

THE LUNAR OBSERVER

RECENT BACK ISSUES: http://www.zone-vx.com/tlo_back.html

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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219 Old Bedford Pike (Elton) - Windber, PA 15963

FEATURE OF THE MONTH - MARCH 2006



MONTES SPITZBERGEN

Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA

November 10, 2005 - 23:25 to 23:46 UT

15cm Newtonian - 170x - Seeing 7-8/10

I drew this area on the evening of Nov. 10, 2005 while observing four occultations. This clump of peaks is in eastern Mare Imbrium north of Archimedes. It is one of several isolated mountain groups in Mare Imbrium. Many of the more conspicuous peaks are in pairs. Montes Spitzbergen (M.S) mu is a small pair of peaks north of the main group. The tiny pit to the west of M.S. mu is Kirch E, according to the L.Q. map. This crater had a modest halo. The large pair at the north end of the main group appears to be M.S. epsilon, and M.S. beta is at the west end. The latter feature had a strip of shadow within it, and also appeared less bright than nearby peaks.

There is a large peak between epsilon and beta which is shown, but not labelled on the L.Q. map. The large double peak at the south end of the main group is M.S. gamma, with M.S. alpha just to its southeast. The moderate sized pit to the southwest is M.S. A, and the small pit to the southeast is Archimedes V. Neither of these craters had a halo. The double peak between these craters is Archimedes xi. This pair is as far south of the main group as M.S. mu is to the north. This area has a varied assortment of small peaks and ridges which I have tried to draw as well as possible.

LUNAR CALENDAR - MARCH 2006 (UT)

01 04:00 Moon 3.3 Degrees SSE of Mercury
 06 06:00 Moon 2.9 Degrees NNW of Mars
 06 20:15 First Quarter
 10 20:00 Moon 3.8 Degrees NNE of Saturn
 13 02:00 Moon at Apogee (406,279 km - 252,450 miles)
 14 23:35 Full Moon (Penumbral Lunar Eclipse)
 19 10:00 Moon 5.0 Degrees SSW of Jupiter
 22 19:10 Last Quarter
 25 11:00 Moon 0.7 Degrees NNW of Ceres
 26 03:00 Moon 5.5 Degrees SSE of Venus
 26 03:00 Moon 3.6 Degrees SSE of Neptune
 27 17:00 Moon 1.3 Degrees SE of Uranus
 27 19:00 Moon 2.1 Degrees SE of Mercury
 28 07:00 Moon at Perigee (359,169 km - 223,177 miles)
 29 10:17 New Moon (Start of Lunation 1030) (Total Eclipse of Sun)

ECLIPSE INFORMATION

For general information about lunar and solar eclipses, visit the A.L.P.O. Eclipse Section Page:
<http://www.lpl.arizona.edu/~rhill/alpo/eclipse.html>

For specific information on both the March 14 penumbral lunar eclipse and the March 29 solar eclipse, visit the NASA Eclipse Home Page:
<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

SPECIAL ANNOUNCEMENT TO A.L.P.O. MEMBERS

Effective immediately, the ALPO Lunar Selected Areas Program will be absorbed into the ALPO Lunar Topographical Studies Program headed by Lunar Coordinator, Mr. Bill Dembowski. This change is being made at the request of Dr. Julius L. Benton, Jr., who has been in charge of the Section for several decades, but must now focus on managing the significantly increased demands of the ALPO Saturn and Venus Sections as well as his duties as ALPO Executive Director. The ALPO Selected Areas Program also includes the Bright and Banded Craters and Dark Haloed Craters Programs. All observations and images, as well as communications concerning the ALPO Selected Areas Program, should be directed to:

Coordinator - Lunar Topographical Studies
William M. Dembowski, FRAS
219 Old Bedford Pike
Windber, PA 15963-8905
dembowski@zone-vx.com

When submitting observations to the A.L.P.O. Lunar Section

In addition to information specifically related to the observing program being addressed, the following data should always be included:

Name and location of observer
Name of feature
Date and time (UT) of observation
Size and type of telescope used
Seeing: 1 to 10 (1-Worst 10-Best)
Transparency: 1 to 6
Magnification (for sketches)
Medium employed (for photographs and electronic images)

AN INVITATION TO JOIN THE A.L.P.O.

The Lunar Observer is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non-members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a non-member you are invited to join our organization for its many other advantages.

We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

Our quarterly journal, **The Strolling Astronomer**, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Several copies of recent journals can be found on-line at: <http://www.justfun.org/djalpo/> Look for the issues marked FREE, they are not password protected. Additional information about the A.L.P.O. can be found at our website: <http://www.lpl.arizona.edu/alpo/> Spend a few minutes browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.

To learn more about membership in the A.L.P.O. go to: <http://www.lpl.arizona.edu/~rhill/alpo/member.html> which now also provides links so that you can enroll and pay your membership dues online.

FOCUS ON: Eratosthenes

**William M. Dembowski, FRAS
Coordinator, Lunar Topographical Studies**

Eratosthenes is a splendid crater located quite near the center of the lunar disc (14.5N 11.3W). Easily found by following the curve of the Apennine Mountains (Figure 1), Eratosthenes is sometimes called a miniature Copernicus which lies to its southwest. Actually, if it were not for the close proximity of Copernicus, Eratosthenes would easily be the grandest crater within a radius of 700 kilometers.



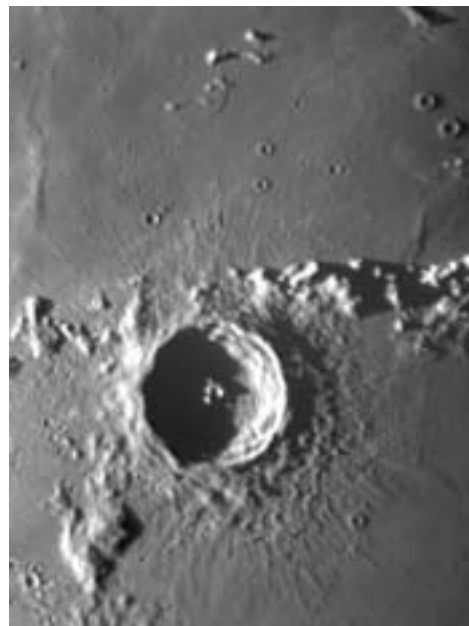
FIGURE 1
Eratosthenes and the Apennine Mountains

**Digital image by Ed Crandall
Winston-Salem, North Carolina, USA
February 8, 2006 - 02:15 UT
110mm f/6.5 APO Refractor
3x Barlow - Philips Toucam**

Under a low to moderate sun, Eratosthenes displays some very sharp features across its terraced walls which reach heights from 3,000 to 5,000 meters (10,000-16,000 ft.). Just beyond the walls is the ejecta blanket, plainly visible on the maria surfaces but mostly obscured where it blends with the Apennine terrain (Figure 2).

FIGURE 2
Ejecta Blanket of Eratosthenes

**Digital image by K.C. Pau
Hong Kong, China
December 23, 2005 - 21:32 UT
250mm f/6 Newtonian Reflector
20mm Eyepiece - Philips Toucam**



The floor, however, is a more difficult subject. Lying about 2,400 meters (8,000 ft.) below the surrounding surface it shows mostly impact melt and ill-defined rubble in a medium sized telescope. The multiple central peaks show nicely when illuminated by a low sun but can appear as a single, triangular mountain under a higher sun or small telescope (Figure 3).

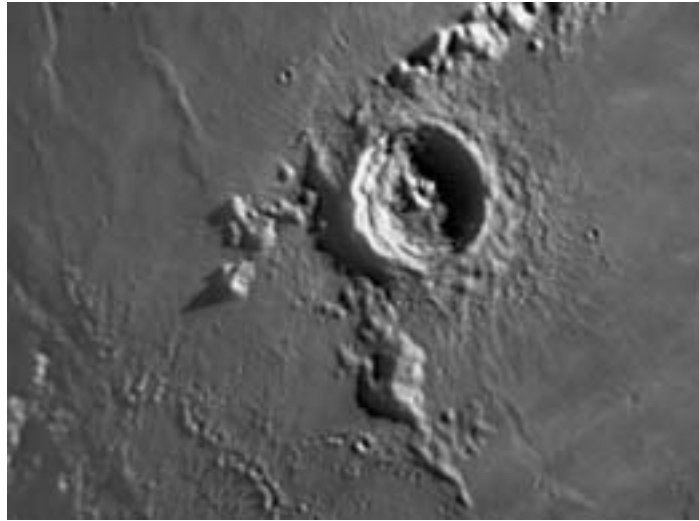


FIGURE 3
Central Peaks in Eratosthenes

**Digital image by Rafael Benavides Palencia - Posadas, Cordoba, Spain
December 20, 2004 - 19:58 UT - 235mm SCT - 2x Barlow - Philips Toucam**

Under a high sun, Eratosthenes is one of the most interesting subjects on the lunar surface if you can find it. With a diameter of 58 km (36 miles), Eratosthenes is not particularly small, but under a high sun it is easily lost in the random pattern of spots and streaks that surround it. The ray pattern of nearby Copernicus contributes to the confusion but it is the markings within Eratosthenes itself which provide most of the camouflage (Figure 4).

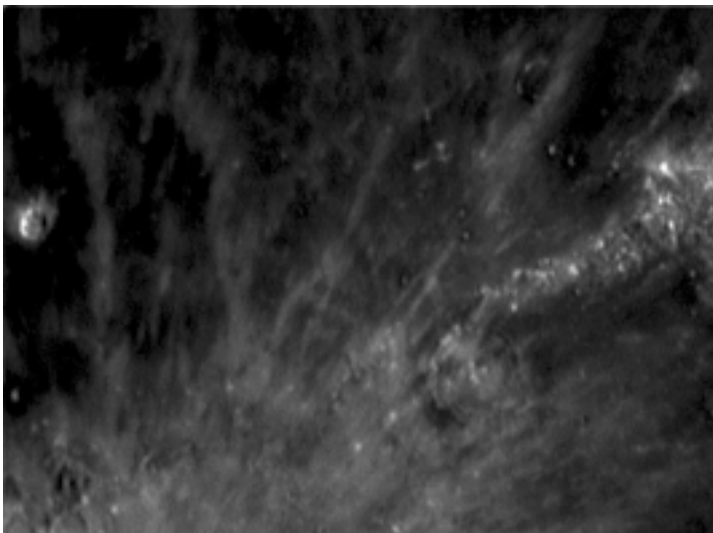


FIGURE 4
Eratosthenes Under a High Sun

**Digital image by Wayne Bailey
Sewell, New Jersey, USA
February 11, 2006 - 02:54 UT
11 inch f/10 SCT
Baader UV-IR Block Filter
Philips Toucam**

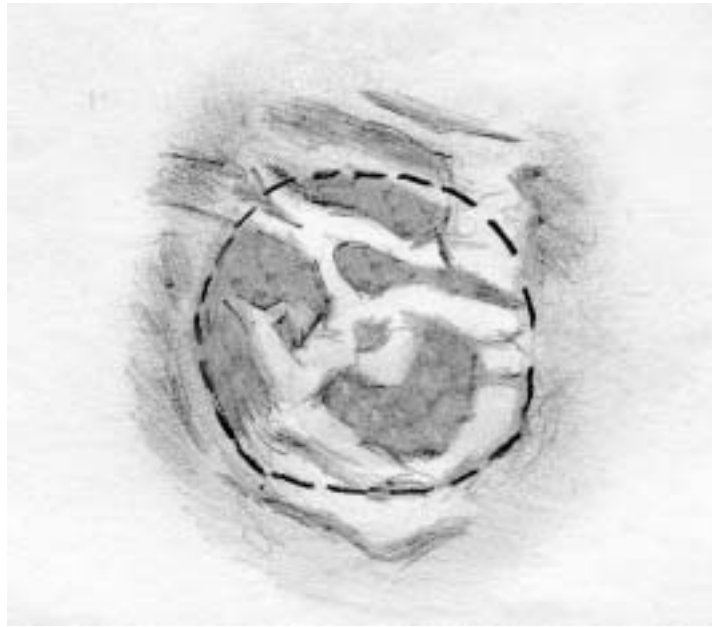


FIGURE 5

Markings Within Eratosthenes at Full Moon

Sketch by Robert Włodarczyk - Czestochowa, Poland

February 12, 2006 - 20:00 UT - 12cm f/7.5 Newtonian Reflector - 112x

The markings within Eratosthenes do not seem to be related to any relief features on its floor or walls (Figure 5). The larger ones are pretty well known and seem to follow cyclical changes in appearance. Even so, their varying patterns make a nice project for persistent observers. Harold Hill included a series of sketches in his “Portfolio of Lunar Drawings” that beautifully illustrate these changing aspects under various lighting conditions. The smaller patches and spots are a somewhat different matter; they don’t follow a predictable cycle. In fact, W. H. Pickering, who spent a great deal of time studying them, attributed their changing appearance to the movements of small animals or swarms of insects. We now know that this would be impossible, but it does illustrate how fascinating this crater can be.

References:

Hill, Harold, “A Portfolio of Lunar Drawings”, Cambridge University Press, 1991

Price, Fred W., “The Moon Observer’s Handbook”, Cambridge University Press, 1988

Wood, Charles A., “The Modern Moon: A personal view”), Sky Publishing, 2003

CALL FOR OBSERVATIONS

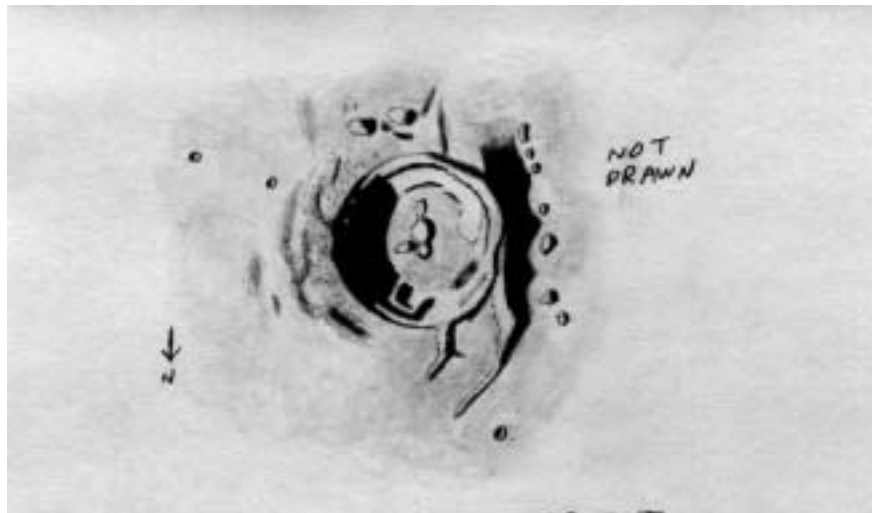
FOCUS ON: Pitatus

Focus On is a bi-monthly series of articles which includes observations received for a specific feature or class of features. The subject of the next installment (**May 2006**) is **Pitatus**. Observations of all kinds (electronic or film based images, sketches, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add this fascinating crater to your observing list and send your favorites to one of the addresses shown in the banner on Page One. The deadline for inclusion in the article is **April 20, 2006**.

ADDITIONAL ERATOSTHENES OBSERVATIONS



**Digital image by Howard Eskildsen - Ocala, Florida, USA
February 7, 2006 - 01:20 UT
8 inch Refractor - 5x TeleXtender - 40mm EP - Nikon Coolpix 4300**



**Sketch by Robert H. Hays, Jr. - Worth, Illinois, USA
January 9, 2006 - 00:15 to 00:55 UT
15cm Newtonian Reflector - 116x**

ADDITIONAL ERATOSTHENES OBSERVATIONS

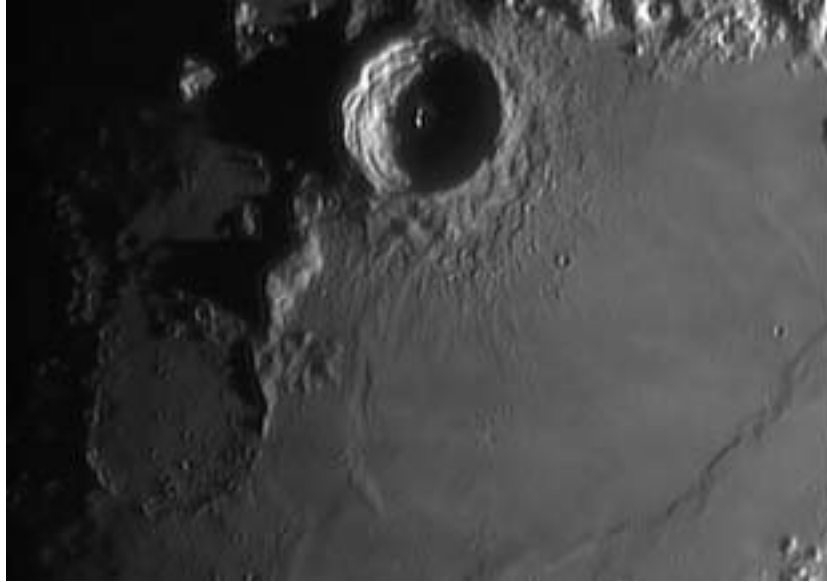


**Digital image by Michael Boschat
Halifax, Nova Scotia, Canada
April 17, 2005 - 00:55 UT
105mm f/10 Refractor - Centrios Camera**



**Digital image by Donald Spain
Hillview, Kentucky, USA
June 15, 2005 - 01:56 UT
152mm f/8 Refractor - 2x Barlow - Meade LPI**

ADDITIONAL ERATOSTHENES OBSERVATIONS



**Digital image by Gerardo Sbarufatti
Caselle Landi, Italy
February 17, 2005 - 19:07 UT
8 inch SCT - 2x Barlow - Red filter - Philips Vesta Pro**



**Digital image by John Sussenbach - Netherlands
April 11, 2003
8 inch SCT - 2x Barlow - Philips Toucam Pro**

LAVA FLOWS IN MARE IMBRIUM

by Raffaello Braga (rafbraga@tin.it) and
Gerardo Sbarufatti (elyx69@libero.it)

As seen from Earth-based telescopes lunar maria seem nothing more than giant plains filled with some type of dark stuff. The ancients believed they were seas like those on the Earth, and some still believe today that they are comparable to the terrestrial deserts, plains of sand formed by the erosion of the lunar relief by wind and water when they were present on the Moon during its early history. But as everyone knows lunar maria actually formed by the superposition of countless flows of basaltic lava erupted from fissures and vents located mostly on the floor of the ancient impact basins.

Before the space age this obvious observation was not so easy to accept by many lunar scientists: if maria are lava plains where are the single flows that form them? In fact on Earth lava flows can be easily traced but on the Moon this is not so simple for a number of reasons, including the very low viscosity of lunar basalts, which formed only very low-relief features, and the degradation by small meteoritic impacts that occurred since the time of their eruption. Location of single lava flows can be deduced by examining the photographs taken from orbiting spacecrafts, in particular the multispectral ones. Clementine and Galileo spacecraft images allowed lunar scientists to trace the history of the emplacement of many lunar maria with unprecedented detail. Imaging of lunar flows from Earth, instead, is a difficult task but not an impossible one. Flow scarps are very low - their height in the order of 30 – 40 meters only, and like lunar domes they can be seen only when crossed by the terminator. Lunar imager Gerardo Sbarufatti produced two beautiful views of lava flows in Mare Imbrium.

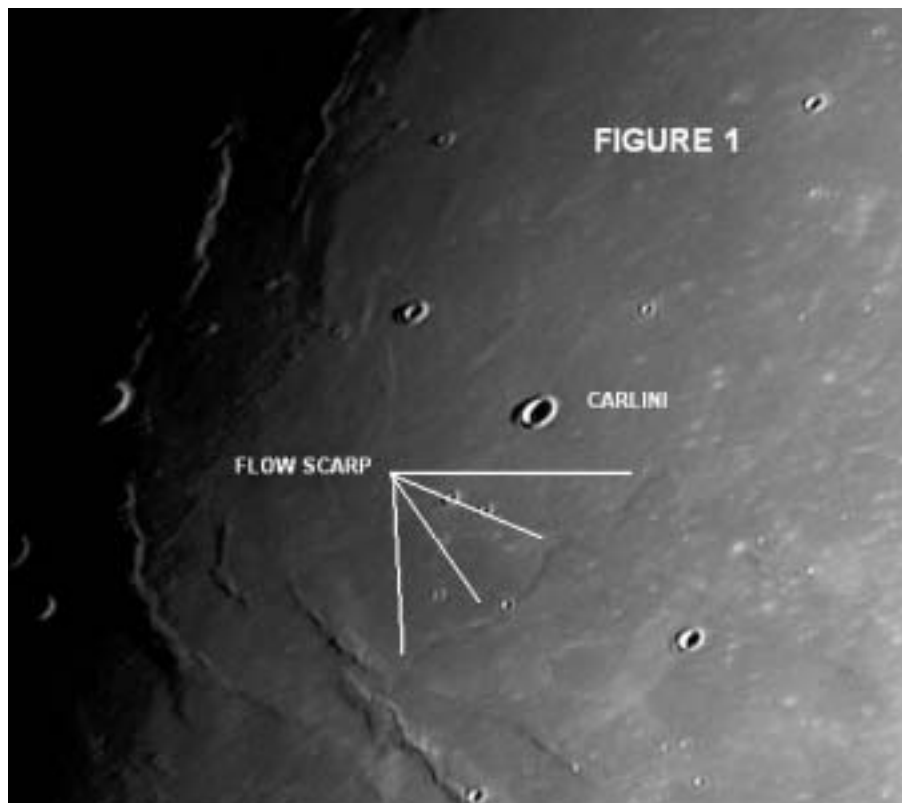


FIGURE 1 - Gerardo Sbarufatti - (See text for details)

Figure 1 was taken in the night of January 9, 2006 at 19:47 UT with a 203 mm Schmidt-Cassegrain telescope and is centred in the region between craters Carlini and Carlini A. Arrows indicate a long flow scarp which is part of a system of relatively young flows originated in the region of crater Euler and flowed toward the center of the mare. This remarkable feature is reported also on the plate No. 10 of the Rühl's atlas. The northeastern "tongue" of this front has been imaged by the Lunar Orbiter V in the frame No. 151-M (not reproduced here) where the feature is reported with impressive details, and the interested reader should not miss such a spectacular view. The prominent ridge toward the bottom of the figure is Dorsum Zirkel whilst Dorsum Heim lies on the east of it.

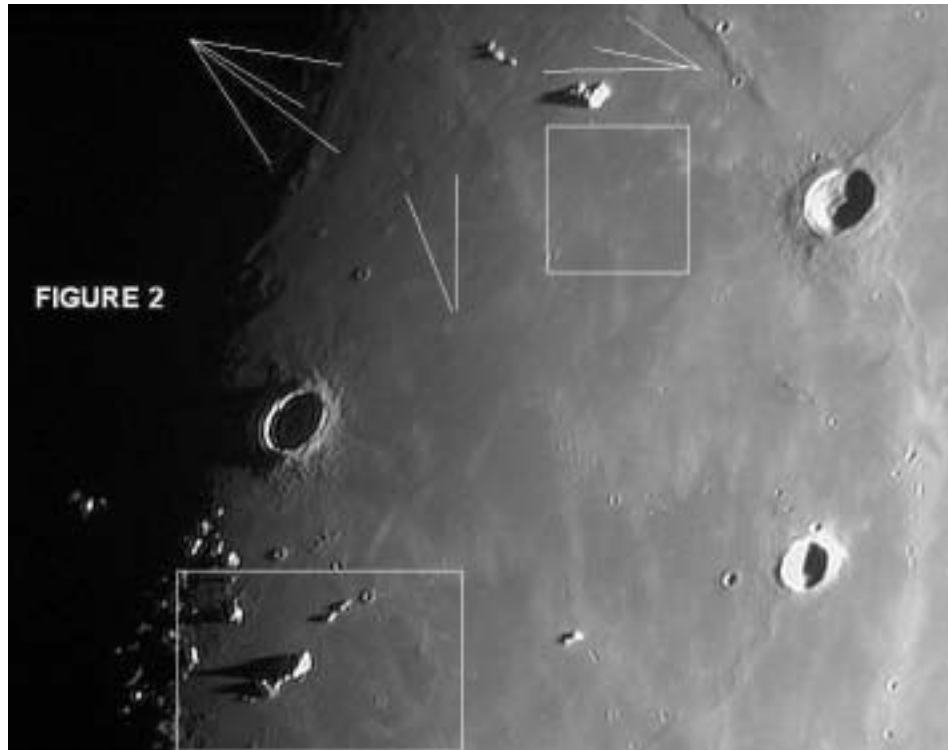


FIGURE 2 - Gerardo Sbarufatti - (See text for details)

Figure 2 (same night at 19:41 UT) continues Figure 1 toward crater Euler along the terminator. The upper part of the figure corresponds to the magnificent Apollo 15 frame M-1556 (see this photo at <http://www.lpi.usra.edu/resources/apollo/frame/?AS15-M-1556>) which can be used for a close comparison with Gerardo's image. Lava channels and ponds, flow fronts and scarps can be recognized here. The white rectangles mark the location of other interesting volcanic zones, in particular the lava source region south of crater Euler whose fine details and rilles require a large telescope and a very steady sky.

LUNAR TOPOGRAPHICAL STUDIES

Coordinator - William M. Dembowski, FRAS

dembowski@zone-vx.com

OBSERVATIONS RECEIVED

WAYNE BAILEY - SEWELL, NEW JERSEY, USA

Digital images of Eratosthenes (16), Copernicus & Eratosthenes (2), Mare Humorum (6), Kepler & Copernicus (3), Mare Humorum, Copernicus, Kepler & Eratosthenes, Dionysius

MICHAEL BOSCHAT - HALIFAX, NOVA SCOTIA, CANADA

Digital image of Eratosthenes

ED CRANDALL - WINSTON-SALEM, NORTH CAROLINA, USA

Digital images of Plato, Archimedes, Clavius (2)

HOWARD ESKILDSEN - OCALA, FLORIDA, USA

Digital images of Eratosthenes (2), Rays of Copernicus & Kepler, Mare Fecunditatis & Australe, 12-Day Moon

RAFFAELLO LENA - ROME, ITALY

Digital images of Rima Hadley & Bradley & domes

RAFAEL BENAVIDES PALENCIA - POSADAS, CORDOBA, SPAIN

Digital images of Eratosthenes (3), Stadius, Hesiodus, Moretus

K. C. PAU - HONG KONG, CHINA

Digital images of Eratosthenes (2)

GERARDO SBARUFATTI - CASSELE LANDI (LODI), ITALY

Digital image of Eratosthenes

DONALD SPAIN - HILLVIEW, KENTUCKY, USA

Digital images of Eratosthenes (2)

RANDY TATUM - RICHMOND, VIRGINIA, USA

Digital images of Copernicus, Furnerius, Stadius, Hadley, Egede

ROBERT WLODARCZYK - CZESTOCHOWA, POLAND

Sketches of Eratosthenes (2), Copernicus

RECENT TOPOGRAPHICAL OBSERVATIONS



ARCHIMEDES

Digital image by Ed Crandall
Winston-Salem, North Carolina, USA
January 19, 2006 - 10:39 UT
110mm f/6.5 Refractor - 3x Barlow - Philips Toucam



RIMA HADLEY

Digital image by Raffaello Lena
Rome, Italy
13cm f/6 Refractor - Webcam

RECENT TOPOGRAPHICAL OBSERVATIONS



EGEDE

Digital image by Randy Tatum

Richmond, Virginia, USA

April 26, 2005 - 04:56 UT

10 inch f/12 Newtonian - 2x Barlow - Philips Toucam



HADLEY

Digital image by Randy Tatum

Richmond, Virginia, USA

April 26, 2005 - 04:56 UT

10 inch f/12 Newtonian - 2x Barlow - Philips Toucam

BRIGHT LUNAR RAYS PROJECT

Coordinator - William M. Dembowski, FRAS

Each month TLO features a book or magazine excerpt dealing with Bright Lunar Rays. Some are from current sources, others from vintage astronomical literature. This month's offering is from:

"Observational Astronomy for Amateurs" J. B. Sidgwick (Dover Press 1971) Section 2

Visibility of the rays varies inversely as the size of the angle at the Moon between the Sun and the observer; neither the Sun nor the Earth being 'overhead' from a particular locality on the Moon's surface is itself sufficient. Some, however, are visible at as little as 20 degrees from the terminator.

The rays provide great scope for work, since there is not yet adequate observational data to test rival theories as to their origin and nature. Whether or not superficial granulation or pitting can account for the observed features of the ray systems is another problem that can only be solved through the accumulation of many more observations than are at present available.

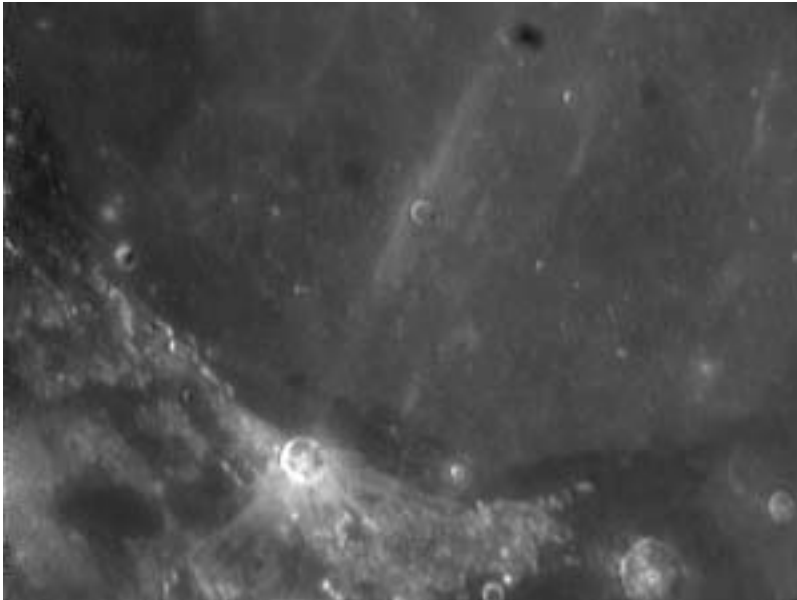
Owing to their ill-defined appearance, and the lack of simultaneity between their best visibility (far from the terminator) and that of other surface features (near the terminator), there is not yet in existence an adequate map of even the more prominent rays.

Statistical discussion of the characteristics of their distribution - e.g. occurrence on high or low ground, broken or smooth ground, on slopes facing towards and away from¹ the centre of the system, discontinuities, curved arcs², avoidance of surface features³, etc - might be very fruitful. Also that of their appearance in different regions - complexity or otherwise of their structure, variations of width, etc; more reliable data are wanted concerning the intercommunication of different ray systems; the smaller ray systems; the radiation of rays from points other than the crater centre - or, if aligned upon the centre, only becoming visible at some distance from the centre; the association of rays with lines of craterlets. Finally, there is a great need for an accurate photometric study of the rays in all parts of the disc.

1. E.g. The Tycho ray on the western slopes of the Altai.
2. E.g. Copernican rays in the vicinity of Pytheas, Pytheas G, and Bessarion D.
3. E.g. Tycho rays in the vicinity of Clavius, Bullialdus, Schneider, and Longomontanus.

A NOTE TO RAY IMAGERS

Present and potential contributors to the Rays Project are reminded that rayed areas should be imaged both when the rays are visible and when they are not. We are interested, not only in the times and lighting conditions under which the rays can/cannot be seen, but in the appearance of the terrain in both circumstances. With that in mind, here are views of Menelaus, with and without its rays.



MENELAUS WITH RAYS

**Digital image by
Alexander Vandenbohede
Ghent, Belgium
January 2, 2004 - 22:00 UT
20cm f/15 Refractor**



MENELAUS WITHOUT RAYS

**Digital image by
Rafael Benavides Palencia
Posadas, Cordoba, Spain
December 7, 2005 - 19:13 UT
15cm f/8 Refractor - 3x Barlow
IR Blocking Filter
Philips Toucam Pro**

LUNAR TRANSIENT PHENOMENA

Coordinator – Dr. Anthony Cook – acc@cs.nott.ac.uk

Assistant Coordinator – David O. Darling – DOD121252@AOL.COM

LTP NEWSLETTER - MARCH 2006

Dr. Anthony Cook - Coordinator

Observations for January were received from: Tony Buick (Orpington, UK), Fabio Carvalho (Lunar Section of REA, Brazil), Clive Brook (Plymouth, UK), Marie Cook (Mundesley, UK), Gerald North (UK), and myself.

The teaching load at University this semester is beginning to bite, so once again sorry for the shortness of this monthly report and also for not keeping the observations received web site up to date.. During the Easter vacation, or after the students finish their exams in May, I will catch up and post all reports received. In the mean time, please keep on sending your observations in and observing at the times given on the predictions. Here are a few highlights from reports received during January 2006:

LTP Report : 2005 Nov 13 - Wayne Bailey has sent me a color image taken (04:47UT) just a few minutes before Glen Ward reported a green cloud near Mersenius (04:50-04:57UT). I checked Wayne's image, and although it has the Mt peak in question, the CCD image is a bit saturated here and it is not obvious that there is any green color - though I can be sure that at the non-saturated base of the Mt it is definitely not green. Anyway I am very grateful that Wayne responded to my request for a confirmation image, this has been helpful. One of these days I am sure that we will get a positive confirmation of a LTP like has been done with meteorite impact flashes. Figure 1 shows his image and Glen's diagram showing the location of the LTP. These images may also be found on-line at:

<http://cs.nott.ac.uk/~acc/Lunar/Nov2005/mersenius.jpg>



Figure 1 - Area near Mersenius

Suspect LTP Report : 2006 Jan 4 - Tony Buick (UK) was taking some digital still images through his Celestron C8. Upon viewing the images afterwards he was interested to find that in one of them Gutenberg C was very bright and had a blue green cast. I have included the sequence of images for others to view on: <http://cs.nott.ac.uk/~acc/Lunar/Jan2006/gutenberg.jpg> . The duration of the event (if that is what it was) was very short, and so if anybody else was observing around 18:32 UT on this day, please get in contact as your image may be the proof that we need. Conversely I think we should be careful here as there are other causes of bright blobs appearing on CCD images in the past e.g. cosmic rays, scintillation, RGB color filter layout over CCD pixels when dealing with small feature scales. Now there is a hint of blue on the last image in the sequence (See Figure 2), which might indicate a LTP decay in process, however there is also a hint of blue on another similar sized crater to the right as well - so one should not read too much into faint blue colorations on digital still camera images as this could be noise.



Figure 2 - Gutenberg C

LTP Report: 2006 Jan 23 UT 06:34-06:36, Fabio Carvalho (Lunar Section of REA, Brazil) was observing visually with a 254mm f/6 Newtonian + Nagler 9mm eyepiece when he noticed some green coloration on the east rim of Tycho. The coloration was a green leaf darkness, like a fog, but gradually faded. The location of the LTP was fixed at that location on the Moon. There was some cirrus but atmospheric stability was good. CCD cameras were brought into action, firstly a high resolution monochrome camera image and then a color image at 06:46 UT. I have examined the latter and even after color normalization and enhancement, no color can be seen here, so the original event was very short in duration and left no discoloration. The monochrome image showing the exact location where the event was observed is shown below in Figure 3. Both images and further information can be found on: <http://cs.nott.ac.uk/~acc/Lunar/Jan2006/tycho.jpg>

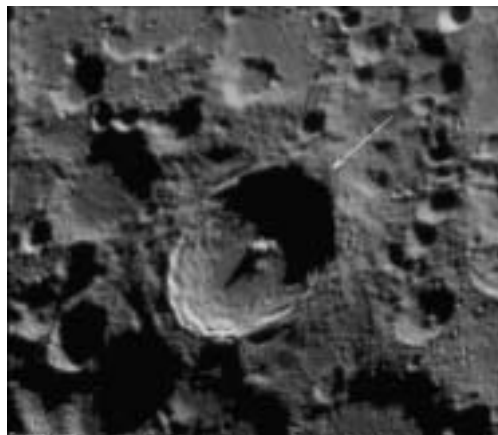


Figure 3 - Tycho

Finally if you want to see a thermal IR image of the Moon taken at Newtonian focus on January then please take a look at <http://cs.nott.ac.uk/~acc/Lunar/Jan2006/2345.jpg> . Remember dark is cold and white is hot. You can see heat from the telescope tube. Resolution is not great, but one can make out some of the seas - these are light and the highlands are dark - a reverse of what we see on visual light images of the Moon.

Further predictions, including the more numerous illumination only events can be found on the following web site: <http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html>. For members who do not have access to the internet, please drop me a line and I will post predictions to you. If you would like to join the LTP telephone alert team, please let me know your phone No. and how late you wish to be contacted. If in the unlikely event you see a LTP, please give me a call on my cell phone: +44 (0)798 505 5681 and I will alert other observers. Note when telephoning from outside the UK you must not use the (0). When phoning from within the UK please do not use the +44!

Dr Anthony Cook, School of Computer Science & IT, Nottingham University, Jubilee Campus, Wollaton Road, Nottingham, NG6 1BB, UNITED KINGDOM. Email: acc@cs.nott.ac.uk

THE MOON IN THE NEWS

SMART-1 To Crash Into Lunar Surface in August

<http://www.physorg.com/news10604.html>

Ancient Impact May Have Created “The Man in the Moon”

http://www.universetoday.com/am/publish/man_on_the_moon.html?1322006

LRO - Searching for a New Moon

http://www.space.com/business/technology/060207_lro_technology.html

Lunar Liquid Mirror Telescope Studied by NASA

http://www.space.com/business/technology/060208_technovel_lmt.html

Shooting for the Moon, Once Again

<http://www.latimes.com/news/science/la-sci-moon12feb12,0,3841305.story?coll=la-home-headlines>

Dark Lava Floor of Crater Billy

<http://www.physorg.com/news11022.html>

NASA Considers Earlier Lunar Landing

<http://msnbc.msn.com/id/11101663/>

The Mysterious Smell of Moon Dust

http://www.nasa.gov/mission_pages/exploration/mmb/30jan_smellofmoondust.html

NASA Focuses on Developing New Moon Craft

http://www.usatoday.com/tech/science/space/2006-02-07-nasa-missions_x.htm

India Mission on Schedule for 2007

<http://www.hindu.com/2006/02/05/stories/2006020514640900.htm>