALPO will resume its presence on the Astronomical League's online store when this service is up and running again. The Astronomical League's web site is highly trafficked among amateurs who are web surfers, and this could lead to more purchases of ALPO memberships from first-time members. [NOTE: The Astronomical League's online store is now back up and running.] The ALPO will maintain its presence on the Galileo Telescopes web site for purchases of ALPO memberships and encourage persons wanting to make purchases for memberships to go directly to this site since this would still be the quickest way to renew or start a membership.

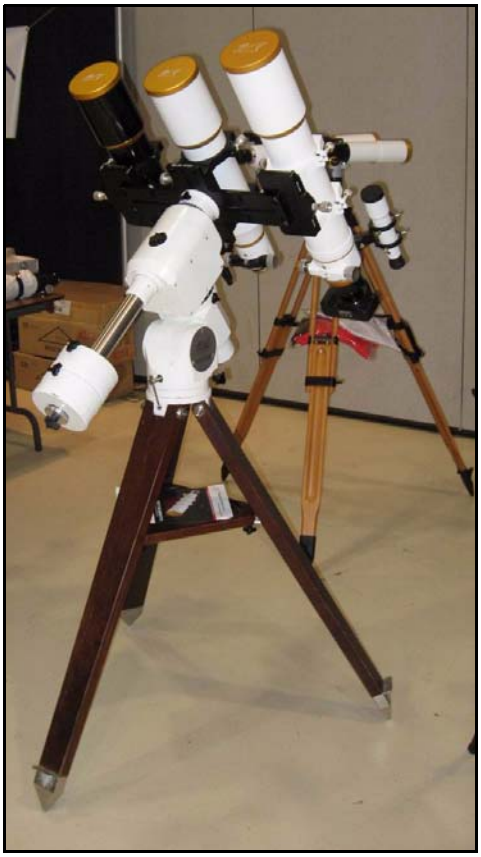
ISSUE FOUR: Archiving ALPO Observations and the Future of a Permanent ALPO Central Headquarters (General Board Discussion)

The issue of an organized central headquarters came up for general discussion. Matthew Will reported on continued yet slow work on organizing a working plan for developing this idea. The purpose for a central headquarters would be primarily to maintain archival data of ALPO observations to protect and share these data for future interested researchers. Another use of a central headquarters would be to maintain collections of astronomical books, papers, and other historical documents worth preserving that may have been maintained by deceased ALPO members who wish their collections to remain intact. The ALPO has had some legitimate offers for maintaining observational records at a physical site, recently. Cost and circumstances do not permit the ALPO to act on these offers at the present time.

Speaking to the issue of archiving observations, Sanjay Limaye expressed concern about immediate needs for archiving data, primarily Venus and Jupiter observations, since these are two current areas of interest among professionals seeking out amateur observational data. Sanjay suggested that some sort of joint effort be established between the ALPO and other entities in producing archival access to ALPO observational data. It could be a low-cost way for the ALPO to maintain data at an isolated physical site with another party maintaining the physical property at which the data would be preserved.

Sanjay made two proposals. The first involved a possible arrangement with current management of the Yerkes Observatory properties. With the sale of the observatory and surrounding land formerly owned by the University of Chicago, the observatories and office space of Yerkes are now in the planning stages of being maintained as an educational outreach institution. The Milwaukee Astronomical Society is involved with this effort to promote the educational aspects of the science of astronomy for primary and secondary school students, as well as the general public. Of course, the Yerkes site, which is being vacated by the University of Chicago, may have ample office space available to meet our needs for electronic archiving of ALPO observations as well as archiving of other hard-copy materials. Sanjay directed Matthew Will to the contacts involved in organizing and maintaining the Yerkes project.

ALPO founder and Executive Director Emeritus Walter Haas, and ALPO Membership Secretary / Treasurer Matt Will tidying up the ALPO display in the Common Room.



Doublet & triplet apochromatics by William Optics on display with Vixen-style mounting plate and one big mount; http://www.williamoptics.com for more info.

Sanjay also suggested as an alternative, that the ALPO might want to consider occupying office space at a facility maintained by the University of Wisconsin, and other Madison area educational institutions. Sanjay said that this former shopping mall located off-site from the University currently has open space available for rent.

Matthew Will responded that while these two situations represented opportunities for the ALPO to fulfill at least part of its overall goal for a centralized headquarters, funding and a working business plan for doing this would have to be worked out. Matthew will follow up on the Yerkes prospect first with the contacts that Sanjay has kindly provided.

ISSUE FIVE: ALPO Collections (Introduced by John Westfall)

John Westfall announced that he had in his possession ALPO materials that have been in storage for sometime on the campus of San Francisco State University. Since John is no longer teaching at the University, his former employer wants these materials removed. These items in storage include imaging of the Moon from the Lunar Orbiter and Apollo missions, USGS materials related to the Moon, photographic prints and plates from Catalina Observatory, extra copies of ALPO Journal, and so on. These materials have some value and are deserving of being saved. John wants to find some way of storing this collection at a different site. Currently, there is no room in his home to store these materials which would surpass the floor space of an ordinary garage. John estimates that available storage space in the San Francisco area to store such material would cost about $44 per month. John is willing to finance half the cost of storage for the collection if the ALPO would be willing to pay for the other half. Matthew Will commented that the amount of financing half of the storage cost is minimal enough to be accommodated into the ALPO's budget. Mike Reynolds offered to reimburse the ALPO for this expense for the first year of storage. The Board approved this arrangement.

ISSUE SIX: Officer and Staff Changes (Introduced by Mike Reynolds)

The current arrangement for leadership in the ALPO is to have the position of ALPO Executive Director rotated among the ALPO Board members in alphabetical order. Julius Benton's two-year term as Executive Director will expire at the end of the Calgary convention. Mike Reynolds has agreed to represent the ALPO as its Executive Director for the next two years and Richard Schmude will become Associate Executive Director over this same term. Matthew Will will continue on as the ALPO's Secretary and Treasurer.

Staff that were identified as acting in their positions will remain acting for the present time. No new staff positions or sections were provisionally created during this meeting.

ISSUE SEVEN: Disbanding the Instruments Section (Proposed by Ken Poshedly)

The Instruments Section has experienced inactivity in recent years. Currently, some follow up inquiries come from articles written by R. B. Minton, but usually none materialize or sustain any interest about instrumentation. Likewise, both R. B. Minton and Richard Wessling have offered services for optical testing for telescopes and instrumentation, however, these offers for services have had little or no response from the ALPO membership. Ken Poshedly has proposed that the Instruments Section be terminated due to such inactivity.

In discussions between Board members, it was pointed our that successful and active sections have had the component of electronic communications using such tools as e-mail, e-mail alerts, web sites, ftp capabilities, etc., where access and participation in section issues is easy, immediate, and facilitates quick actions. Currently, 76 of the 425 ALPO members have indicated an interest in instrumentation issues when they join or renew their membership, using the interest codes on the application/renewal form. So, there is membership interest in instrumentation topics, among ALPO members.

Since the ALPO Board sees unlocking interest in instrumentation with the members through internet communications, a coordinator with those capabilities is badly needed. The Board has decided that this can best be appropriated through a coordinator capable of utilizing those resources. Mike Reynolds agreed to assume control of the Instruments Section and guide it toward becoming a more interactive section. The Board is appreciative of R. B. Minton's contributions to the Journal over the years and his insightful papers on telescopes and their instrumentation. It is hoped that taking the Instruments Section to the next level will generate interest in this topic as it relates to lunar and planetary astronomy.

John Westfall made the following motion. R. B. Minton should be retired as Instruments Section Coordinator and Michael Reynolds be instated as the coordinator of this section. Matthew Will seconded the motion. All Board members voted yes, including two proxy votes from two absent Board members.

With no further business to conduct, the ALPO Board meeting was adjourned at 9:51 p.m. MDT.

Feature Story:

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By Michael Mattei
E-mail: *micmattei@comcast.net*

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Book Review

Saturn and How to Observe It

Review by Robert A. Garfinkle, FRAS,
acting book review editor
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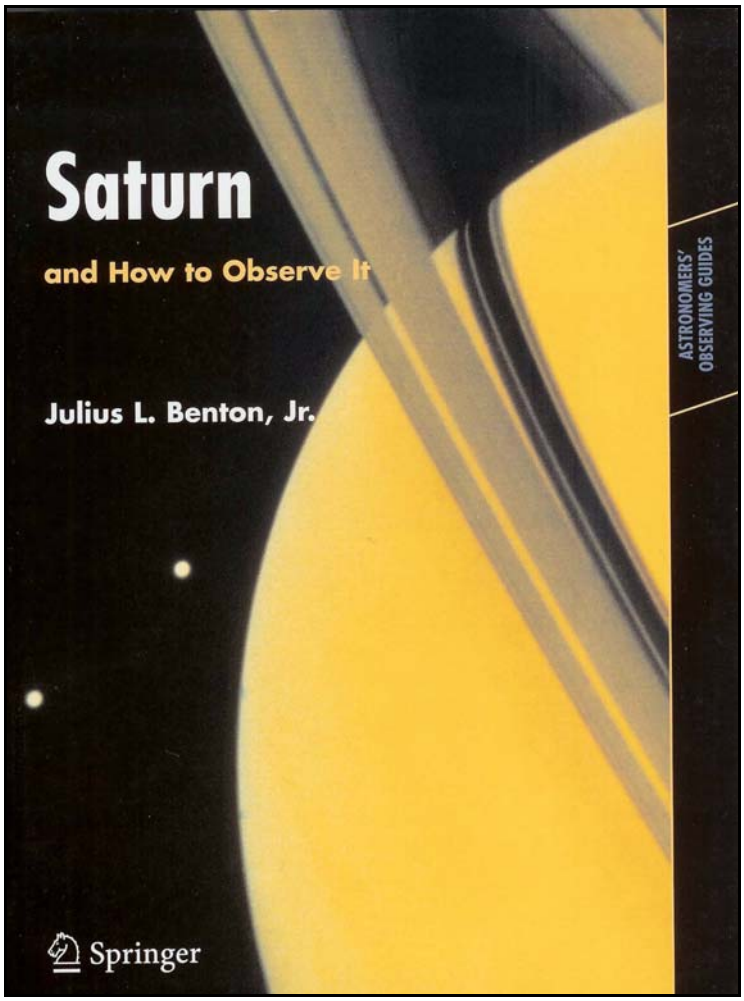
Saturn and How to Observe It by Julius L. Benton, Jr., FRAS. Softcover, 182 pages, published by Springer, 2005. English, ISBN: 978-1-85233-887-9. Retail, $29.95

Dr. Julius Benton has written a fascinating book both for those observers who like to study Saturn and for those who have looked, but not studied the second largest planet in our solar system. Benton has been a Saturn observer for over four decades and has served as the ALPO Saturn Section coordinator a number of times since 1971.

The author opens the book by explaining both the general data about Saturn, such as its size and orbit, and detailed information on the chemical make-up of its atmosphere, and its various belts, zones, and rings. The book includes 96 images, most of which are of the planet, some of the images are of astronomical instruments or accessories. Images of the planet were taken by spacecraft and by Earth-based observers. The book includes dozens of eyepiece drawings. The color images are spectacular. Benton spends 12 pages just on the basics of the rings followed by 17 pages on its satellites!

If you do not own a telescope or are looking to upgrade, chapter 2 is for you. This chapter covers the best types of telescope to use in observing Saturn and the accessories to go along with the telescope. One section states in clear and easy-to-understand explanations simple mathematical formulas for determining magnification, exit pupil, focal length, etc, of your optical instrument. This chapter should be read and understood by anyone looking for an optical instrument or accessories to purchase to use in making detailed studies of Saturn. The chapter includes a table of color filters giving you information on which color to use for enhancing your views of the different features on Saturn and the rings.

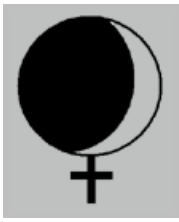
Chapter 4 is the heart of this book. This is where you begin to observe the planet. Benton gives details on what to look for in each belt and zone, from the South Polar Region (SPR) northward to the North Polar Region (NPR). He tells you what color each belt section (zones) is, how or when these colors may vary, and what to look for in each belt and zone. When you are finished looking at the belts, here comes detailed information on each of the rings. Benton even covers how to observe and record an occultation of Saturn by our own Moon, then the why's and how- to's of making eyepiece drawings of the planet and its rings.



The last four chapters are for the more serious and technically inclined Saturn observers. Benton goes over the methods of doing visual photometry. He stresses the importance of making estimates of the relative intensity of the different belts, zones, and ring components as a way of assisting in the evaluation of seasonal changes in the atmosphere or other Saturn phenomenon over time. He also discusses using a CCD camera or webcam in additional to visual estimates. Another important set of observations that will help in determining the real nature of Saturn is for observers to determine the precise latitude of the belts and zones and to measure any fluctuations in the width or latitude of these cloud features over time. The last chapter covers the latest in imaging technology, with Benton giving tips on how to improve your imaging of Saturn.

I myself am a casual observer of Saturn — or should I say I *was* a casual observer. When not observing the deep sky, I am a lunar and solar observer. This book has aimed lots of bright lights on Saturn. I now want to spend more time studying the Saturnian system, looking for all of the many features that Benton has introduced to me.

If there is a flaw to this book, it is that I wanted more when I got to the last page. I highly recommend this book to both novice and experienced students of this yellowish gas giant. You will not be disappointed.



Feature Story: Venus

ALPO Observations of Venus During the 2003 - 2004 Eastern (Evening) Apparition

By Julius L. Benton, Jr., coordinator, ALPO Venus Section
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An ALPO Venus Section Observing Report Form is located at the end of this report.

Abstract

Twenty-five observers from Germany, Italy, France, Japan, Puerto Rico, the Netherlands, Mexico, the United Kingdom, Canada, and the United States submitted images and visual observations to the ALPO Venus Section during the 2003-04 Eastern (Evening) Apparition. This report summarizes the results of those observations. Types of telescopes and accessories used in making the observations, as well as data sources, are discussed. Comparative studies take into account observers, instruments, and visual and photographic results.

The report includes illustrations and a statistical analysis of the long-established categories of features in the atmosphere of Venus, including cusps, cusp-caps, and cusp-bands, seen or suspected at visual wavelengths in integrated light and with color filters, as well as images captured at visible, ultraviolet (UV) and infrared (IR) wavelengths. Terminator irregularities and the apparent phase are discussed, as well as coverage based on results from continued monitoring of the dark hemisphere of Venus for the enigmatic Ashen Light, including a report on the historically-significant first successful imaging of the dark side of Venus in the near-IR by an amateur astronomer.

The rare transit of Venus that occurred on June 8, 2004 is cited in the report, with references for further coverage of the remarkable event.

Introduction

The Venus Section of the ALPO received a combination of 340 drawings and images of the planet made using webcams or CCD cameras throughout the 2003-04 Eastern (Evening) Apparition from 25 contributors in Germany, Italy, France, Japan, Puerto Rico, the Netherlands, Mexico, the United Kingdom, Canada, and the United States. Geocentric phenomena in Universal Time (UT) for this observing season are given in *Table 1*, while *Figure 1* shows the distribution of observations by month during the apparition. *Table 2* gives the location where observations were made, the number of observations submitted, and the telescopes employed.

Observational coverage of Venus throughout this apparition was extremely good. A handful of individuals began viewing the planet 26 days after Superior Conjunction (which occurred on 2003 August 18), while others joined the fold by late December, and the majority of observers then continued their observational work to within two days prior to Inferior Conjunction on 2004 June 8.

Terminology: Western vs Eastern

"Eastern" apparitions are those when that planet is **east of the Sun,** as seen in our sky after sunset.

"Western" apparitions are those when an "inferior" planet (Mercury or Venus, whose orbits lie inside the Earth's orbit around the Sun) is **west of the Sun**, as seen in our morning sky before sunrise.

All Readers

Your comments, questions, etc., about this report are appreciated. Please send them to: *poshedly@bellsouth.net* for publication in the next Journal.

Online Features

Left-click your mouse on:

- The author's e-mail address in blue text to contact the author of this article.
- The references in blue text to jump to source material or information about that source material (Internet connection must be ON).

Observing Scales

Standard ALPO Scale of Intensity:
- 0.0 = Completely black
- 10.0 = Very brightest features
- Intermediate values are assigned along the scale to account for observed intensity of features

ALPO Scale of Seeing Conditions:
- 0 = Worst
- 10 = Perfect

Scale of Transparency Conditions:
- Observable, allowing for daylight or twilight

IAU directions are used in all instances.

Those observers who were fortunate in having cooperative weather witnessed the spectacular transit of Venus on 2004 June 8, a rare event that had not previously been seen by anyone alive today. Results of the Venus transit have appeared previously in this Journal, although an image of the event accompanies the illustrations in this report.

Adopting the practice of making reliable systematic observations of Venus from conjunction to conjunction cannot be stressed enough, and the ALPO Venus Section has been fortunate to have enlisted a team of dedicated, persistent observers who have done just that in recent years. An apparition of Venus is defined as the entire period between successive conjunctions (in this case 295 days, while the "observing season" (actual period of observations) ranged from 2003 September 13 to 2004 June 6 (267 days or a full 90.5 percent of the apparition), with 86.8 percent of the observations occurring during 2004 February through May. During the observing season Venus passed through maximum elongation from the Sun (46°.0), dichotomy (half-phase), and greatest brilliancy (-4.5 m_v).

Figure 2 shows graphically the distribution of observers and contributed observations by nation of origin for the 2003-04 Eastern (Evening) Apparition of Venus. Three-fifths (60.0 percent) of the participants in the ALPO Venus observing programs were located in the United States, accounting for a roughly similar share (61.5 percent) of the total observations. Strong international cooperation occurred during this observing season, and the ALPO Venus Section continues to stress development of even wider global cooperation for the future.

Table 1: Geocentric Phenomena in Universal Time (UT) for the 2003-04 Eastern (Evening) Apparition of Venus

Superior Conjunction	2003 Aug 18^d 18^h UT
Initial Observation	Sep 13 13.83
Greatest Elongation East	2004 Mar 29 17 (46.0°)
Dichotomy (predicted)	Mar 31 15.34
Greatest Brilliancy	May 02 08 (m_v = –4.5)
Final Observation	June 06 17.60
Inferior Conjunction	June 08 09
Apparent Diameter (observed range):	9".84 (2003 Sep 13) ↔ 58 (2004 Jun 06)
Phase Coefficient, ***k*** (observed range):	0.999 (2003 Sep 13) ↔ 0.001 (2004 Jun 06)

The types of telescopes used to observe Venus are graphed in *Figure 3*. About three-fourths (75.6 percent) of all observations were made with telescopes ≥ 15.2 cm (6.0 in) in aperture. For the 2003-2004 Apparition, the frequency of use of classical designs (refractors and Newtonians) was 34.4 percent, while the utilization of catadioptrics (Schmidt-Cassegrains and Maksutovs) was 65.6 percent, a fairly dramatic shift to compound optics since the last several apparitions. This variation is most likely a result of the ease of attaching webcams and CCDs to rather compact catadioptrics. The vast majority of visual and digital observations (99.7 percent) were performed under twilight or daylight conditions, since more experienced Venus

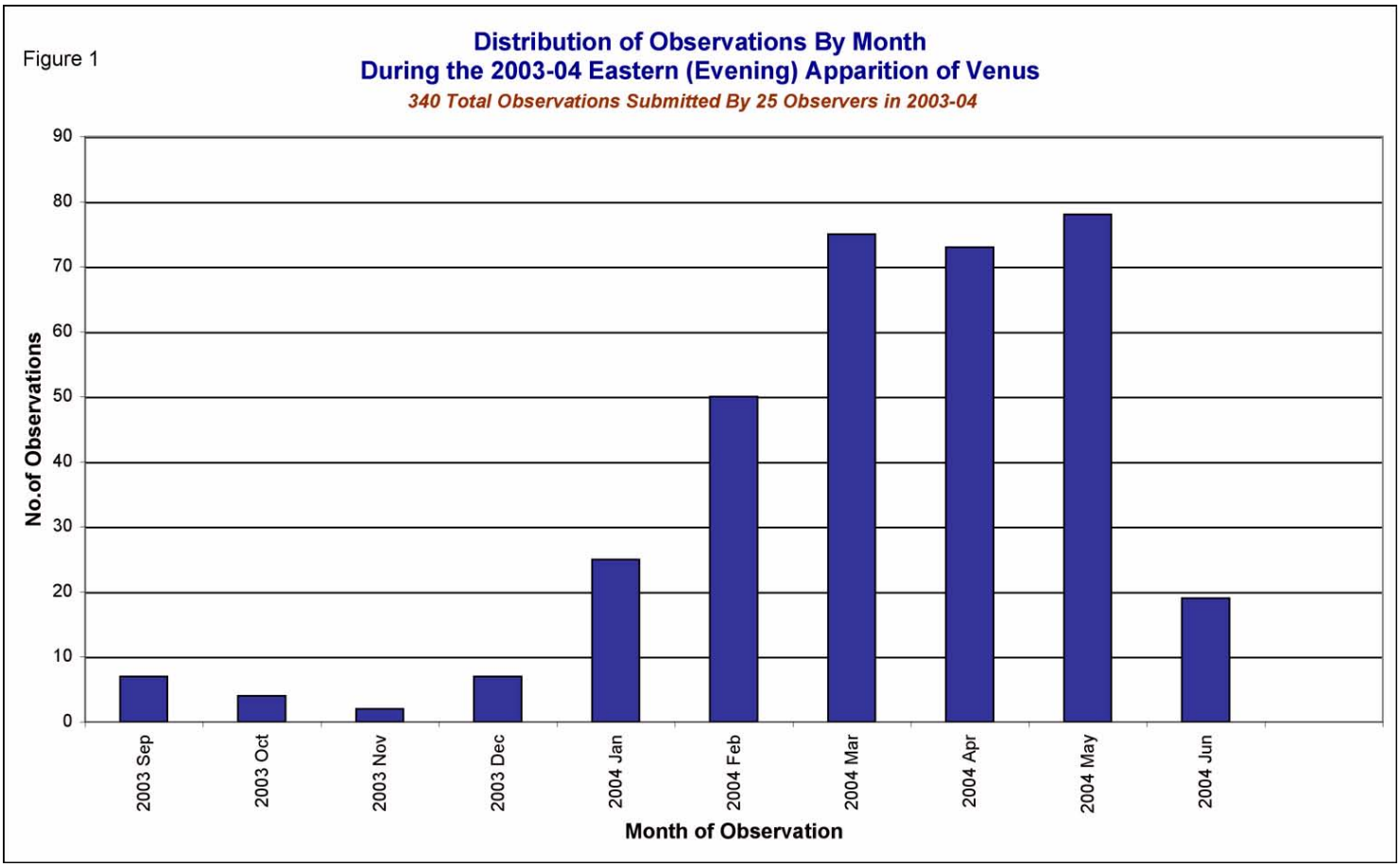


Table 2: ALPO Observing Participants in the 2003-04 Eastern (Evening) Apparition

Observer & Observing Site	Number of Observations	Telescope(s) Used*
Amato, Michael; West Haven, CT	1 2	9.0-cm (3.5-in) REF 20.3-cm (8.0-in) NEW
Benton, Julius L.; Wilmington Island, GA	58	12.7-cm (5.0-in) MAK
Boisclair, Norman J.; South Glens Falls, NY	6 4	9.0-cm (3.5-in) MAK 50.8-cm (20.0-in) NEW
Boyar, Dan; Boynton Beach, FL	2 2	7.5-cm (3.0-in) REF 9.8-cm (3.9-in) NEW
Calia, C. Laird; Ridgefield, CT	1 2	12.7-cm (5.0-in) REF 12.7-cm (5.0-in) MAK
Cudnik, Brian; Houston, TX	7 1	25.4-cm (10.0-in) NEW 31.8-cm (12.5-in) NEW
del Valle, Daniel; San Juan, Puerto Rico	2	20.3-cm. (8.0-in) SCT
Haas, Walter H.; Las Cruces, NM	1 29 6	15.2-cm (6.0-in) NEW 20.3-cm (8.0-in) NEW 31.8-cm (12.5-in) NEW
Hatton, Jason P.; Mill Valley, CA	27	23.5-cm (9.25-in) SCT
Ikemura, Toshihiko; Osaka, Japan	14	31.0-cm (12.2-in) NEW
Lazzarotti, Paolo; Massa, Italy	2 1	13.0-cm (5.1-in) REF 25.4-cm (10.0-in) NEW
Legault, Thierry; Elancourt, France	1	10.6-cm (4.2-in) REF
Melillo, Frank J.; Holtsville, NY	23	20.3-cm (8.0-in) SCT
Minton, R.B.; Raton, NM	8	20.3-cm (8.0-in) NEW
Niechoy, Detlev; Göttingen, Germany	3 73	15.2-cm (6.0-in) REF 20.3-cm (8.0-in) SCT
Peach, Damian; Norfolk, UK	1	23.5-cm (9.25-in) SCT
Pellier, Christophe; Bruz, France	2 23	18.0-cm (7.1-in) NEW 35.6-cm (14.0-in) SCT
Post, Cecil; Las Cruces, NM	7 6	15.2-cm (6.0-in) NEW 20.3-cm (8.0-in) NEW
Pujic, Zac; Cambridge, MA	5	25.4-cm (10.0-in) REF
Roel, Eric; Valle de Bravo, Mexico	1	25.4-cm (10.0-in) MAK
Roussell, Carl; Hamilton, Ontario, Canada	7	15.2-cm (6.0-in) REF
Tatum, Randy; Richmond, VA	2	30.5-cm (12.0-in) SCT
Vandebergh, Ralf; Maastricht, Netherlands	1	15.2-cm (6.0-in) REF
Venable, Roger; Wrens, GA	5	12.5-cm (4.9-in) SCT
Williamson, Thomas E.; Albuquerque, NM	4	20.3-cm (8.0-in) NEW
Total Number of Observers	**25**	
Total Number of Observations	**340**	

* MAK = Maksutov, NEW = Newtonian, REF = Refractor, SCT = Schmidt-Cassegrain

observers have learned that viewing the planet during twilight or in full daylight diminishes the excessive glare associated with the planet. Also, viewing or imaging Venus when it is higher in the sky substantially reduces detrimental effects of atmospheric dispersion and image distortion so prevalent near the horizon.

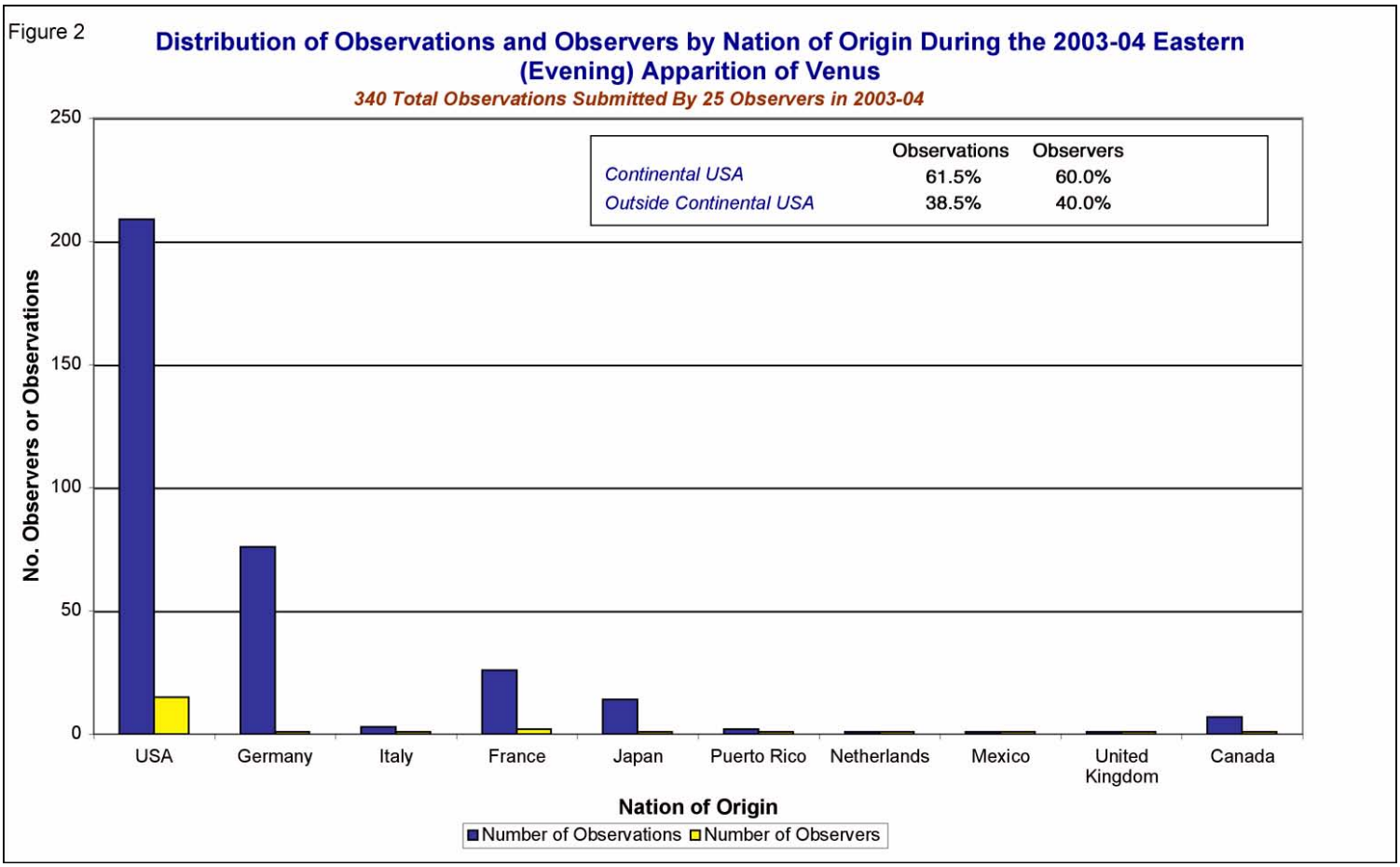
The author extends his deepest gratitude to the 25 observers who made this report possible by contributing a fine series of drawings, CCD and webcam images, as well as descriptive reports, of Venus in 2003-04. We encourage those readers who wish to study Venus in coming apparitions to join the ALPO and become routine contributors to our observational efforts. Venus is, of course, always a bright object that is easy to find, and around the dates of greatest elongation from the Sun, the planet can be as much as 15 times brighter than Sirius and can even cast shadows when seen from a dark, Moonless observing site. Getting started in the Venus Section programs requires only minimal aperture, ranging from 7.5 cm (3.0 in.) for refractors to 15.2 cm (6.0 in.) for reflectors.

Observations of Atmospheric Details on Venus

The techniques and methodology for performing visual studies of the notoriously faint, elusive "markings" in the atmosphere of Venus are described in considerable detail in *The Venus Handbook*, available from the ALPO Venus Section in printed or pdf format. Readers who maintain a library of earlier issues of this Journal may also find it useful to consult previous apparition reports for a good historical account of ALPO studies of Venus.

The majority of the drawings and a considerable number of images used for this analytical report were made at visible wavelengths, but an increasing number of observers are regularly imaging Venus in infrared (IR) and ultraviolet (UV) light. Some examples of submitted drawings and images supplement this report to help readers interpret the level and types of atmospheric activity reported on Venus this apparition.

Represented in the photo-visual data for this apparition were all of the long-established categories of dusky and bright markings in the atmosphere of Venus, including a small fraction of radial dusky features, as described in the literature cited earlier in this report. *Figure 4* shows the frequency of identifiable forms of markings seen or suspected on Venus. Most observations referenced more than



one category of marking or feature, so totals exceeding 100 percent are not unusual. There is no question that a certain level of subjectivity is inevitable when visual observers try to describe, or accurately depict on drawings, the variety of highly elusive atmospheric features on Venus, and this natural bias surely affected some of the data in *Figure 4*. Nevertheless we believe that the conclusions discussed in this report are at the very least reasonable.

The dusky markings of Venus' atmosphere are always very troublesome to perceive by normal visual observing methods, and this well-known characteristic of the planet is largely independent of the experience of the observer. Yet, when one employs color filters and variable-density polarizers, one's views of cloud phenomena on Venus at visible wavelengths may be measurably improved. In combination with routine visual work, the ALPO Venus Section continually encourages observers to try CCD imaging of Venus at UV and IR wavelengths, and with every apparition that passes, more and more individuals are getting into such work. Indeed, the morphology of features captured at UV and IR wavelengths is often quite different from what is seen in the visible region of the spectrum, particularly atmospheric radial dusky patterns (in the UV) and the appearance of the dark hemisphere (in IR). Yet, similarities do occasionally occur between images taken at UV wavelengths and visible-light images or drawings made with blue or violet Wratten filters. The more observations at different wavelengths that we receive during an observing season, the more interesting should be the comparisons of what can or cannot be seen or imaged in visible light versus what CCD or webcam images at various wavelengths reveal.

Figure 4 illustrates that in 32.6 percent of the observations contributed this apparition the dazzlingly bright disc of Venus was considered to be totally devoid of

Table 3: Observed vs. Predicted Dichotomy of Venus: 2003-04 Eastern (Evening) Apparition

Quantity	Observer					
	R. Venable		C. Roussell		J. Benton	
	UT Date	k (Pred.)	UT Date	k (Pred.)	UT Date	k (Pred.)
Observed (O)	2004 Mar 25.06	0.536	2004 Mar 29.04	0.514	2004 Mar 26.05	0.531
Predicted (P)	2004 Mar 31.64	0.500	2004 Mar 31.64	0.500	2004 Mar 31.64	0.500
Difference (O-P)	-06.58d	+0.036	-02.60d	+0.014	-05.59d	+0.031

atmospheric features. When dusky features were seen or suspected on the disc of Venus, the highest percentage was "Amorphous Dusky Markings" (62.1 percent), followed by "Banded Dusky Markings" (36.2 percent), and "Irregular Dusky Markings" (14.2 percent). Although many more UV images were submitted this observing season than previously, the incidence of "Radial Dusky Markings" was essentially negligible (0.7 percent).

Terminator shading was reported in 82.6 percent of the observations, as shown in *Figure 4*. Terminator shading normally extended from one cusp of Venus to the other, and the dusky shading was progressively lighter in tone (higher intensity) from the region of the terminator toward the bright planetary limb. Many observers described this upward gradation in brightness as ending in the Bright Limb Band. Several images at visible wavelengths showed terminator shading, but it was most obvious on many UV images.

The mean numerical relative intensity for all of the dusky features on Venus this apparition ranged from 8.5 to 8.8, expressed on the standard ALPO Relative Intensity Scale (which ranges from 0.0 for completely black shadow to 10.0 for the brightest possible features). The ALPO Scale of Conspicuousness (a numerical sequence from 0.0 for "definitely not seen" up to 10.0 for "definitely seen") was also used regularly, and the dusky markings in *Figure 4* had a mean conspicuousness of ~3.0 throughout the apparition, suggesting that the atmospheric features on Venus were within the range between very indistinct impressions to fairly strong indications of their actual presence.

Figure 4 also shows that "Bright Spots or Regions," exclusive of the cusps, were seen or suspected in only 22.0 percent of the submitted observations. It is standard practice for observers to denote such bright areas on drawings by using dotted lines to surround them, as in *Figure 7*.

Observers regularly used color-filter techniques when viewing Venus, and when results were compared with studies in integrated light (unfiltered), it was evident that color filters and variable-density polarizers improved the visibility of otherwise indefinite atmospheric markings on Venus.

The Bright Limb Band

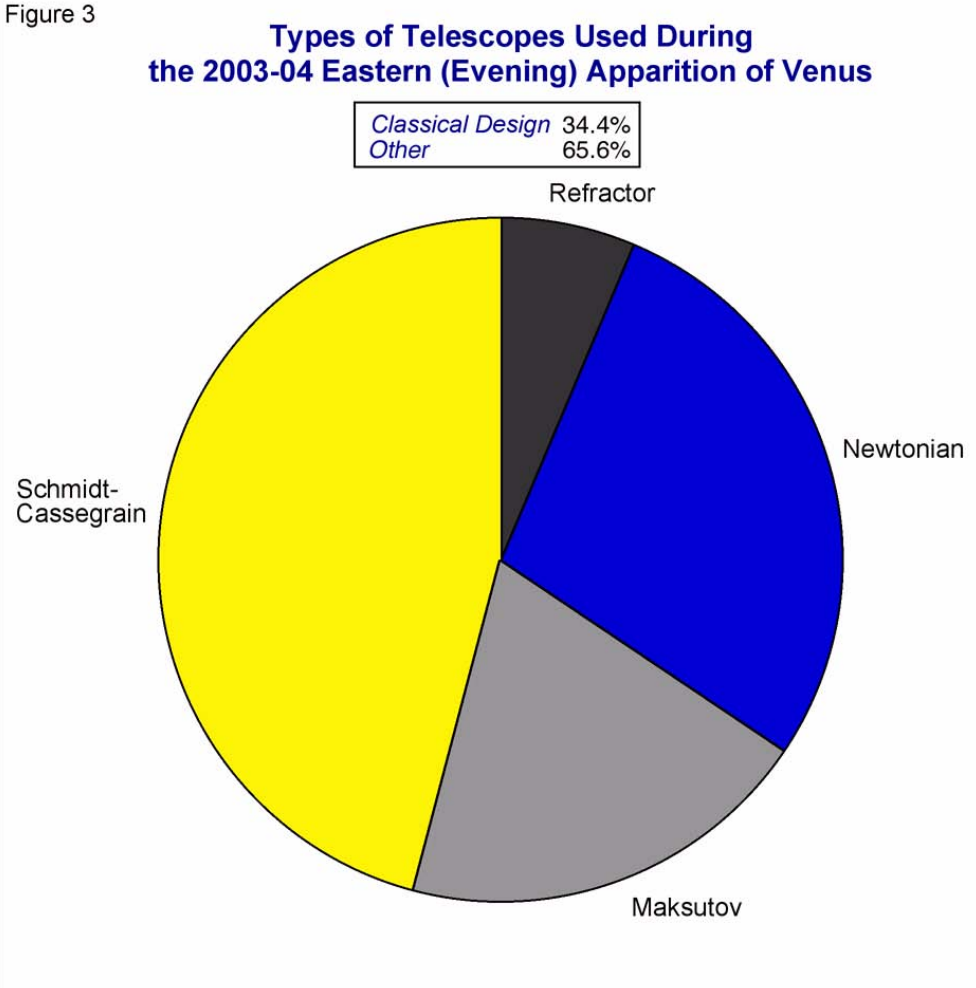
Figure 4 illustrates that nearly two-thirds of the submitted observations (64.2 percent) this apparition referred to a very conspicuous "Bright Limb Band" on the illuminated hemisphere of Venus. This impression is consistent with many previous viewing seasons, the most recent exception being the 2002 Eastern (Evening) Apparition. When the Bright Limb Band was reported, it appeared as a continuous, brilliant arc running from cusp to cusp 48.3 percent of the time, and interrupted or only marginally visible along the limb of Venus in 51.7 percent of the positive reports.

Note that the Bright Limb Band was more likely to be incomplete in UV images than in images captured in the visible spectrum as well as in submitted drawings. The mean numerical intensity of the Bright Limb Band was 9.8, and apparently it was slightly more obvious when color filters or variable-density polarizers were used. This very bright feature, usually reported by visual observers this apparition, was also seen on a fairly large number of webcam and CCD images.

Terminator Irregularities

The terminator refers to the geometric curve that separates the bright sunlit and dark hemispheres of Venus. A deformed or asymmetric terminator was reported in about 39.3 percent of the observations. Amorphous, banded, and irregular dusky atmospheric markings often seemed to merge with the terminator shading, possibly contributing to some of the reported incidences of irregularities. Filter techniques usually improved the visibility of terminator asymmetries and associated dusky atmospheric features. Because of irradiation effects, bright features adjacent to the terminator can sometimes falsely take the form of bulges into the dark hemisphere, while darker markings may appear as wispy hollows.

Figure 3



Cusps, Cusp-Caps, and Cusp-Bands

When the Venusian *phase coefficient*, **k**, is between 0.1 and 0.8 (the phase coefficient is the fraction of the disc that is illuminated), atmospheric features on Venus with the greatest contrast and overall prominence are consistently sighted at or near the planet's cusps, bordered sometimes by dusky cusp-bands. *Figure 5* shows the visibility statistics for Venusian cusp features for this apparition.

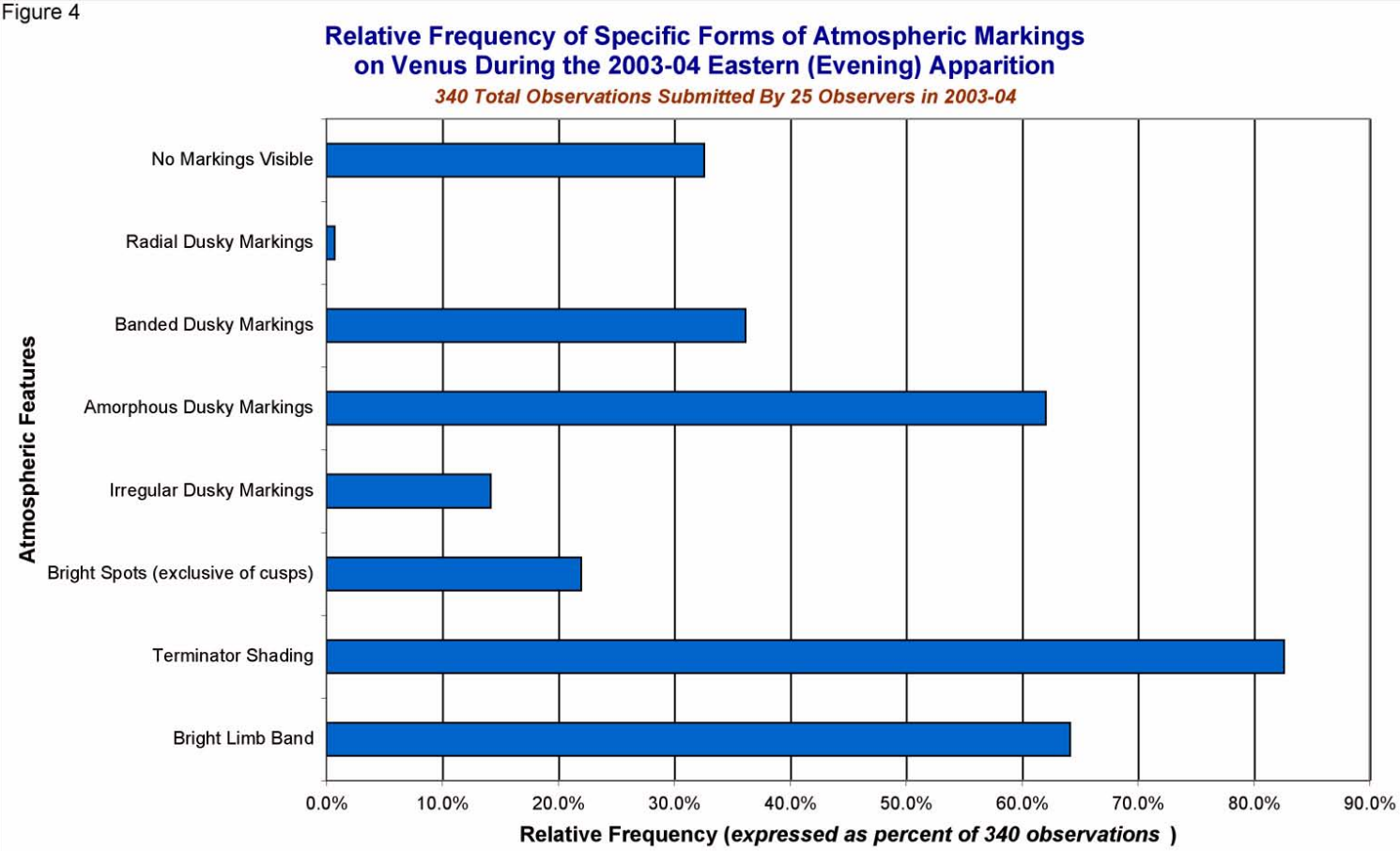
When the northern and southern cusp-caps of Venus were reported this observing season, these features were equal in size the majority (86.4 percent) of the time and in brightness in 75.7 percent of the observations. Also, there were several instances when one of the cusp-caps was larger and brighter than the other. Neither cusp-cap was visible in 61.3 percent of the observational reports. The mean relative intensity of the cusp-caps was about 9.8 during the observing season.

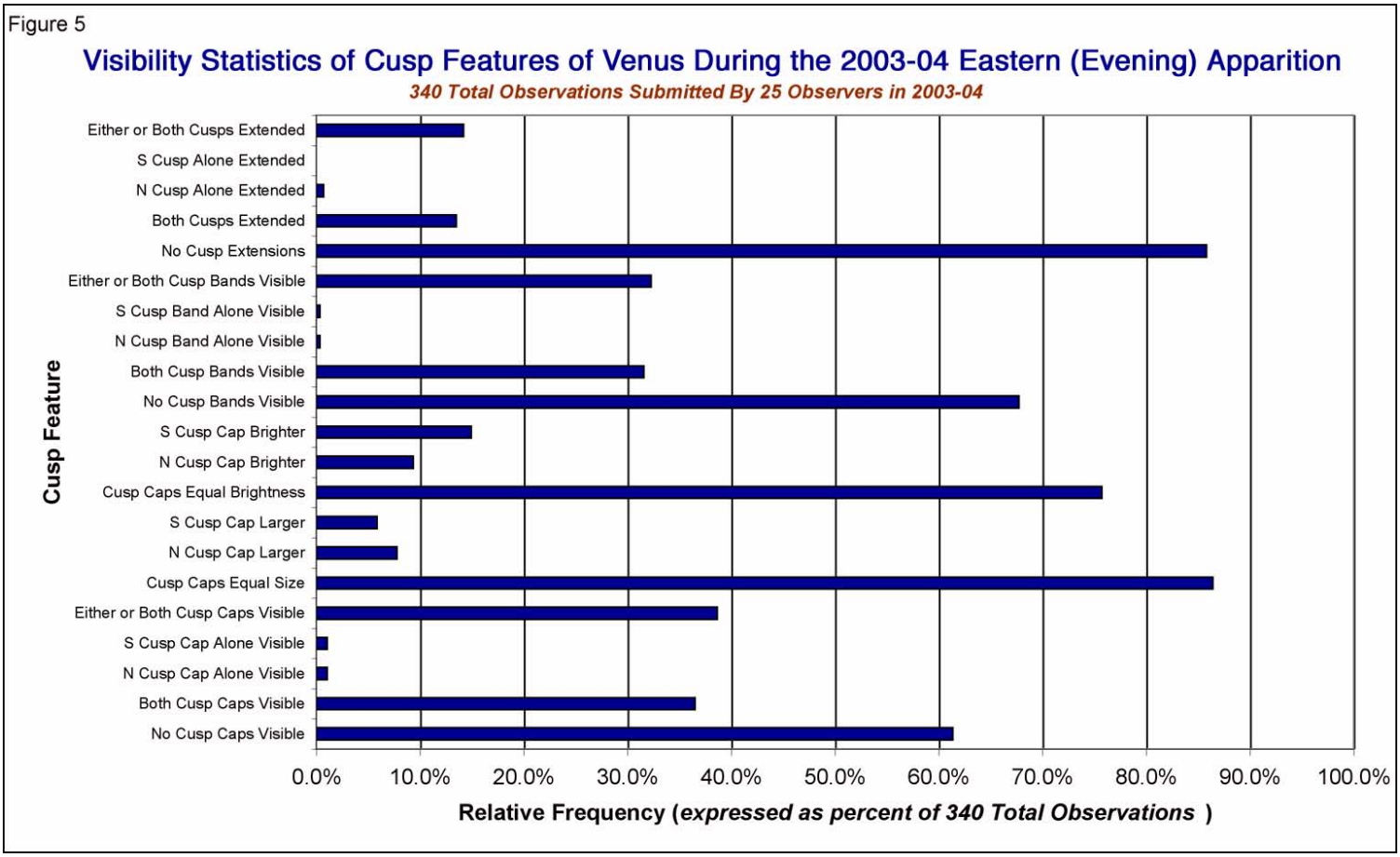
No dusky cusp-bands were detected flanking the bright cusp-caps in 67.7 percent of the observations when cusp-caps were visible. When seen, the cusp-bands displayed a mean relative intensity of about 7.5 (see *Figure 5*).

Cusp Extensions

Figure 5 shows that, in 85.8 percent of the observations, there were no cusp extensions detected in integrated light or with color filters beyond the 180° expected from simple geometry. Later during the apparition, as Venus progressed through its crescent phases, approaching inferior conjunction on 2004 June 8, observers sometimes recorded cusp extensions ranging from 2° to 80°. Suspected cusp extensions were apparent on several drawings that were submitted, with observers noting that variable-density polarizers improved their visibility. From Las Cruces, NM on 2004 June 02 at 01:19-02:35 UT, Walter Haas and Cecil Post (observing together but recording impressions independently) used a 20.3-cm (8.0-in.) Newtonian at 120x and a 15.2-cm (6.0-in.) Newtonian at 300x, respectively, in poor seeing to strongly suspect that the N and S cusp extensions were within a few degrees of connecting with one another along the planet's unilluminated limb. Both observers, together using Post's 15.2-cm (6.0-in.) Newtonian at 168x, again suspected a similar aspect of the cusp extensions in poor seeing on 2004 June 04. Approximately two days later, on 2004 June 06 at 17:36 UT, Thierry Legault in France imaged Venus using a red filter and a videocam attached to a 10.6-cm (4.2-in.) refractor, capturing extended cusps as they formed a halo encircling the dark hemisphere of Venus. Normally, experience has shown that cusp extensions are very difficult to capture on images because the directly sunlit regions of Venus are so much brighter than the faint extensions. Nevertheless, observers are encouraged to continue to try to record these features using CCD imagers and webcams in future apparitions.

Figure 4





Estimates of Dichotomy

A discrepancy between the predicted and the observed dates of dichotomy (half-phase) on Venus is often referred to as the "Schröter Effect". The predicted half-phase occurs when $\boldsymbol{k} = 0.500$, and the phase angle, $\boldsymbol{i}$, between the Sun and the Earth as seen from Venus equals 90°. This effect was reported by three observers during this apparition, with the observed minus predicted discrepancies given in *Table 3*.

Dark Hemisphere Phenomena and Ashen Light Observations

The Ashen Light, first reported by G. Riccioli in 1643, refers to an extremely elusive, faint illumination of Venus' dark hemisphere. Although the origin is not the same, of course, the Ashen Light is said by some to resemble Earthshine on the dark portion of the Moon. Many observers are in agreement that Venus must be viewed against a totally dark sky for the Ashen Light to be seen, but these "ideal" circumstances occur only when the planet is extremely low in the sky where bad seeing adversely affects viewing. The substantial glare from Venus in contrast with the surrounding dark sky complicates matters as well. Despite all of this, the ALPO Venus Section continues to receive reports from seasoned observers, looking at the planet in twilight, who are absolutely convinced they have seen the Ashen Light, and so the controversy persists. Venus observers are always strongly encouraged to try to capture any dark-side illumination that may be present on the planet, using CCD imagers and web-cams, ideally as part of a cooperative simultaneous observing endeavor with visual observers.

During this apparition several visual observers periodically suspected dark-hemisphere illumination on Venus. The most notable such observation was on 2004 April 10 in fair seeing, from 01:48-02:12 UT, by Cecil Post, who strongly suspected Ashen-Light phenomena on Venus using a 20.3-cm (8.0-in.) Newtonian at 209X with a W23A (light red) filter.

In early May 2004, Sanjay Limaye of the University of Wisconsin posted an appeal to both amateur and professional astronomers to attempt systematic imaging of the planet Venus at near-infrared wavelengths. On 2004 May 12 at 20:04-20:43 UT, Christophe Pellier of Bruz, France, using a 35.6-cm (14.0-in.) SCT, an ATK-1HS CCD camera and a 1000-nm (1μ) IR filter, captured historically unprecedented amateur images of Venus' illuminated dark hemisphere. Pellier followed up with additional sequential IR images of the dark-hemisphere illumination on several dates between 2004 May 16 and 21 using the same instrumentation, and his images over several days also surpass the previous efforts by ground-based professional astronomers. What his images show is the hot surface of Venus in the near-IR, the light penetrating the dense clouds of the planet. The mottlings that show up in Pellier's images can be explained, at least in a preliminary analysis, not as Venusian atmospheric features but as dark higher-

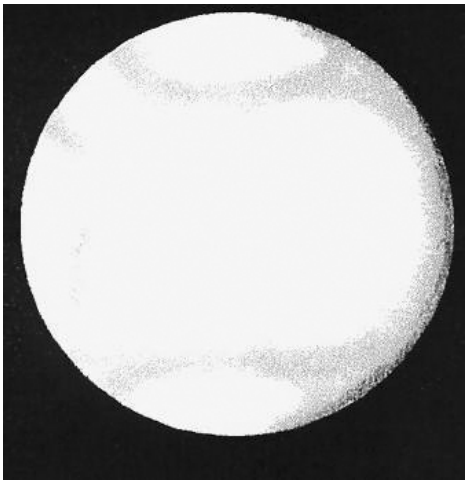


Figure 6. Drawing of Venus by Detlev Niechoy, 2003 Sep 13 11h 37m UT. 20.3-cm (8.0-in) SCT, 225X, W15 (deep yellow) Filter. Seeing 5.0 (interpolated). Phase (k) = 0.993, Diameter = 9".84. South is at the top in Figures 6-30. When given, Seeing is in the standard ALPO Scale (ranging from 0.0 = worst possible conditions to 10.0 = perfect) and Transparency is the limiting naked-eye magnitude. Telescope types are abbreviated as in Table 2. The diameter of Venus is the apparent disk diameter (i.e., of Venus' cloud tops rather than its surface). Contrasts have been exaggerated for reproduction.

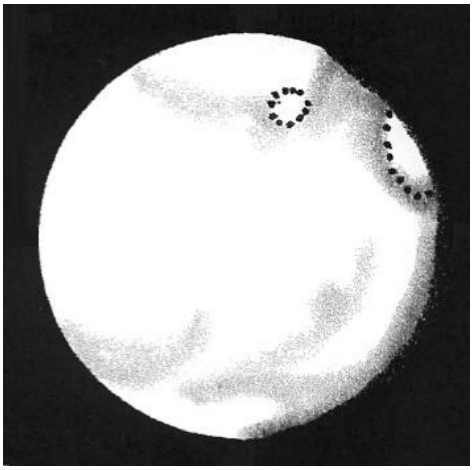


Figure 7. Drawing of Venus by Detlev Niechoy, 2003 Oct 13 10h 10m UT. 20.3-cm (8.0-in) SCT, 112X, Integrated Light. Seeing 4.0 (interpolated). Phase (k) = 0.969, Diameter = 10".23.

elevation (cooler) terrain and bright lower (hotter) surface areas. Furthermore, the appearance of these features was similar in all of his images and persisted over the span of his imaging efforts in 2004 May. Because the methodology and instrumentation Pellier employed was rather uncomplicated, perhaps more Venus observers will be able to perform similar imaging work of this nature in future apparitions.

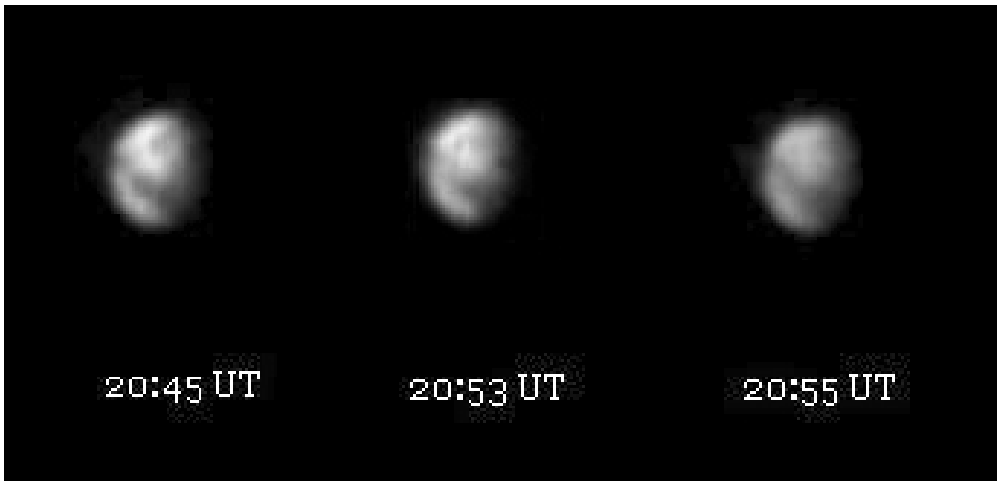


Figure 8. CCD UV image of Venus by Frank J. Melillo, 2003 Dec 28 20h 45m-20h 55m UT. 20.3-cm (8.0-in) SCT, Schott UG-1 UV Filter w/IR blocker, Starlight Xpress MX-5 CCD camera, 2 sec f/25. Seeing 8.0. Phase (k) = 0.841, Diameter = 12".71.

There were no instances this apparition when observers suspected the dark hemisphere of Venus of appearing darker than the background sky, a sometimes-reported phenomenon that is probably nothing more than a curious contrast effect.

A New Amateur-Professional Cooperative Program

Amateur astronomers and ground-based observations have contributed very useful information for studies of Venus' atmosphere. Lomonosov first suggested the existence of an atmosphere on Venus (1761); Boyer and Guerin first determined the rapid, "4-day" circulation of the Venus atmosphere; and most recently, as described in this apparition report, Christophe Pellier succeeded in imaging the night side of Venus (emission from the hot surface) using a 1000nm IR filter with a 35.6-cm (14.0-in.) SCT. Other observers in growing numbers have also been imaging Venus in the near-UV using CCDs and webcams for the last several apparitions. Now amateurs equipped with CCD cameras and appropriate filters can effectively contribute even more to professional studies of Venus, since continued UV and polarized-light imaging of the Venusian atmosphere and its circulation is likely to be useful for quite some time to come.

The Venus Express (VEX) spacecraft began systematically monitoring Venus at near-UV, visible and near-IR wavelengths in May 2006 and will continue to do so about three more years, although the mission may get extended somewhat longer. Despite the fact that spacecraft images of Venus will be extremely high-resolution, far better than is possible from Earth, the fact is that monitoring by the VEX cameras will not be continuous. Thus, this opens up a fantastic opportunity for more advanced amateur astronomers to attempt high-quality digital imaging of Venus in the wavelength range of 350-1000 nm (near-UV to near-IR). The Venus Amateur Observing Project (VAOP) has been organized in cooperation with the European Space Agency (ESA) where images can be contributed by amateur astronomers to complement the Venus Express (VEX) spacecraft results. More information about this project, as well as prerequisites for participation and instructions for uploading images, can be obtained by contacting the ALPO Venus Section or by visiting the VAOP website at *http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=38833&fbodylongid=1856*.

In addition to dispatching images to the VAOP project, they should also be regularly sent to the ALPO Venus Section. The submitted images will be archived for analysis and comparison with results

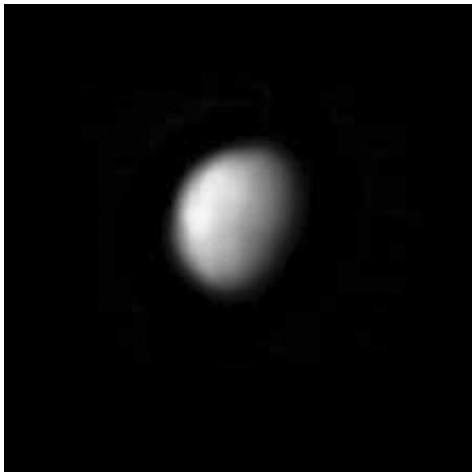


Figure 9. Webcam image of Venus by Jason P. Hatton, 2004 Jan 04 01h 41m UT. 23.5-cm (9.25-in) SCT, W47 (deep blue) Filter w/IR blocker, Philips ToUcam webcam, 1/25 sec. Seeing 4.0. Phase (k) = 0.827, Diameter = 13".05.

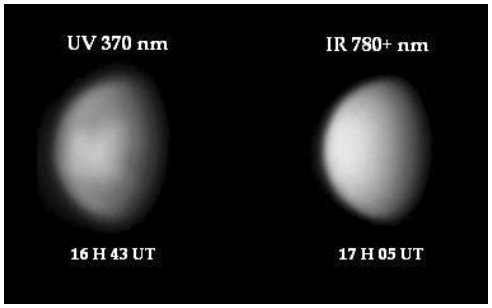


Figure 10. CCD UV-IR composite image of Venus by Christophe Pellier, 2004 Jan 24 16h 43m-17h 05m UT. 35.6-cm (14.0-in) SCT, UV 370-nm & IR 780-nm filters, ATK-1HS CCD camera. Seeing 3.0, Transparency 6.0. Phase (k) = 0.772, Diameter = 14".40.

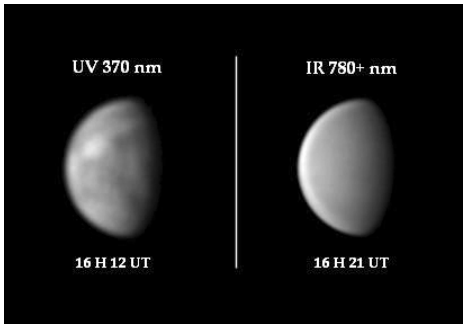


Figure 11. CCD UV-IR composite image of Venus by Christophe Pellier, 2004 Feb 08 16h 12m-16h 21m UT. 35.6-cm (14.0-in) SCT, UV 370-nm & IR 780-nm filters, ATK-1HS CCD camera. Seeing 7.0, Transparency 6.0. Phase (k) = 0.725, Diameter = 15".68.

Figure 12. Webcam image of Venus by Thomas E. Williamson, 2004 Feb 11 00h 57m-01h 11m UT. 20.3-cm (8.0-in) NEW, Philips ToUcam webcam w/IR blocker. Seeing 3.5, Transparency 6.0. Phase (k) = 0.717, Diameter = 15".92.

about the planet's atmospheric circulation gleaned from the Venus Express (VEX) mission. The ALPO Venus Section looks forward to a successful Pro-Am cooperation in this mission, and we welcome observers throughout the world to participate.

Conclusions

Our analysis of ALPO observations of Venus during the 2003-04 Eastern (Evening) Apparition suggests that vague shadings on the disc of the planet were occasionally apparent to visual observers who utilized suitable filter techniques in order to help bring out these very elusive features. It must be emphasized, however, that it is very troublesome to differentiate between what is real and what is merely illusory in the atmosphere of Venus at visible wavelengths. Increased confidence in visual accounts will improve as the incidence of simultaneous observations increases, and it is important to stress that well-executed drawings of Venus are still a vital part of our overall program and will continue to remain so.

Our goal, therefore, is to improve the opportunity for confirmation of highly elusive atmospheric phenomena, to introduce more objectivity, and to standardize observational techniques and methodology. It is especially cheering to see that more and more Venus observers are employing CCDs and webcams to image Venus, especially at near-UV and near-IR wavelengths. It is also meaningful when several observers, some using visual methods and others employing imaging techniques, on the same date and time, but doing so independently, achieve similar results. Consider, for example, that atmospheric radial or "spoke" patterns on drawings often look strikingly similar to those in images received.

Two remarkable events truly made this apparition especially memorable. First, was the transit of Venus that occurred on 2004 June 8, the details of which were covered in an earlier report in this Journal, but it is significant that no one living today had witnessed Venus pass across the disc of the Sun until this observing season. What an unforgettable spectacle it was, indeed, for those who had clear skies! The other notable event this apparition was the extraordinary accomplishment of our colleague Christophe Pellier, who was successful in imaging illumination of the dark hemisphere of the planet for the first time in history by an amateur astronomer. The author, as well as a host of others both amateur and professional, will never forget the excitement when

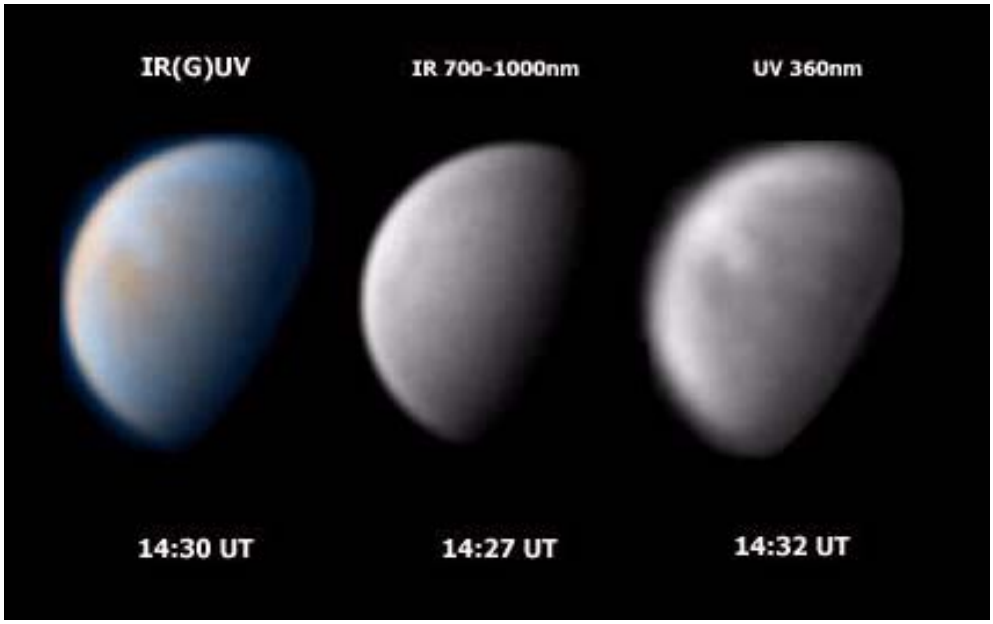


Figure 13. Webcam composite UV-IR image of Venus by Damian Peach, 2004 Feb 19 14h 27m-14h 32m UT. 23.5-cm (9.25-in) SCT, IR 700-1000-nm & UV 360-nm filters, Philips ToUcam webcam. Seeing 4.0 (interpolated). Phase (k) = 0.687, Diameter = 16".85.

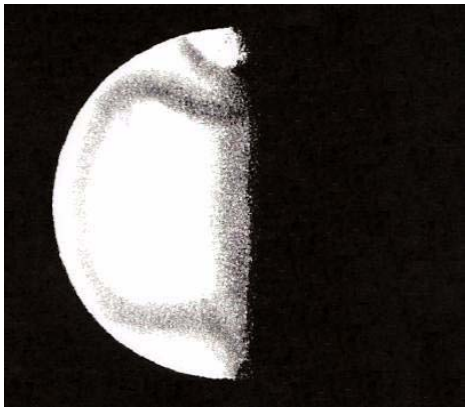


Figure 14. Drawing of Venus by Detlev Niechoy, 2004 Feb 29 12h 37m UT. 20.3-cm (8.0-in) SCT, 225X, Integrated Light. Seeing 3.0 (interpolated). Phase (k) = 0.649, Diameter = 18".12.

opening those Images of Venus when they arrived by e-mail!

Many of our best UV images have been sought after by the professional community, and cooperative involvement of amateurs and professionals on common projects has taken another step forward with the establishment of the Venus Amateur Observing Project (VAOP) in 2006 in conjunction with the Venus Express (VEX) mission. Here is another opportunity for collaborative Pro-Am work similar to ALPO studies of the Ashen Light during the Pioneer Venus Orbiter Project nearly three decades ago, and nowadays amateurs are so much better equipped to record atmospheric features and phenomena on cloudy Venus.

Active international cooperation by individuals making regular systematic, simultaneous observations of Venus remains our main objective, and the ALPO Venus Section invites interested readers to join us in our many projects and challenges in the coming years.

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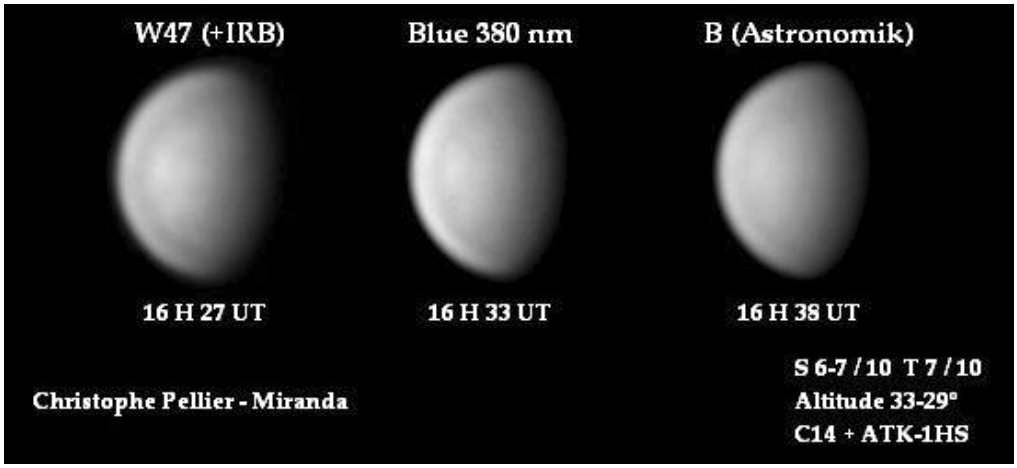

Figure 15. CCD composite image of Venus by Christophe Pellier, 2004 Feb 29 16h 27m-16h 38m UT. 35.6-cm (14.0-in) SCT, W47 w/IR blocker, Blue 380-nm, Blue Astronomik filters, ATK-1HS CCD camera. Seeing 7.5, Transparency 6.0. Phase (k) = 0.648, Diameter = 18".14.

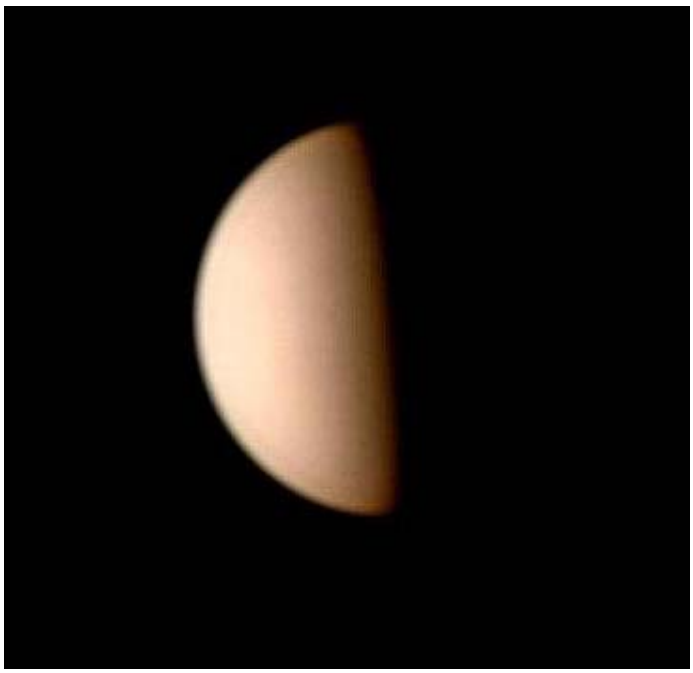

Figure 16. Webcam IR image of Venus by Eric Roel, 2004 Mar 19 00h 32m UT. 25.4-cm (10.0-in) MAK, IR 720-nm filter, Philips ToUcam webcam. Seeing n/a. Phase (k) = 0.566, Diameter 21".26.

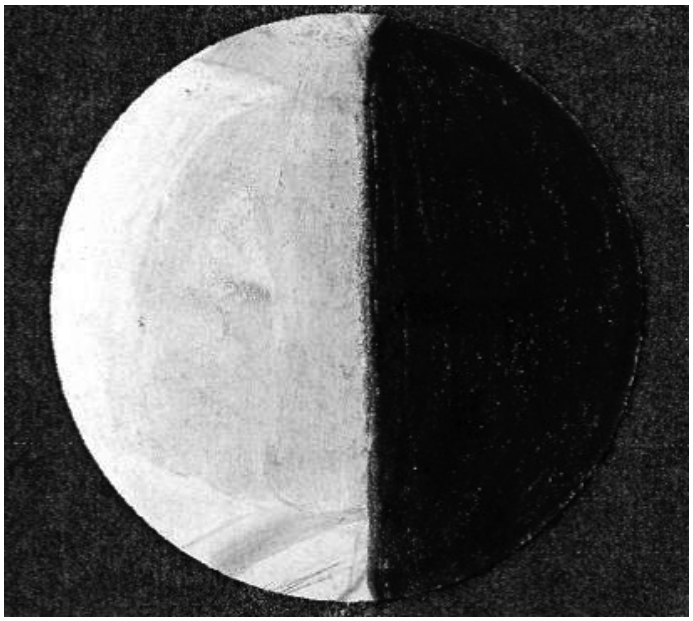

Figure 17. Drawing of Venus by Carl Roussell, 2004 Mar 29 00h 20m-01h 00m UT. 15.2-cm (6.0-in) REF, 300X, Integrated Light + W15 (deep yellow), W25 (red), and W47 (deep blue) Filters. Seeing 5.0, Transparency 3. Phase (k) = 0.515, Diameter = 23".54.

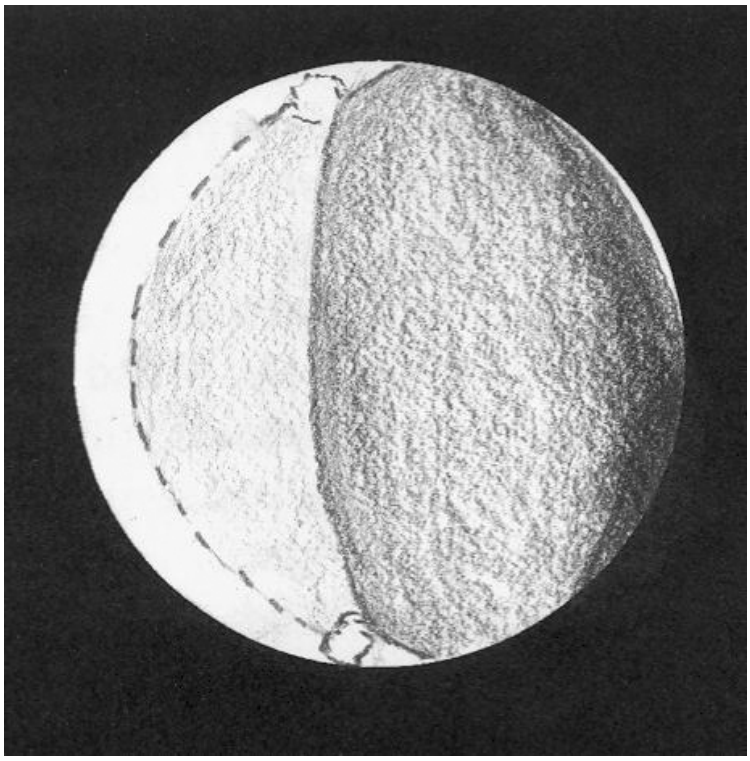

Figure 18. Drawing of Venus by Cecil Post, 2004 Apr 10 01h 48m-02h 12m UT. 20.3-cm (8.0-in) NEW, 209X, Integrated Light + W23A (red) Filter. Seeing 3.5, Transparency (haze). Phase (k) = 0.443, Diameter = 27".10.

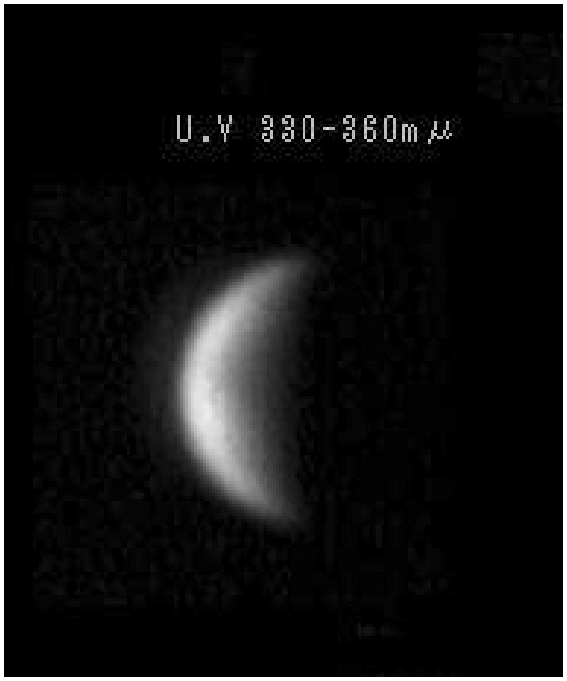

Figure 19. Webcam UV image of Venus by Toshihiko Ikemura. 2004 Apr 10 10h 59m UT. 31.0-cm (12.2-in) NEW, U360 filter w/IR blocker, Philips ToUcam webcam. Seeing 7.0, Transparency 6.0. Phase (k) = 0.441, Diameter = 27".22.

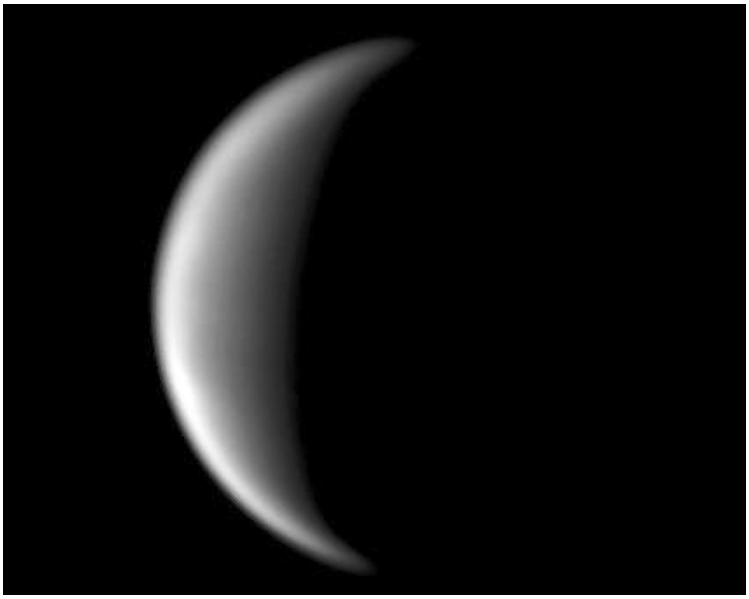

Figure 20. Webcam image of Venus by Paolo Lazzarotti, 2004 Apr 28 19h 10m UT. 25.4-cm (10.0-in) NEW, 400-520-nm blue-violet filter, Vesta Pro webcam. Seeing 4.0, Transparency 4.0. Phase (k) = 0.308, Diameter 35".16.

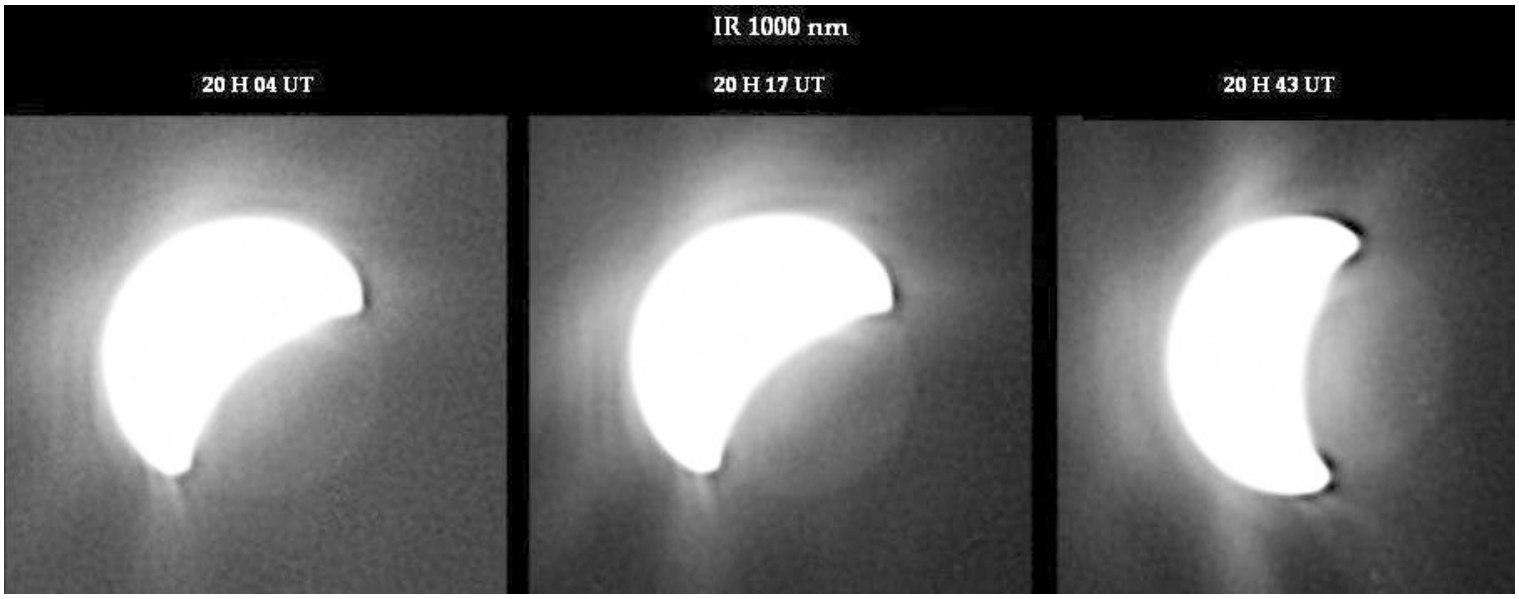

Figure 21. CCD IR image of Venus by Christophe Pellier, 2004 May 12 20h 04m-20h 43m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 4.0, Transparency 6.0. Phase (k) = 0.181, Diameter = 43".97.

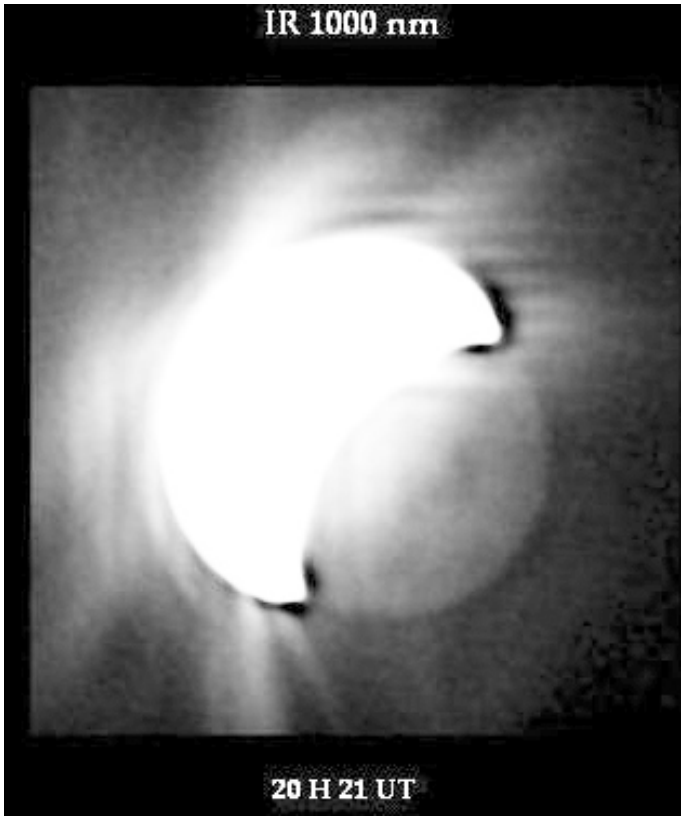

Figure 22. CCD IR image of Venus by Christophe Pellier, 2004 May 16 20h 21m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 4.0, Transparency 6.0. Phase (k) = 0.143. Diameter = 46".85.

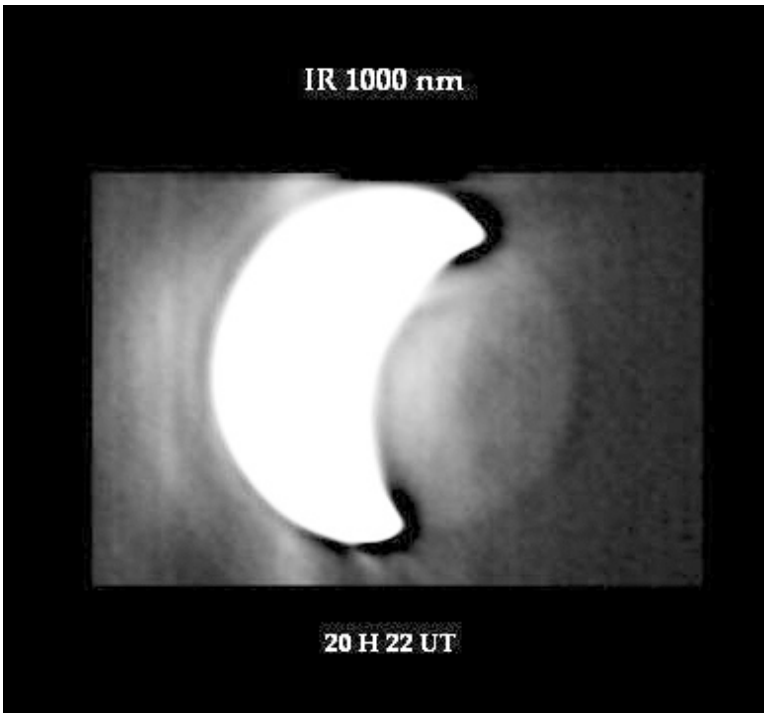

Figure 23. CCD IR image of Venus by Christophe Pellier, 2004 May 17 20h 22m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 3.0, Transparency 6.0. Phase (k) = 0.134, Diameter = 47".58.

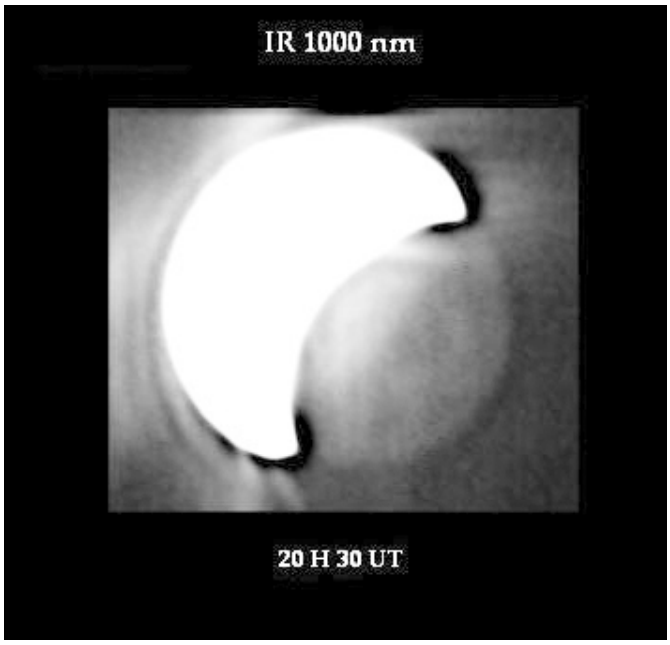

Figure 24. CCD IR image of Venus by Christophe Pellier, 2004 May 18 20h 30m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 3.0, Transparency 6.0. Phase (k) = 0.124, Diameter = 48".31.

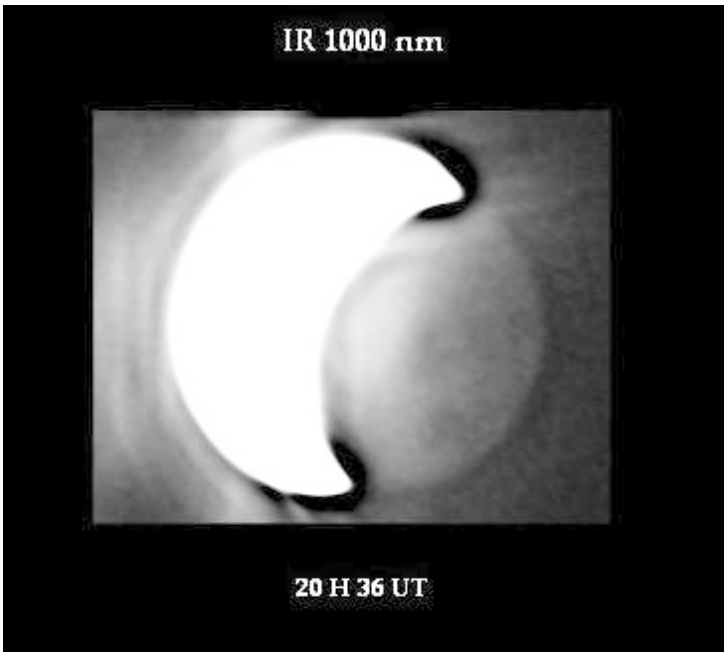

Figure 25. CCD IR image of Venus by Christophe Pellier, 2004 May 19 20h 36m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 5.0, Transparency 6.0. Phase (k) = 0.115, Diameter = 49".05.

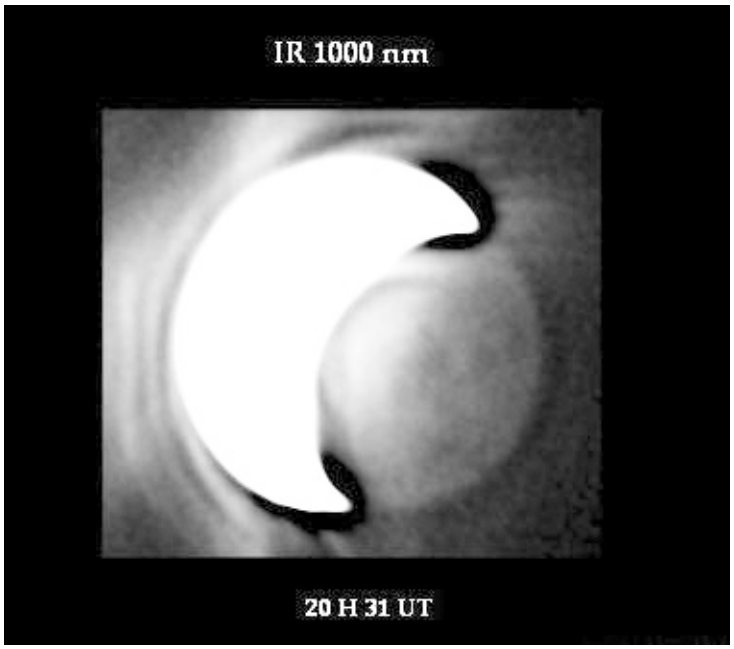

Figure 26. CCD IR image of Venus by Christophe Pellier, 2004 May 21 20h 31m UT. 35.6-cm (14.0-in) SCT, IR 1000-nm filter, ATK-1HS CCD camera. Seeing 3.0, Transparency 6.0. Phase (k) = 0.096, Diameter = 50".49.

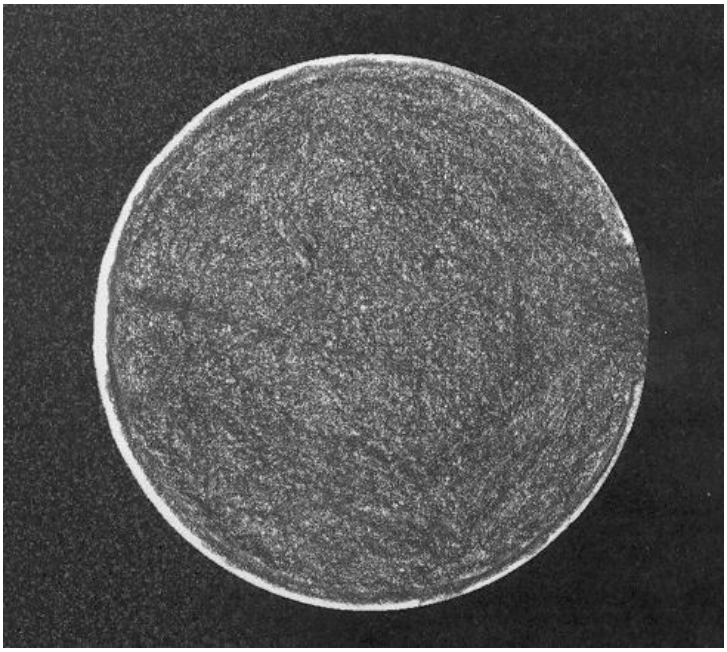

Figure 27. Drawing of Venus by Cecil Post, 2004 Jun 04 19h 38m-20h 48m UT. 15.2-cm (6.0-in) NEW,168X Integrated Light. Seeing 1.5, Transparency (haze). Phase (k) = 0.005, Diameter = 57".85.

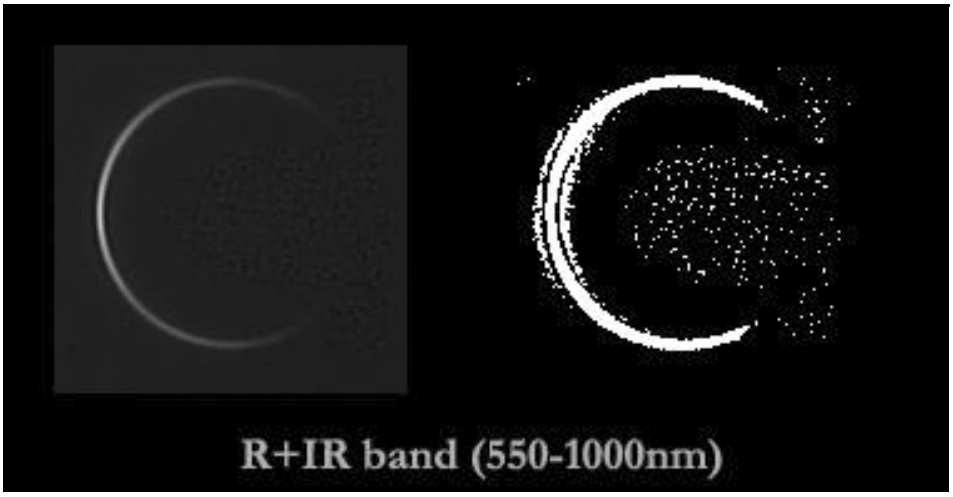

Figure 28. CCD image of Venus by Paolo Lazzarotti, 2004 Jun 06 11h 07m UT. 13.0-cm (5.1-in) REF, 550-1000-nm filter, Vesta Pro webcam. Seeing 4.5, Transparency 3.0. Phase (k) = 0.001, Diameter = 58".12.

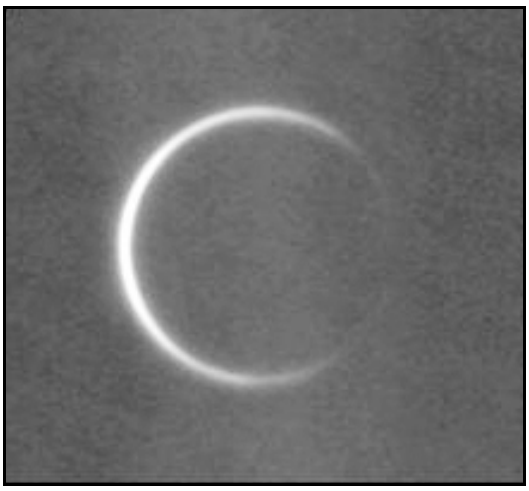

Figure 29. Videocam image of Venus by Thierry LeGault, 2004 Jun 06 17h 36m UT. 10.6-cm (4.2-in) REF, red filter, Videocam. Seeing 4.0, Transparency 3.0. Phase (k) = 0.001, Diameter = 58".15.

Figure 30. Webcam composite image of Venus in transit on the Sun by Ralf Vandebergh, 2004 Jun 08 07h 29m UT. 15.2-cm (6.0-in) REF, Hα and Solarmax Filters, Philips ToUcam webcam. Seeing 5.0, Transparency 6.0. Phase (k) = 0.000, Diameter = 58".22.

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A.L.P.O. Visual Observation of Venus

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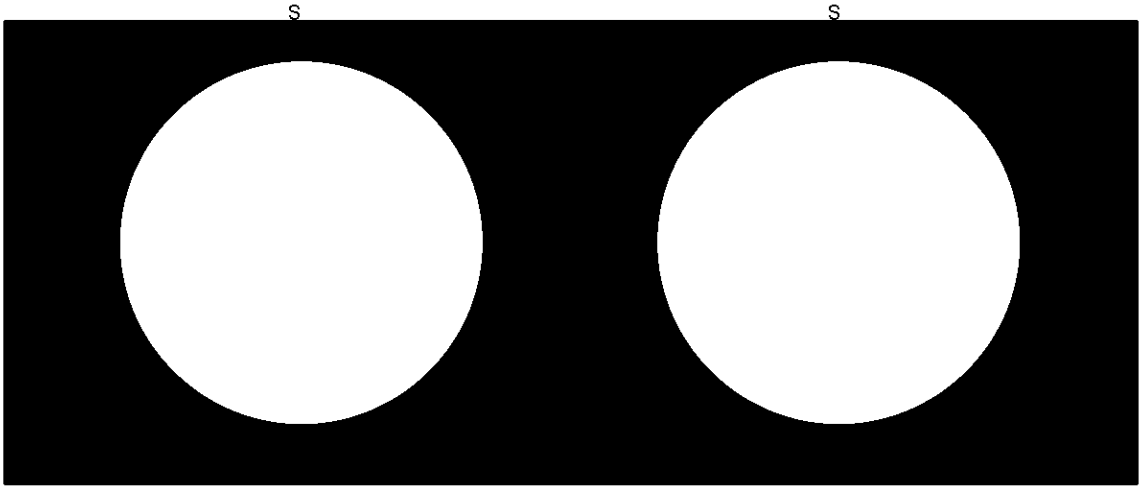

p | *f*

N | (*all coordinates are IAU*) | N

Observer_____Location_____

UT Date _____ UT Start _____ UT End _____ D = _____″ k_m = _____ k_c = _____

m_v = _____ Instrument _____ Magnification(s) _____ x_{min} _____ x_{max}

Filter(s) IL(none) _____ f_1 _____ f_2 _____ f_3 _____ Seeing _____ Transparency _____

Sky Illumination (*check one*): [ ] Daylight [ ] Twilight [ ] Moonlight [ ] Dark Sky

Dark Hemisphere (*check one*):
[ ] No dark hemisphere illumination
[ ] Dark hemisphere illumination suspected
[ ] Dark hemisphere illumination
[ ] Dark hemisphere darker than sky

Bright Limb Band (*check one*):
[ ] Limb Band not visible
[ ] Limb Band visible (complete cusp to cusp)
[ ] Limb Band visible (incomplete cusp to cusp)

Terminator (*check one*):
[ ] Terminator geometrically regular (no deformations visible)
[ ] Terminator geometrically irregular (deformations visible)

Terminator Shading (*check one*):
[ ] Terminator shading not visible
[ ] Terminator shading visible

Atmospheric Features (*check, as applicable*):
[ ] No markings seen or suspected
[ ] Radial dusky markings visible
[ ] Amorphous dusky markings visible
[ ] Banded dusky markings visible
[ ] Irregular dusky markings visible
[ ] Bright spots or regions visible (exclusive of cusp regions)

Cusp-Caps and Cusp-Bands (*check, as applicable*):
[ ] Neither N or S Cusp-Cap visible
[ ] N and S Cusp-Caps both visible
[ ] N Cusp-Cap alone visible
[ ] S Cusp-Cap alone visible
[ ] N and S Cusp-Caps equally bright
[ ] N and S Cusp-Caps equal size
[ ] N Cusp-Cap brighter
[ ] N Cusp-Cap larger
[ ] S Cusp-Cap brighter
[ ] S Cusp-Cap larger
[ ] Neither N or S Cusp-Band visible
[ ] N and S Cusp-Bands both visible
[ ] N Cusp-Band alone visible
[ ] S Cusp-Band alone visible

Cusp Extensions (*check, as applicable*):
[ ] No Cusp extensions visible
[ ] N Cusp extended (angle = _____°)
[ ] S Cusp extended (angle = _____°)

Conspicuousness of Atmospheric Features (*check one*):
[ ] 0.0 (nothing seen or suspected)
[ ] 3.0 (indefinite, vague detail)
[ ] 5.0 (suspected detail, but indefinite)
[ ] 7.0 (detail strongly suspected)
[ ] 10.0 (detail definitely visible)

IMPORTANT: Depict morphology of atmospheric detail, as well as the intensity of features, on the appropriate blanks at the tope of this form. Attach to this form all supporting descriptive information, and please do not write on the back of this sheet. The intensity scale is the *Standard A.L.P.O. Intensity Scale*, where 0.0 = completely black ⇔ 10.0 = very brightest features, and intermediate values are assigned along the scale to account for observed intensity of features.

Feature Story:
Evolution of the "X" on the Moon

By William M. Dembowski, FRAS,
dembowski@zone-vx.com
Dana Thompson,
dthomp29@columbus.rr.com

Online Features

Left-click your mouse on the authors e-mail addresses in blue text to contact the authors of this article.

The surface of the Moon contains an incredible amount of detail visible in even a modest size telescope. Add to this the ever-changing interplay of light and shadow and you have an almost unlimited number of subjects for both serious and pleasurable observing. One of the more popular "pleasure" sights is the very transitory "X on the Moon".

On or about First Quarter, as the terminator slowly moves over the crater Werner, the light of the lunar sunrise begins to illuminate what will eventually appear under low magnification to be a near perfect "X" on the lunar surface. Not a lone independent feature, the "X" is made up of the crater walls, ridges, and masses of impact ejecta that comprise the common ground between the craters Purbach, La Caille and Blanchinus.

The peak of the southeast wall of Purbach is illuminated first. Next is a peak on the northeast wall of Purbach and common topography between Purbach and La Caille. Light then strikes the peak of the southwest wall of Blanchinus and finally the peaks of the northwest wall of Blanchinus and common topography between Blanchinus and La Caille.

When fully formed, the "X" stands out in stark contrast to the dark side of the terminator. This unique event lasts for approximately two hours before being washed out by the climbing Sun as it gradually illuminates the lower reaches of the area.

Selenographic colongitudes ranging from approximately 356° to 359° have been noted on different observation dates in the past. The exact colongitude when a particular point on the "X" is first sunlit must vary a little with the small changes in the Sun's selenographic latitude. Perhaps an easy-to-use guide when preparing to view the full illumination of the "X" is a solar altitude of 0.8° to 1.2° over the crater Werner. Observers might also find useful help in Harry Jamieson's *Lunar Observer's Tool Kit*. (See the *ALPO Resources* pages later in this Journal.)

But colongitude is not proving to be completely accurate as a prediction parameter. Although the "X" is definitely a First Quarter event, the illumination percentage of the Moon is even less useful.

Predicted start times for remaining "X" illuminations for 2007 include October 18, 11:58 UT and November 17, 01:14 UT, with the November date being very favorable for parts of North America.

ALPO member Dana Thompson of Ohio has developed more than a passing interest in the "X on the Moon" which has fascinated him since his first sighting in 1978 at the age of 15. Dana has gathered a great deal of information and many personal images of this chance illumination including a timed sequence of its evolution (See Figures 1-6).

Dana's primary interest now is searching for the earliest image or observation log of the illumination (either intentional or accidental). In the "Times Atlas of the Moon" (1969 - page xxiv) is a photograph of the First Quarter Moon taken by the Lick Observatory which clearly shows the "X". The observatory has confirmed that the image was taken on May 6, 1938, and is the earliest such image that Dana has been able to locate. If any readers have knowledge of an earlier image, you may contact Dana at *dthomp29@columbus.rr.com*

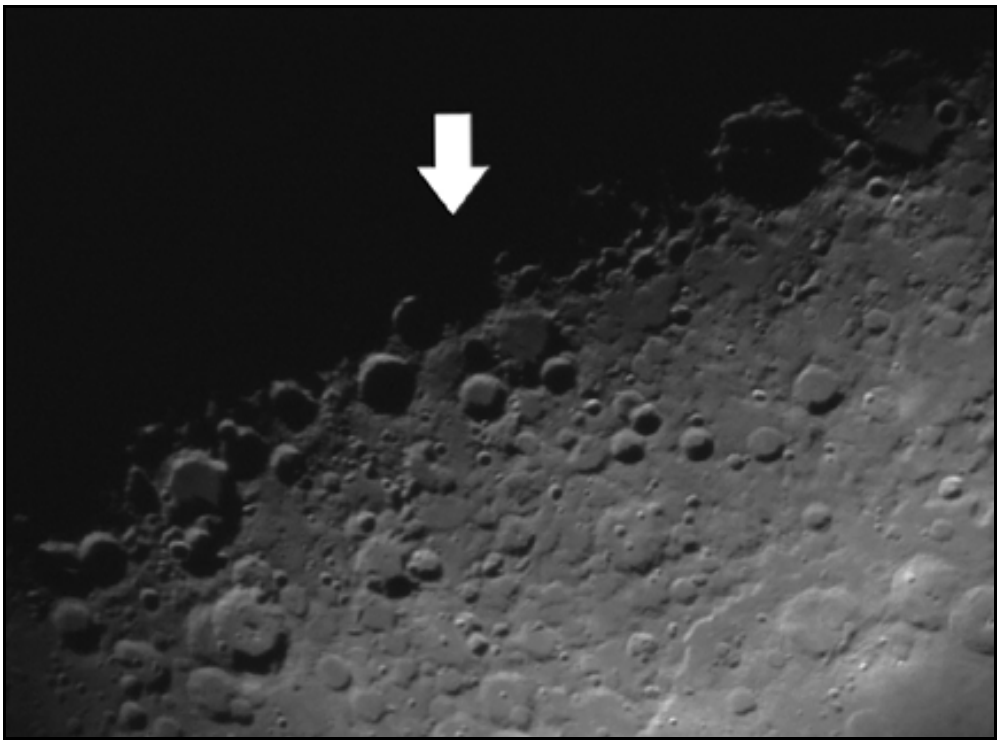

Figure 1. 03:21 UT - Colongitude 356.43°. None of the "X" feature is visible.

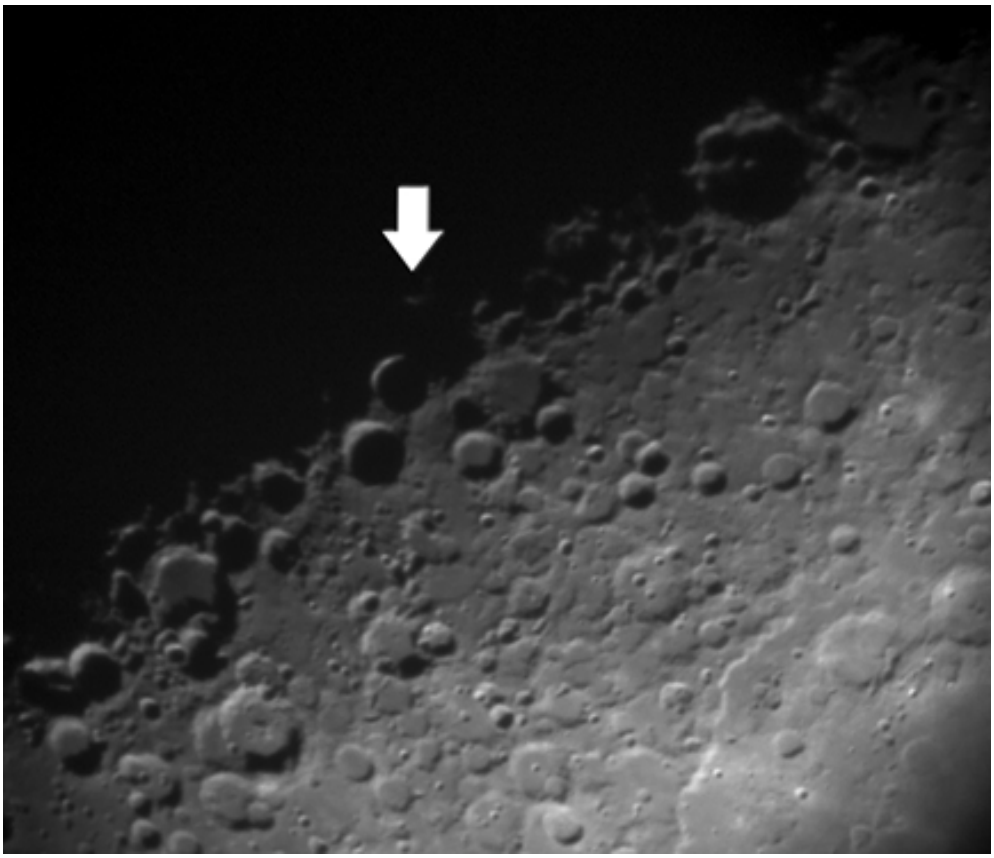

Figure 2. 04:39 UT - Colongitude 357.09°. A pinpoint of light is reflected off one of the higher elevations in the area.

NOTE: All images are single exposures by Dana Thompson (Hebron, Ohio) taken on March 7, 2006 (UD) using an Orion "Apex" 127mm, f/12.1 Maksutov-Cassegrain telescope and a Fuji S5000 digital camera (afocal). North is up.

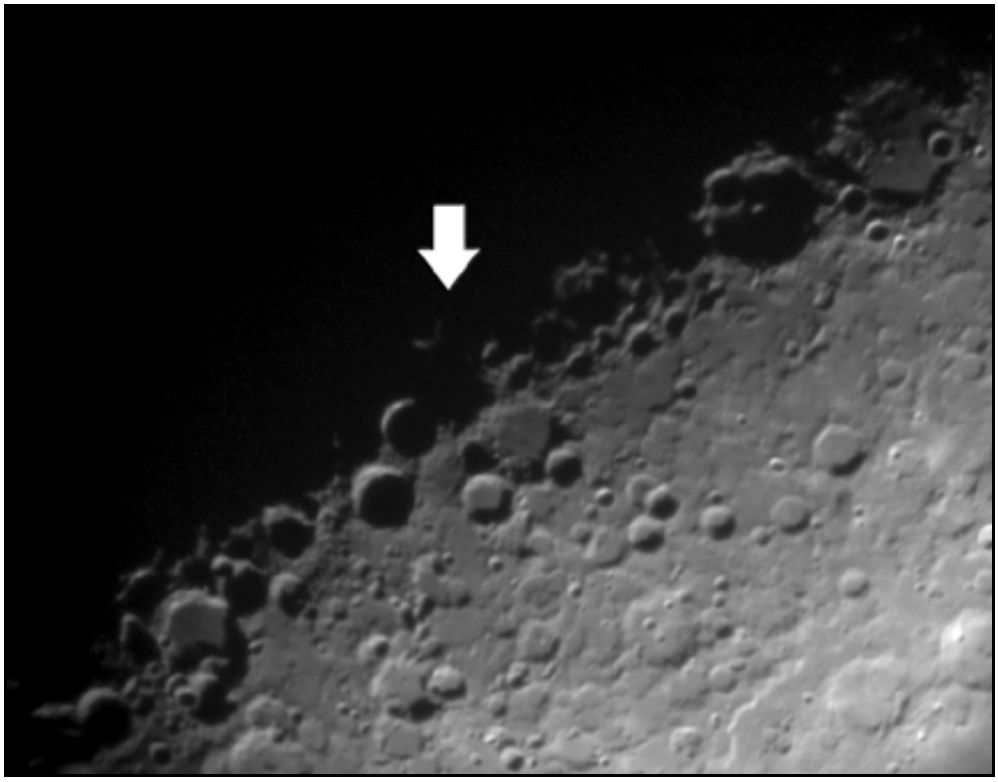

Figure 3. 04:43 UT - Colongitude 357.12°. A second arm of the "X" has emerged.

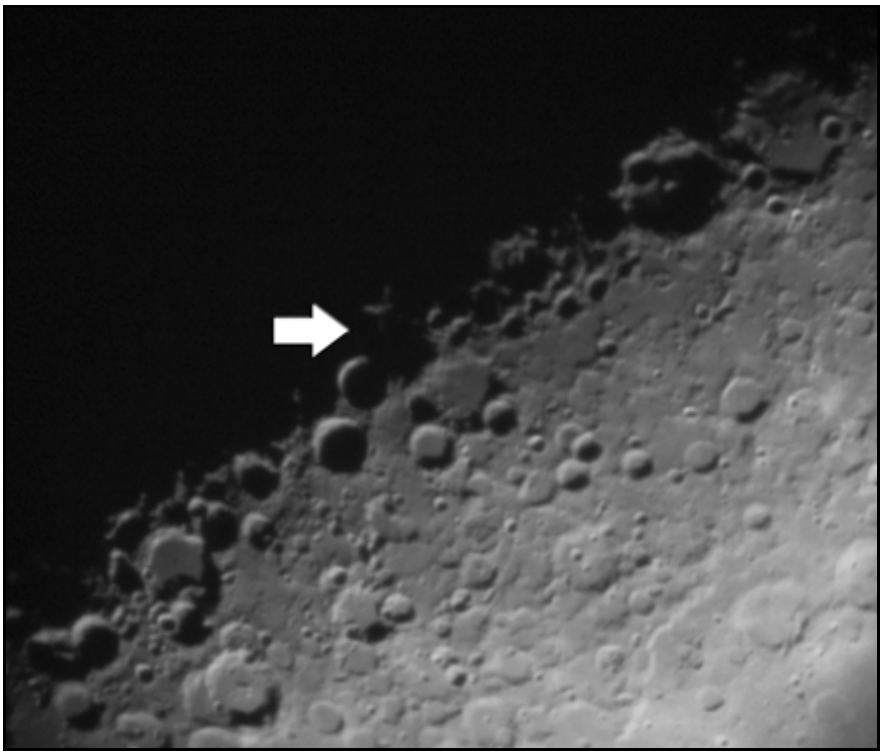

Figure 4. 05:03 UT - Colongitude 357.29°. The third arm of the “X” has begun to take form.

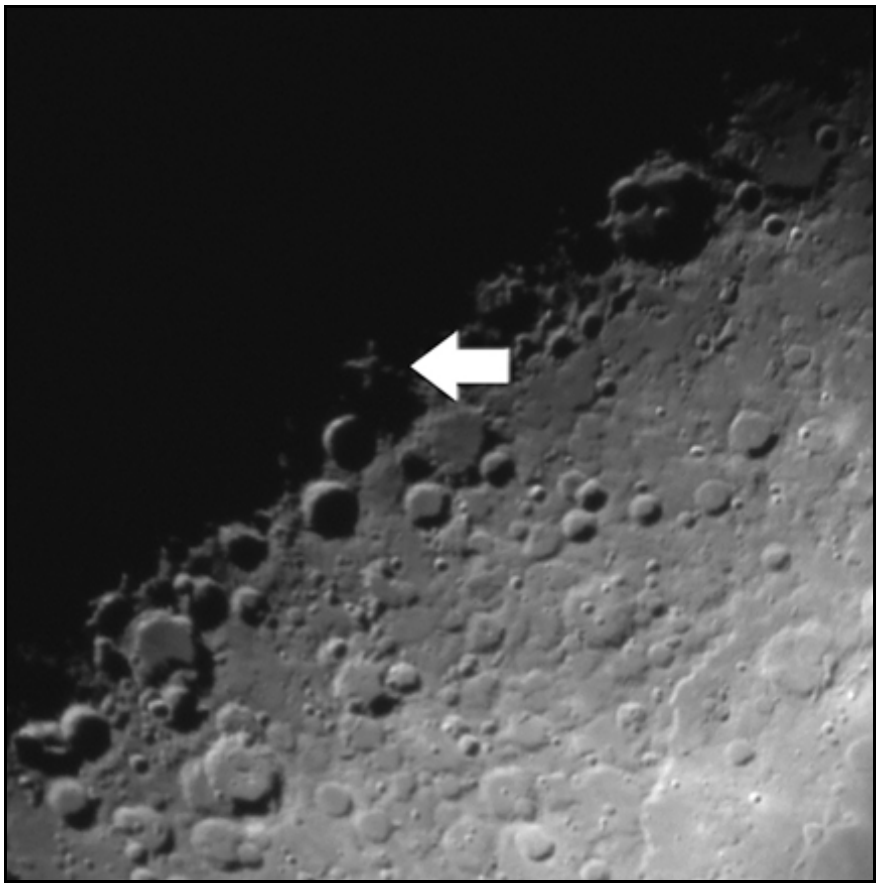

Figure 5. 05:34 UT - Colongitude 357.55°. Three of the four arms of the “X” are complete and light is beginning to illuminate the last part of the feature.

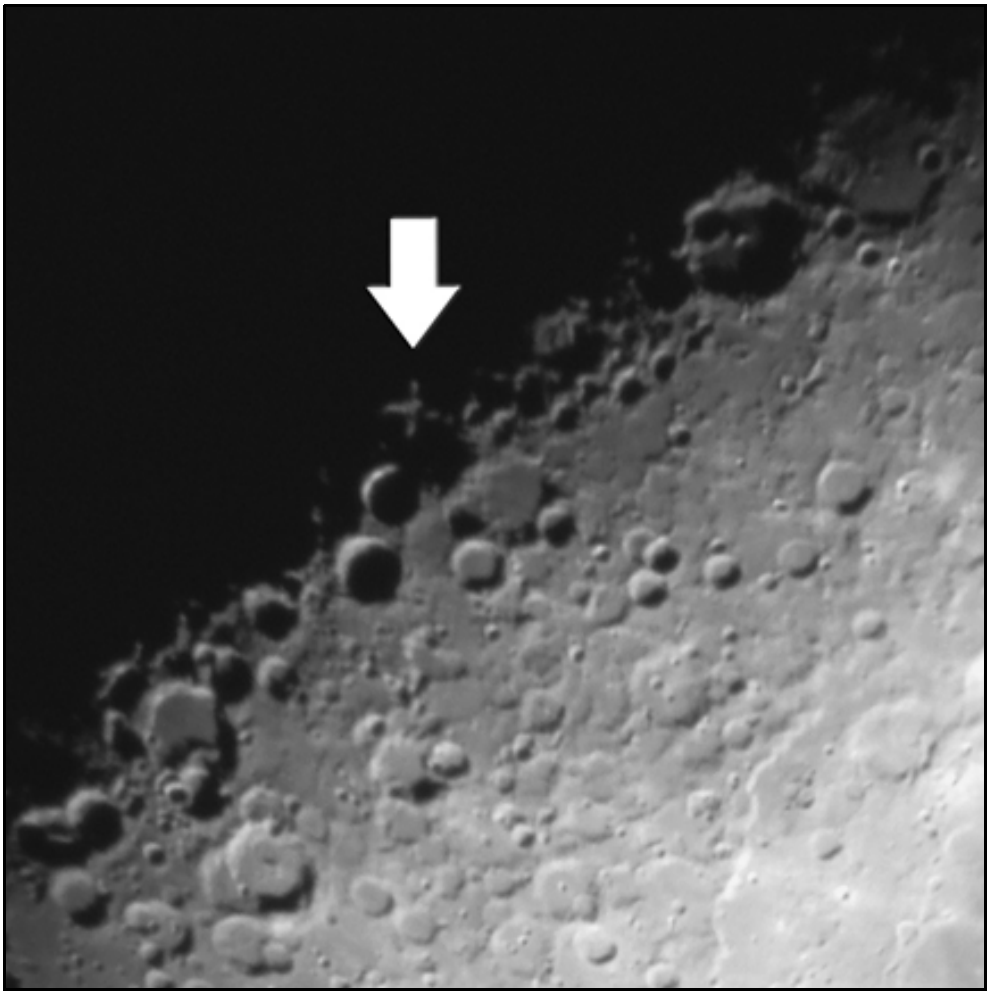

Figure 6. 05:52 UT - Colongitude 357.70°. The “X on the Moon” is completely formed.

Feature Story:

Early Report on the Mars Dust Storm of 2007

By: Jim Melka, e-mail:
jtmelka@yahoo.com

An ALPO Mars Section Observing Report Form is located at the end of this report.

On July 6, 7 and 8, I had exceptional steady seeing in a 15-minute period before and after sunrise. This allowed me a rare opportunity to record sub-arc-second resolution images of the developing dust storm on Mars on those days from my home in Chesterfield, Missouri. I used eyepiece projection at f/65 with my 12-inch Newtonian and a ToUcam II webcam. K3CCDtools software was used to capture 2,400 frames at 10 frames per second for each image. About 500 of the best frames were combined using Registax 4.0.

The three Mars-disks in the attached montage actually show independent core dust clouds over dark surface markings from left to right in each image in Mare Sirenum, Mare Cimmerium, Mare Tyrrhenum and Hesperia with South at the top. The south polar regions are cloud-covered in each image. I made two assumptions to help interpret cloud phenomena and movements:

1. The MARS GENERAL CIRCULATION MODEL for 2 p.m. surface winds near Ls 270° shows a southward wind direction near -15° latitude in the regions identified above. For the MGCM see *http://humbabe.arc.nasa.gov/mcc/9974/270/uvloc_xy.gif* .
2. From the circular appearance of numerous dust clouds in these images, it is assumed that core clouds are basically circular and any that look elongated are circular clouds in contact with each other.

Three clouds (see arrows) near the morning (right) limb in the July 6 image appear in the July 7 image to have moved southward and coalesced into two clouds (see arrows) in Eastern Tyrrhenum. One cloud in central Cimmerium in the July 6 image and one in western Cimmerium have both moved southwestward in the July 7 image still in Cimmerium. All four of these clouds appear to have moved and grown in size in the July 8 image.

Figure 1. Imaging setup by Jim Melka, including laptop computer and 12.0 in. (30.5 cm) Newtonian reflector on German Equatorial Mount with a Philips ToUcam webcam configured for eyepiece projection; laptop equipped with K3CCD Tools image acquisition software, Registax 4.0 image processing software. (Image by Jim Melka)

All Readers

Your comments, questions, etc., about this report are appreciated. Please send them to: *poshedly@bellsouth.net* for publication in the next Journal.

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Standard ALPO Scale of Intensity:
- 0.0 = Completely black
- 10.0 = Very brightest features
- Intermediate values are assigned along the scale to account for observed intensity of features

ALPO Scale of Seeing Conditions:
- 0 = Worst
- 10 = Perfect

Scale of Transparency Conditions:
- Magnitude of the faintest star observable near Mars in the sky when allowing for daylight and twilight

IAU directions are used in all instances.

A cloud in the July 6 image in Eastern Cimmerium appears to have a dust tail extending into the south polar regions! The July 8 image shows a line of four clouds in a gentle arc covering parts of Phaethontis, Electris and Eridania. With Mars at a distance of 1.44 AU from Earth, one second of arc covers about 1,046 km. Based on this, the clouds in this region range between 450 km and 650 km in diameter. These are among the most interesting observations of Mars that I have made over a period of 35 years that began with the great dust storm of 1971.

The new electronic imaging technology contributed greatly to this success. All Mars observers with similar cameras can benefit in like manner if excellent seeing conditions are present.

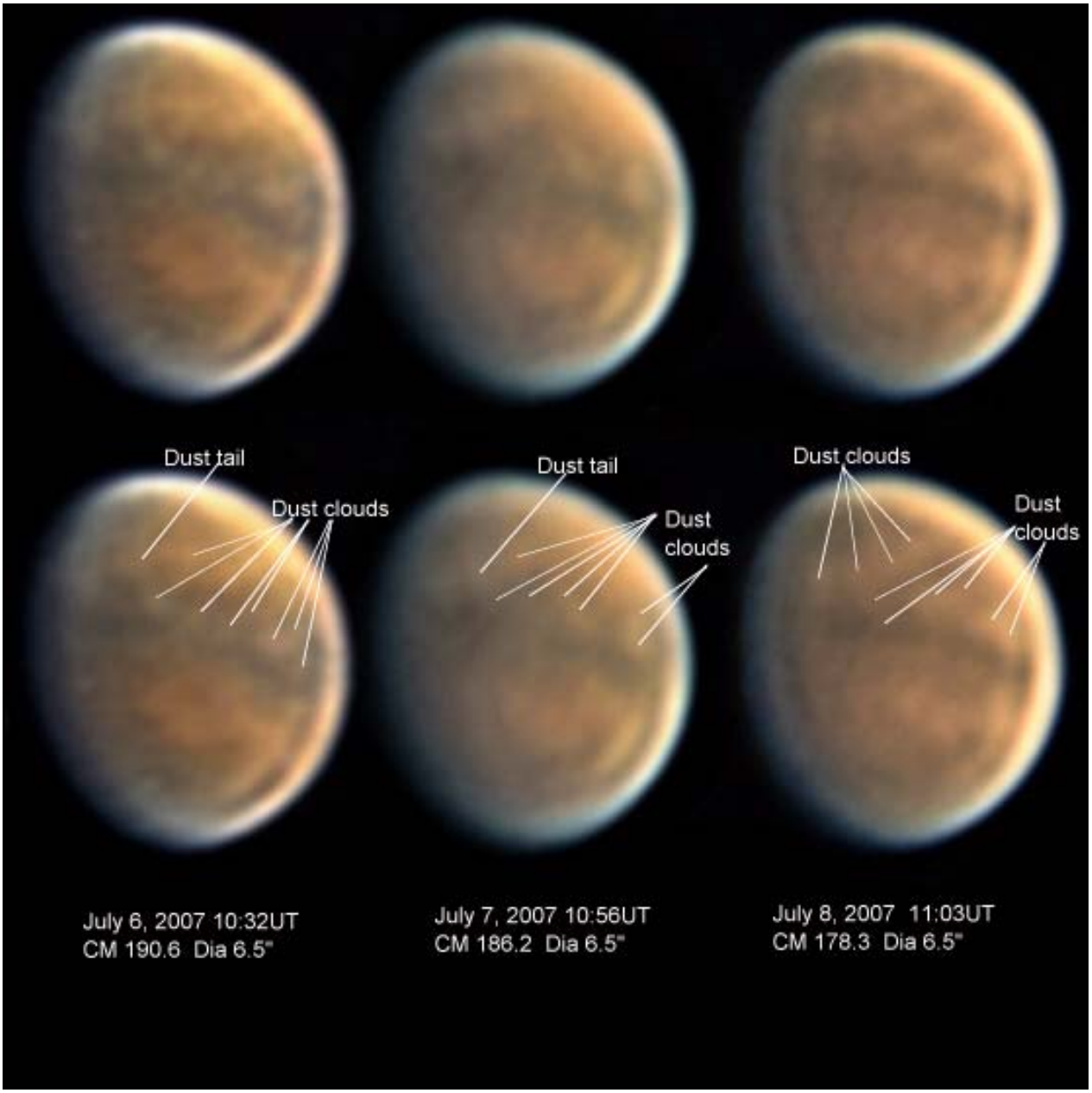
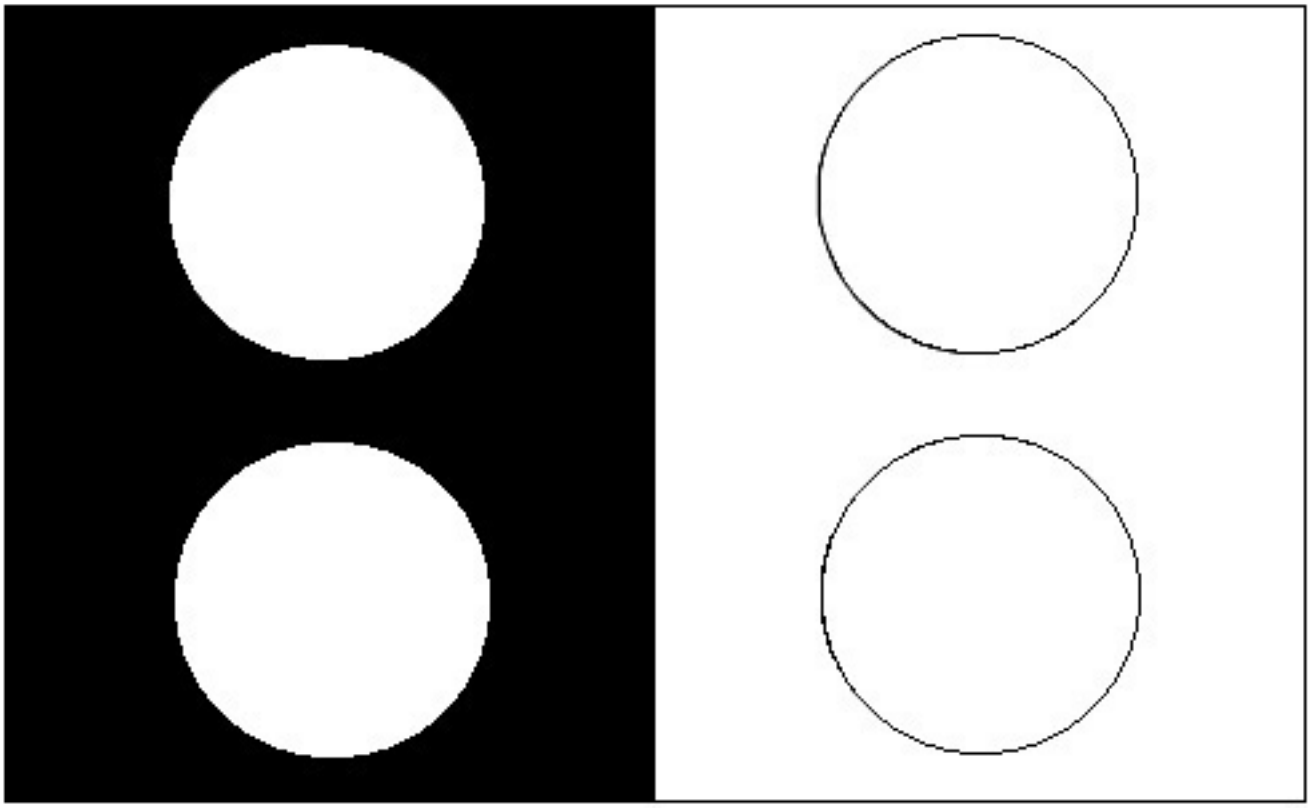


Figure 2. Mars images by Jim Melka, showing progression of dust clouds on July 6, 7 and 8, 2007. (Image by Jim Melka)

A.L.P.O. Mars Section Observation



Top: Time (UT):_____
CM:_____° W
Filter:_____(W / S)

Bottom: Time (UT):_____
CM:_____° W
Filter:_____(W / S)

Date (UT):_____
Time (UT):_____ - _____
CM: _____° W - _____° W
D_E:_____° - L_S:_____°
Dia. ("):_____ k (phase): _____
Telescope:_____ f/_____ (in. / cm. ; RL . RR . SC)
Magnification:_____x _____x _____x
Filters:_____(W / S)
Seeing (0-10):_____ Antoniadi (I-V):_____
Transparency (1-6):_____(Clear / Haze / Int. Clouds)
Blue (Violet) Clearing (0-3):_____

Observer:_____
Address:_____

Observing Station:_____

E-mail (optional):_____

Notes

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(Continue on back if needed)

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ALPO Resources

People, publications, etc., to help our members

areas at 219 inches to the lunar diameter. Price: $28 for the United States, Canada, and Mexico; $40 elsewhere.

- **Monograph No. 4.** *Proceedings of the 45th Convention of the Association of Lunar and Planetary Observers. Wichita, Kansas, August 1-5, 1995.127* pages. Hard copy $17 for the United States, Canada, and Mexico; $26 elsewhere.

- **Monograph No. *5.*** *Astronomical and Physical Observations of the Axis of Rotation and the Topography of the Planet Mars. First Memoir; 1877-1878.* By Giovanni Virginio Schiaparelli, translated by William Sheehan. 59 pages. Hard copy $10 for the United States, Canada, and Mexico; $15 elsewhere.

- **Monograph No. *6.*** *Proceedings of the 47th Convention of the Association of Lunar and Planetary Observers, Tucson, Arizona, October 19-21, 1996.20* pages. Hard copy $3 for the United States, Canada, and Mexico; $4 elsewhere.

- **Monograph No. 7.** *Proceedings of the 48th Convention of the Association of Lunar and Planetary Observers. Las Cruces, New Mexico, June 25-29, 1997.76* pages. Hard copy $12 for the United States, Canada, and Mexico; $16 elsewhere.

- **Monograph No. 8**. *Proceedings of the 49th Convention of the Association of Lunar and Planetary Observers. Atlanta, Georgia, July 9-11,1998.122* pages. Hard copy $17 for the United States, Canada, and Mexico; $26 elsewhere.

- **Monograph Number 9**. *Does Anything Ever Happen on the Moon?* By Walter H. Haas. Reprint of 1942 article. 54 pages.Hard copy $6 for the United States, Canada, and Mexico; $8 elsewhere.

- **Monograph Number 10.** *Observing and Understanding Uranus, Neptune and Pluto*. By Richard W. Schmude, Jr. 31 pages.Hard copy $4 for the United States, Canada, and Mexico; $5 elsewhere.

ALPO Observing Section Publications

Order the following directly from the appropriate ALPO section coordinators; use the address in the listings pages which appeared earlier in this booklet unless another address is given.

- **Solar:** Totally revised *Guidelines for the Observation and Reporting of Solar Phenomena*, $10 USD; includes CD with 100 page-manual in pdf with up-to-date techniques, images, and links to many solar references. Produced by ALPO Solar Section Assistant Coordinator and Archivist Jamey Jenkins, this publication replaces *Observe and Understand the Sun* and its predecessor, *The Association of Lunar& Planetary Observer's Solar Section Handbook for the White Light Observation of Solar Phenomena*, both by the ALPO's own Rik Hill. To order, send check or US money order made payable to Jamey Jenkins, 308 West First Street, Homer, Illinois 61849; e-mail to *jenkinsjl@yahoo.com*

- **Lunar and Planetary Training Program:** *The Novice Observers Handbook* $15. An introductory text to the training program. Includes directions for recording lunar and planetary observations, useful exercises for determining observational parameters, and observing forms. Send check or money order payable to Timothy J. Robertson, 2010 Hillgate Way #L, Simi Valley, CA 93065.

- **Lunar (Dembowski):** (1) *The ALPO Lunar Section's Selected Areas Program (*$17.50). Includes full set of observing forms for the assigned or chosen lunar area or feature, along with a copy of the *Lunar Selected Areas Program Manual.* (2) *Observing Forms,* free at *http://www.alpo-astronomy.org* (then Topographical Studies and Selected Areas Home Page), or $10 for a packet of forms by regular mail. Specify *Lunar Forms*. NOTE: Observers who wish to make copies of the observing forms may instead send a SASE for a copy of forms available for each program. Authorization to duplicate forms is given only for the purpose of recording and submitting observations to the ALPO lunar SAP section. Observers should make copies using high-quality paper.)

- **Lunar**: *The Lunar Observer*, official newsletter of the ALPO Lunar Section, published monthly. Free at *http://www.zone-vx.com/tlo.pdf* or 70 cents per copy hard copy; send SASE with payment (check or money order) to: William Dembowski, Elton Moonshine Observatory, 219 Old Bedford Pike, Windber, PA 15963

- **Lunar (Jamieson):** *Lunar Observer's Tool Kit*, price $50, is a computer program designed to aid lunar observers at all levels to plan, make, and record their observations. This popular program was first written in 1985 for the Commodore 64 and ported to DOS around 1990. Those familiar with the old DOS version will find most of the same tools in this new Windows version, plus many new ones. A complete list of these tools includes Dome Table View and Maintenance, Dome Observation Scheduling, Archiving Your Dome Observations, Lunar Feature Table View and Maintenance, Schedule General Lunar Observations, Lunar Heights and Depths, Solar Altitude and Azimuth, Lunar Ephemeris, Lunar Longitude and Latitude to Xi and Eta, Lunar Xi and Eta to Longitude and Latitude, Lunar Atlas Referencing, JALPO and Selenology Bibliography, Minimum System Requirements, Lunar and Planetary Links, and Lunar Observer's ToolKit Help and Library. Some of the program's options include predicting when a lunar feature will be illuminated in a certain way, what features from a collection of features will be under a given range of illumination, physical ephemeris information, mountain height computation, coordinate conversion, and browsing of the software's included database of over 6,000 lunar features. Contact *harry@persoftware.com*

- **Venus (Benton):** (1) *ALPO Venus Observing Kit,* $17.50; includes introductory description of ALPO Venus observing programs for beginners, a full set of observing forms, and a copy of *The Venus Handbook.* (2) *Observing Forms,* free at *http://www.alpo-astronomy.org* (then Venus Section), or $10 for a packet of forms by regular mail (specify *Venus Forms).* To order either numbers (1) or (2), send a check

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- **Mars:** *(1) ALPO Mars Observers Handbook,* send check or money order for $15 per book (postage and handling included) to Astronomical League Sales, c/o Marion M. Bachtell, P.O. Box 572, West Burlington, IA 52655; FAX: 1-319-758-7311; e-mail at alsales@astronomicalleague.com. *(2) Observing Forms;* send SASE to obtain one form for you to copy; otherwise send $3.60 to obtain 25 copies (send and make checks payable to "Deborah Hines").

- **Jupiter:** *(1) Jupiter Observer's Handbook*, $15 from the Astronomical League Sales, c/o Marion M. Bachtell, P.O. Box 572, West Burlington, IA 52655; FAX: 1-319-758-7311; e-mail at alsales@astronomicalleague.com. (2) *Jupiter*, the ALPO section newsletter, available online only via the ALPO website; (3) *J-Net*, the ALPO Jupiter Section e-mail network; send an e-mail message to Craig MacDougal. (4) *Timing the Eclipses of Jupiter's Galilean Satellites* observing kit and report form; send SASE to John Westfall. (5) *Jupiter Observer's Startup Kit*, $3 from Richard Schmude, Jupiter Section coordinator.

- **Saturn (Benton):** (1) *ALPO Saturn Observing Kit*, $20; includes introductory description of Saturn observing programs for beginners, a full set of observing forms, and a copy of *The Saturn Handbook*. Newly released book *Saturn and How to Observe It* (by J. Benton) replaces to *The Saturn Handbook* in early 2006. (2) *Saturn Observing Forms*, free *t http://www.alpo-astronomy.org* (then Saturn Section), or $10 by regular mail. Specify *Saturn Forms.* NOTE: Observers who wish to make copies of the observing forms may instead send a SASE for a copy of forms available for each program. Authorization to duplicate forms is given only for the purpose of recording and submitting observations to the ALPO Saturn section.

- **Meteors:** (1) *The ALPO Guide to Watching Meteors* (pamphlet). $4 per copy (includes postage & handling); send check or money order to Astronomical League Sales, c/o Marion M. Bachtell, P.O. Box 572, West Burlington, IA 52655; FAX: 1-319-758-7311; e-mail at alsales@astronomicalleague.com. (2) *The ALPO Meteors Section Newsletter*, free (except postage), published quarterly (March, June, September, and December). Send check or money order for first class postage to cover desired number of issues to Robert D. Lunsford, 1828 Cobblecreek St., Chula Vista, CA 91913-3917.

- **Minor Planets (Derald D. Nye):** *The Minor Planet Bulletin*. Published quarterly; free at *http://www.minorplanetobserver.com/mpb/default.htm* or $14 per year via regular mail in the U.S., Mexico and Canada, $19 per year elsewhere (air mail only). Send check or money order payable to "Minor Planet Bulletin" to Derald D. Nye, 10385 East Observatory Dr., Corona de Tucson, AZ 8564I-2309.

Other ALPO Publications

Checks must be in U.S. funds, payable to an American bank with bank routing number.

- ***An Introductory Bibliography for Solar System Observers.* No charge.** Four-page list of books and magazines about Solar System objects and how to observe them. The current edition was updated in October 1998. Send self-addressed stamped envelope with request to current ALPO Membership Secretary (Matt Will).

- ***ALPO Membership Directory.*** Provided only to ALPO board and staff members. Contact current ALPO membership secretary/treasurer (Matt Will).

- ***Back issues of The Strolling Astronomer (JALPO)***. Download JALPO43-1 thru present issue in pdf from *http://www.justfurnfurn.org/DJALPO* (no charge).

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The Association of Lunar & Planetary Observers (ALPO) was founded by Walter H. Haas in 1947, and incorporated in 1990, as a medium for advancing and conducting astronomical work by both professional and amateur astronomers who share an interest in Solar System observations. We welcome and provide services for all individuals interested in lunar and planetary astronomy. For the novice observer, the ALPO is a place to learn and to enhance observational techniques. For the advanced amateur astronomer, it is a place where one's work will count. For the professional astronomer, it is a resource where group studies or systematic observing patrols add to the advancement of astronomy.

Our Association is an international group of students that study the Sun, Moon, planets, asteroids, meteors, meteorites and comets. Our goals are to stimulate, coordinate, and generally promote the study of these bodies using methods and instruments that are available within the communities of both amateur and professional astronomers. We hold a conference each summer, usually in conjunction with other astronomical groups.

We have "sections" for the observation of all the types of bodies found in our Solar System. Section Coordinators collect and study submitted observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals. Each Coordinator can supply observing forms and other instructional material to assist in your telescopic work. You are encouraged to correspond with the Coordinators in whose projects you are interested. Coordinators can be contacted through our web site via e-mail or at their postal mail addresses listed in back of our Journal. Out web site is hosted by the Lunar and Planetary Laboratory of the University of Arizona which you are encouraged to visit at http://www.lpl.arizona.edu/alpo/. Our activities are on a volunteer basis, and each member can do as much or as little as he or she wishes. Of course, the ALPO gains in stature and in importance in proportion to how much and also how well each member contributes through his or her participation.

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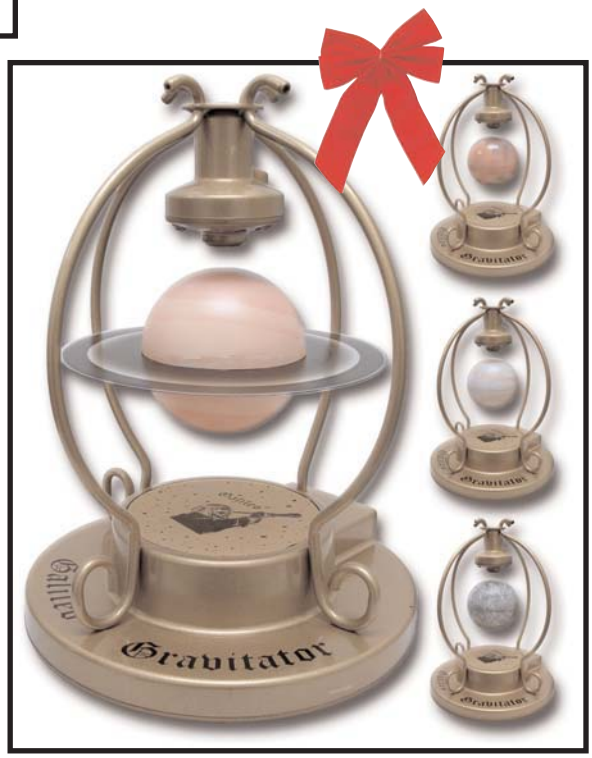

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