# THE LUNAR OBSERVER

**A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.**


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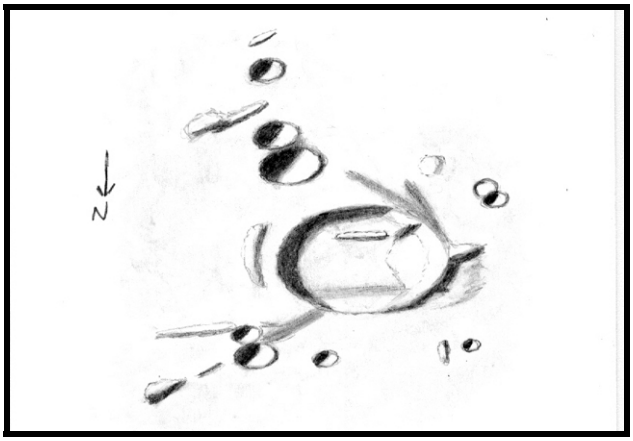
**RECENT BACK ISSUES:** http://moon.scopesandscapes.com/tlo_back.html


# FEATURE OF THE MONTH – SEPTEMBER 2012

## Anaxagoras




**Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA**
**April 3, 2012 02:20-02:56 UT, 15 cm refl, 170x, seeing 7-8/10**

I drew this crater and vicinity on the evening of April 2/3, 2012. This crater is north of Mare Frigoris and well north of Plato. The libration was favorable for it that evening. Anaxagoras has what appears to be a large slump inside its western rim opposite a large, sharp projection or peak outside that rim. There is a low ridge inside its south rim and a vague strip of shadow inside its north rim. The shadow inside its east rim looks ordinary, but there is a low, curved ridge just outside the east rim and concentric to it. Another strip of shadow angles off from the north rim of Anaxagoras, ending at two craters, the larger being Goldschmidt D. More elevations and shadow strips are east of this crater pair, and another pit is just west of Goldschmidt D. A craterlet and short ridge are northwest of Anaxagoras near a slope west of that crater. A deep pit and adjacent saucer are south of the aforementioned projection on the west rim of Anaxagoras. A low hill is to their east near some shadow strips. These strips point to Anaxagoras A. The two craters farther south may be Anaxagoras C and B, according to the Lunar Quadrant map. This is assuming that the map shows C smaller and farther from A than I saw it. More low ridges are near those craters. The terrain east and southwest of Anaxagoras A appeared very smooth.

# LUNAR CALENDAR

## SEPTEMBER-OCTOBER 2012 (UT)

| | | |
|---|---|---|
| Sept. 02 | 22:00 | Moon 4.7 Degrees NNW of Uranus |
| Sept. 07 | 06:01 | Moon at Apogee (404,295 km – 251,217 miles) |
| Sept. 08 | 10:00 | Moon 0.70 Degrees SSW of Jupiter |
| Sept. 08 | 13:15 | Last Quarter |
| Sept. 08 | 18:12 | Extreme North Declination |
| Sept. 09 | 07:00 | Moon 1.0 Degree NW of asteroid 1-Ceres |
| Sept. 12 | 16:00 | Moon 3.6 Degrees S of Venus |
| Sept. 13 | 09:00 | Comet Gehrels-2 0.75 Degrees ESE of Moon |
| Sept. 16 | 02:09 | New Moon (Start of Lunation 1110) |
| Sept. 16 | 12:00 | Moon 5.5 Degrees SSW of Mercury |
| Sept. 18 | 12:00 | Moon 4.8 Degrees SSW of Saturn |
| Sept. 19 | 02:53 | Moon at Perigee (365,748 km – 227,265 miles) |
| Sept. 19 | 22:00 | Moon 0.83 Degrees ESE of Mars |
| Sept. 22 | 00:12 | Extreme South Declination |
| Sept. 22 | 19:41 | First Quarter |
| Sept. 23 | 06:00 | Moon 1.1 Degrees WSW of Pluto |
| Sept. 27 | 06:00 | Moon 5.8 Degrees NNW of Neptune |
| Sept. 30 | 02:00 | Moon 4.7 Degrees NNW of Uranus |
| Sept. 30 | 03:17 | Full Moon |
| Oct. 05 | 00:44 | Moon at Apogee (405,161 km – 251,755 miles) |
| Oct. 05 | 22:00 | Moon 1.1 Degrees SE of Jupiter |
| Oct. 06 | 01:42 | Extreme North Declination |
| Oct. 07 | 03:00 | Moon 1.2 Degrees SW of asteroid 1-Ceres |
| Oct. 08 | 07:33 | Last Quarter |
| Oct. 11 | 15:00 | Comet Gehrels-2 0.53 Degrees WNW of Moon |
| Oct. 12 | 16:00 | Moon 5.9 Degrees SSW of Venus |
| Oct. 15 | 12:02 | New Moon (Start of Lunation 1111) |
| Oct. 16 | 02:00 | Moon 4.5 Degrees SSW of Saturn |
| Oct. 17 | 01:00 | Moon 1.4 Degrees NNW of Mercury |
| Oct. 17 | 01:03 | Moon at Perigee (360,672 km – 224,111 miles) |
| Oct. 18 | 14:00 | Moon 2.1 Degrees NNE of Mars |
| Oct. 19 | 06:48 | Extreme South Declination |
| Oct. 20 | 15:00 | Moon 0.77 Degrees E of Pluto |
| Oct. 22 | 03:33 | First Quarter |
| Oct. 24 | 12:00 | Moon 5.8 Degrees NNW of Neptune |
| Oct. 27 | 05:00 | Moon 4.8 Degrees NNW of Uranus |
| Oct. 29 | 19:49 | Full Moon |

# 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 nonmember 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. Additional information about the A.L.P.O. and its Journal is on-line at: **http://www.alpoastronomy.org/index.htm** I invite you to 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.alpo-astronomy.org/main/member.html** which now also provides links so that you can enroll and pay your membership dues online.

## 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 be included (**Bold items are required)**:

**Name and location of observer**
**Name of feature**
**Date and time (UT) of observation**
**Size and type of telescope used**
**Magnification (for sketches)**
Orientation of image: (North/South - East/West)
Seeing: 1 to 10 (1-Worst 10-Best)
Transparency: 1 to 6
Medium employed (for photos and electronic images)

## CALL FOR OBSERVATIONS:
## FOCUS ON: Atlas

***Focus on*** is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **November 2012** edition will be **the crater Atlas. In particular observations are desired at all phases, not just the most photogenic.** Observations at all phases and of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add Atlas to your observing list and send your favorites to:

**Wayne Bailey** - wayne.bailey@alpo-astronomy.org

**Deadline for inclusion in the Atlas article is October 20, 2012**

## FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for potential contributors the following targets have been selected:

**Alphonsus time series TLO Issue: January 2013 Deadline: December 20, 2012**

For this Focus On article, I would like to get images covering as wide a range of phases (colongitudes) as possible to examine variations of the albedo features in the craters. So send as many different images as you can get.

# FOCUS ON: Aristillus

## By Wayne Bailey
## Coordinator: Lunar Topographical Studies

Aristillus is the northernmost of the conspicuous trio of craters on eastern Mare Imbrium near the gap between Montes Apenninus and Caucasus that connects Maria Imbrium and Serenitatis (Fig. 1). It is the mid-sized crater of this trio, at 55 km diameter. It also is apparently the youngest. The largest, and oldest, of this trio, Archimedes, was the subject of the March, 2012 Focus On article. Autolycus completes the trio.

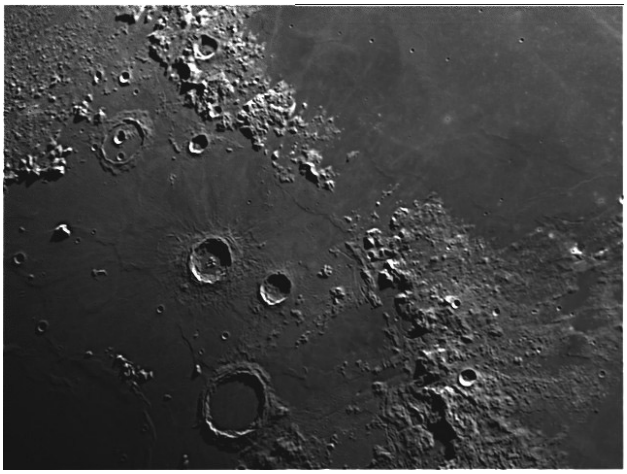


***FIGURE 1.*** ***ARISTILLUS ON MARE IMBRIUM.*** *Michael Sweetman, Tucson, Arizona, USA, July 27, 2012 04:45 UT, Seeing 5/10 hazy. 6" Mak f/12. DMK21. Astonomik 742 nm IR pro filter.*

The crater formed on the level, smooth mare surface so is not distorted by pre-existing topographic features. Its outline is slightly polygonal, with a flat, dark floor, terraced inner walls, and a complex cluster of central peaks (Fig. 2). Its general appearance is similar to Copernicus.

Radial ridges and furrows extend in all directions from the outer walls of the crater (Fig. 2). These are best viewed under low sun illumination (Fig. 3 & 4). The north-south features are more conspicuous, since the east-west illumination creates shadows more effectively when perpendicular to linear features. Curiously, many of these appear curved. Under high sun, rays can be seen extending in all directions (Fig. 5). These can be traced across the mountains onto Mare Serenitatis. But near the trio of craters, they mingle with the weaker ray system of Autolycus.

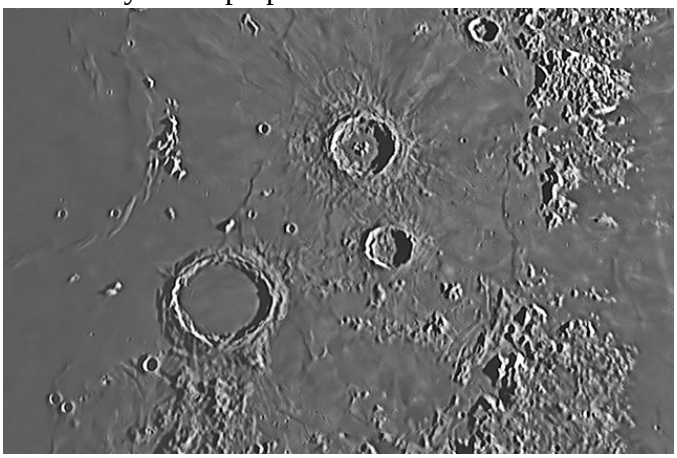


***FIGURE 2.*** ***ARISTILLUS-ARCHIMEDES-AUTOLYCUS.*** *William Dembowski, Windber, Pennsylvania, USA. June 28, 2012 01:35 UT Colongitude 16.7, Seeing 5/10. Celestron 9.25" SCT f/10, DMK41 UV/IR filter.*

The overlapping ray systems of Aristillus and Autolycus (Archimedes predates the flooding of Mare Imbrium, so has no ray system) creates some uncertainty in the dates of formation of the craters. Apollo 15 landed nearby and returned samples identified as ray material, which indicated two ages, 1.29 Gy and 2.1 Gy. These ages are assumed to refer to the formation of Aristillus and Autolycus. Since the craters were not visited to obtain samples, and Aristillus along with its secondaries and rays appears fresher than Autolycus, the younger age is assigned to Aristillus.

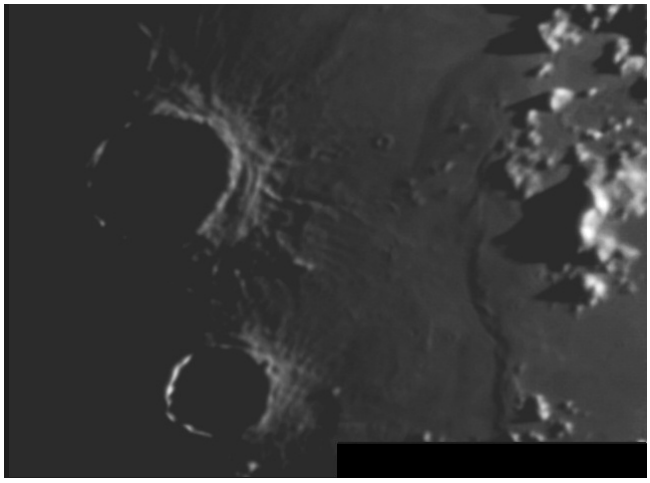


***FIGURE 3.*** ***ARISTILLUS.*** *Richard Hill – Tucson, Arizona, USA May 24, 2007 04:59 UT. Seeing 6/10. C14 SCT 1.6x barlow. SPC900NC. UV/IR block filter.*

Aristillus is also an example of a banded crater. A prominent dark band extends from the floor to the rim of the northeast interior wall (Fig. 5). A less prominent dark band also exists on the northwest wall. These albedo features are most visible under high sun illumination.

***FIGURE 4.*** ***ARISTILLUS.*** *Richard Hill – Tucson, Arizona, USA February 25, 2007 02:28 UT. Seeing 6/10. C14 SCT. ToUCam, Wratten 21 filter.*

A light, rectangular feature oriented northwest-southeast overlaps the north wall and extends onto the mare (Fig. 5). This is especially prominent under high sun, but is visible even at moderately low sun angles. It partially overlaps the ghost crater that just touches the north rim. Apparently, it is ray material, but the shape is curious and immediately draws attention to the area. The dark band on the northeast wall coincides with the edge of this feature on the inner wall, but the rectangle continues down the outer wall and onto the mare.

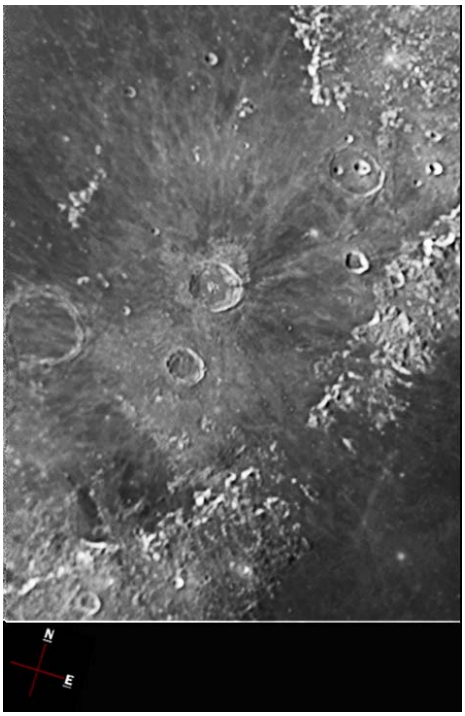



***FIGURE 5*** ***BULLIALDUS FLOOR RIDGE*** *- Orlando Benitez Sanchez-Canary Islands, Spain. March 11, 2012 01:35UT. Seeing 7/10 transparency 4/6, Colongitude 126.2°. SCT 235mm, f/10, DMK21AU04.AS, IR cut filter.*

There also appears to be a shallow, elongated depression (or possibly two parallel low ridges) extending from the base of the outer northeast wall about 2/3 of the distance to Theaetetus that is visible under low angle illumination (Fig. 6). Several other wrinkle ridges exist in the area, including two that extend north from Aristillus, bracketing the ghost crater then merging, and several on the mare among the trio of craters.

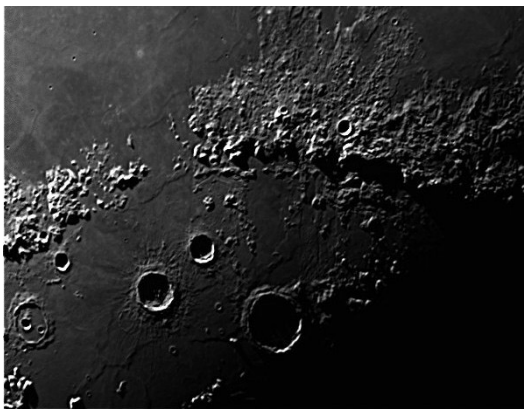


***FIGURE 6.*** ***ARISTILLUS.*** *Michael Sweetman, Tucson, Arizona, USA, April 29, 2012 04:47 UT, Seeing 6/10 Transparency 3.5/6,. 6" Mak f/12. DMK21. Orion IR cut filter.*

In conclusion, this is an area with a variety of features that will reward examination at any phase.

## ADDITIONAL READING


Bussey, Ben & Paul Spudis. 2004. The Clementine Atlas of the Moon. Cambridge University Press, New York.
Byrne, Charles. 2005. Lunar Orbiter Photographic Atlas of the Near Side of the Moon. Springer-Verlag, London.
Gillis, Jeffrey J. ed. 2004. Digital Lunar Orbiter Photographic Atlas of the Moon.. Lunar & Planetary Institute, Houston. Contribution #1205 (DVD). (http://www.lpi.usra.edu/resources/lunar_orbiter/).
Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.
North, Gerald. 2000. Observing the Moon, Cambridge University Press, Cambridge.
Rukl, Antonin. 2004. Atlas of the Moon, revised updated edition, ed. Gary Seronik, Sky Publishing Corp., Cambridge.
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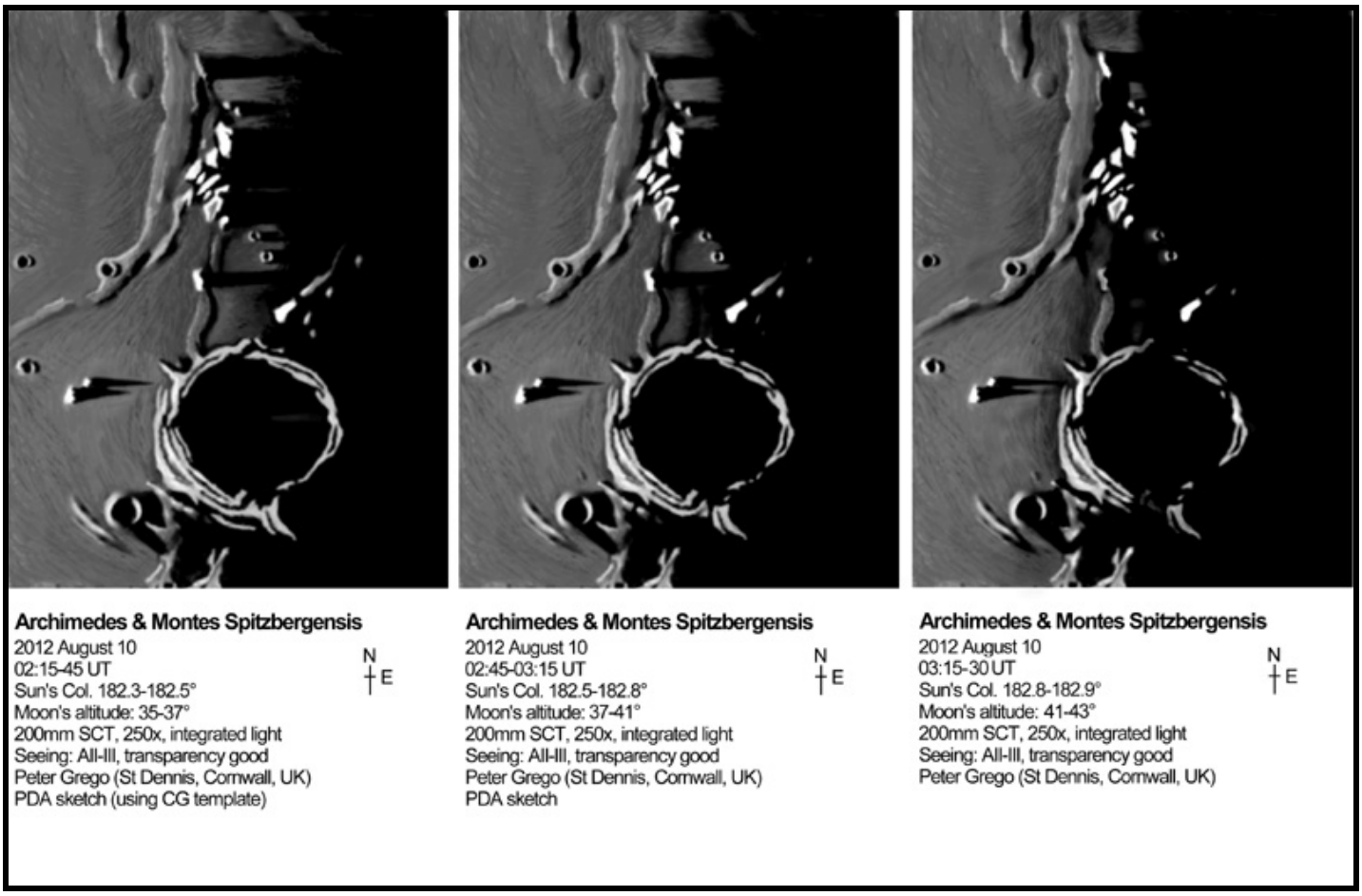
The-Moon Wiki. http://the-moon.wikispaces.com/Introduction

# ARCHIMEDES AND MONTES SPITZBERGENSIS

## Peter Grego

A sequence of three observations was made over a period of more than an hour as sunset fell over eastern Mare Imbrium, Archimedes and Montes Spitzbergensis. The observation was planned after it was noted that a 'sunset ray' might be visible crossing the eastern floor of Archimedes early on in the session -- this proved to be the case. An electronic template was prepared using LTVT in order to achieve positional accuracy in the sketch, over which the observation was made using a drawing program on PDA (Mobile Atelier). The area sketched covers part of Montes Archimedes in the south to just short of Kirch in the north, and from Archimedes C in the west to beyond the terminator east of Archimedes (approximately to the unilluminated western wall of Aristillus). After commencing the sketch it became clear that too large an area was taken on to depict all the fine detail that was visible. Nevertheless, the area proved too attractive to concentrate upon just one small part of it, although a study of the Montes Spitzbergensis alone would have easily been enough to contend with.




Observation 1: A very faint 'sunset ray' of illumination was discerned in Archimedes, diverging slightly and fading as it went from mid-floor towards the wall, the angle of divergence estimated to be five degrees or so; the 'ray' could not be traced all the way to the edge of the floor. Apart from this, the floor of Archimedes was entirely in shadow. The upper parts of Archimedes' inner eastern wall were visible, brightest in the mid-section at the 3 o'clock position. The inner eastern and outer western walls were complicated, with much terracing discernable, and far more fine detail in them was discerned than was depicted in this observation. Nothing immediately east of Archimedes' eastern rim was seen. The interior of Archimedes A was almost covered with shadow. West of Archimedes twin peaks cast two long shadow spikes which fell just

short of touching the base of Archimedes' outer western wall. A low but pronounced dorsum (for the purposes of this report labeled 'd1') connected Archimedes' outer wall (at the 11 o'clock position) with a bright peak lying mid-way between the southern tip of Montes Spitzbergensis and Archimedes; this ridge proceeded to the southern tip of Montes Spitzbergensis. To the northeast of Archimedes a group of elevated features beyond the terminator caught sunlight; these consisted of a pronounced bright peak (for the purposes of this report named 'p1), a northeast-trending ridge and several points further east in the vicinity of the craters Archimedes D and Archimedes U, although whether these were the illuminated outer western walls of these craters is not clear. Due north of Archimedes were two small craters casting shadows into the terminator in Sinus Lunicus; the southernmost was Archimedes V, the northernmost a slightly smaller unnamed crater. The peaks of the main group of Montes Spitzbergensis, of which there were around a dozen, appeared bright, the largest peak in the north, Epsilon, being the brightest. The peak Gamma was complicated and showed a dusky cleft down its centre. Another faint but very narrow 'sunset ray' was visible east of the north point of Gamma, estimated to be 25 km in length. Kappa and the peak to its north cast a conical shadow to the terminator. The peak furthest north, Mu, did not appear as bright as the other peaks of Montes Spitzbergensis, and cast a very long shadow across the smooth plain to the terminator. Large, broad dorsa ran around Mare Imbrium to the east of Montes Spitzbergensis and linked with the crater Spitzbergensis A. A feature recorded as a dome in this observation is actually Kirch E, west of Mu Spitzbergensis. Another dorsum, this one curving (like the outer southwestern wall of a large crater) was visible in the very north on the terminator.

Observation 2. The 'sunset ray' within Archimedes had disappeared and parts of the inner eastern wall of Archimedes had begun to break up. The terminator had advanced so that the previously mentioned ridge in Sinus Lunicus was less extensive and the smaller illuminated peaks in the vicinity of Archimedes D had faded, but 'p1', the main large peak in the south, retained its brilliance. Another north-trending dorsum in Sinus Lunicus between this peak and 'd1' was now visible in the very low illumination. The terminator now touched the eastern flanks of Archimedes D and its companion crater, and the narrow 'sunset ray' east of the north point of Gamma had disappeared. The terminator had engulfed the dorsum in the far north but it was still faintly illuminated.

Observation 3. Further encroachment of shadow on the inner walls of Archimedes was evident. The peak mid-way on dorsum 'd1'appeared to have dimmed, the shadow of 'd1' had broadened and only faint shading was seen further east with no sign of the other dorsum in Sinus Lunicus. The appearance of a ridge or step in the level of the terrain northeast of 'd1' was noted. Only a small section of the ridge northeast of 'p1' was now visible, and just one faint illuminated point to its east. Only tiny illuminated patches of ground could be seen west of Archimedes D and its companion crater. The twin spike shadows cast by the peak duo west of Archimedes now touched the base of Archimedes' western wall. The shadow cast by the ridge northwest of Montes Spitzbergensis now touched the base of the Montes Spitzbergensis. Mu now appeared brighter than before, but the increases in brilliance mentioned in this report may have been the product of unavoidable visual illusion (the one means of determining relative brightness would have been by the use of a polarizing filter). Finally, the curving ridge in the north was completely covered by shadow by the end of the observation.

# Sunset Shadows on the Straight Wall

## Phil Morgan


On 2007 July 8th at 03:00hrs to 03 45 UT, colongitude 186:80 to 187.17, (Fig. 1) I secured an observation of sunset on Birt and the Straight Wall. The easterly shadows from the small crater Birt and Birt A were falling on to the face of the wall. Interestingly only at two points did the shadows actually cut into the illuminated face.

***FIGURE 1. BIRT & THE STRAIGHT WALL AT SUNSET.***
*Phil Morgan, Lower Harthall-Tenbury Wells, Worcestershire, England. July 8, 2007 03:00-03:45 UT. Seeing 7/10 Transparency 4/5. Colongitude 186.8-187.2º. 305mm Newtonian, 400x.*

These two points took the form of triangular bites out of the scarp. At the time I took no notice of this – I simply carried on recording what I saw in the eyepiece. It was only later when I started my finished sketch that I became intrigued by this strange appearance and decided to try and work out what was causing it.

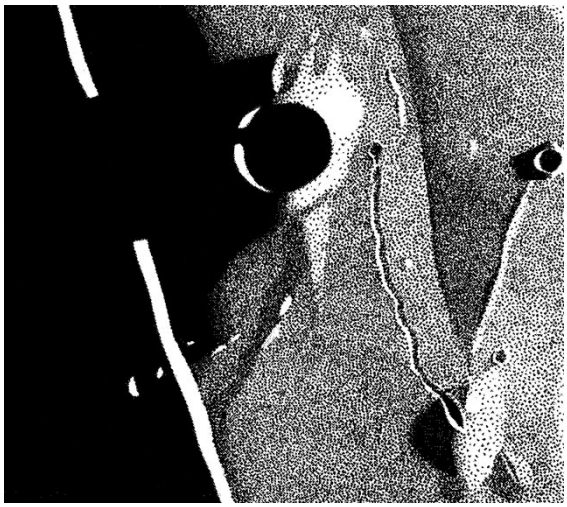
As it turned out things got forgotten until recently, when some five years later (2012 July 12th 03:00 to 03:30 UT, colongitude 188.2 to188.4.(Fig. 2) that I managed to secure a follow up observation at 03:30 at a very slightly later colongitude.

It seems to me that the most likely explanation is that the two shadow bites out the Wall are the easterly falling shadows from both the north and south ramparts of Birt. The illuminated section of the Wall in between being a consequence of the low point in the eastern crater rim where Birt A abuts allowing the sunlight to stream through and on to the Wall's westwardly sloping face at this point. Another point of shade runs to the foot of the wall at north, leaving a triangular section of the mare surface illuminated. This illuminated section is probably just caused by a high point on the ground, since the shadow doesn't cut into the sunlit face of the Wall.

***FIGURE 2. BIRT & THE STRAIGHT WALL AT SUNSET.***
*Phil Morgan, Lower Harthall-Tenbury Wells, Worcestershire, England. July 12, 201203:00-03:30 UT. Seeing 6/10 Transparency 5/5. Colongitude 188.2-188.4 º. 305mm Newtonian, 400x.*

Harold Hill's observation (Fig. 3), made at a slightly later colongitude and better seeing conditions than my most recent one shows just how quickly appearances can change. There are no breaks in the eastwardly falling shadows, just a broad swath of darkness falling onto the Wall and beyond.

The inwardly dipping anticline just to the west of the Birt rille is of interest. It is as though material has sunk down and produced a zone of compression, with a corresponding zone of tension to the east causing the rille to open up. This would make the Straight Wall the result of a similar tension in the crust since the ground falls away from the foot of the scarp down to the eastern edge of the Birt rille.



Birt itself is some 17km in diameter and 3,500m deep, whilst A is only 6.8km in diameter. The inclination of the Wall is about 30 to 40 degrees with a varying height of about 300 to 400m.

***FIGURE 3.*** *Harold Hill's fine observation of 1987 November 14th, 05:00 to 05:25 UT, colongitude 188.4 to 188.6.*

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# LUNAR TOPOGRAPHICAL STUDIES

**Coordinator – Wayne Bailey - wayne.bailey@alpo-astronomy.org**

**Assistant Coordinator – William Dembowski - dembowski@zone-vx.com**

**Website: http://moon.scopesandscapes.com/**

## OBSERVATIONS RECEIVED

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 5, 6, 10 day Moon, Clavius, Eratosthenes, Hadley Rille, Montes Apennines-Alps, Montes Caucasus, Moretus, Plato(3), Straight Wall-Ptolemaeus, & Tycho.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Sacrobosco & Sinus Asperitatis. Banded crater report for Birt.

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawings of Archimedes-Montes Spitzbergensis(3) & Montes Apennines..

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Aristillus(2) Archimedes, Autolycus-Eudoxus, Maginus, Olbers-Riccioli, & Tycho.

PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawings of Birt-Straight Wall.

DAMIAN PEACH-SELSEY, WEST SUSSEX, UNITED KINGDOM. Digital image of Aristarchus.

# RECENT TOPOGRAPHICAL OBSERVATIONS

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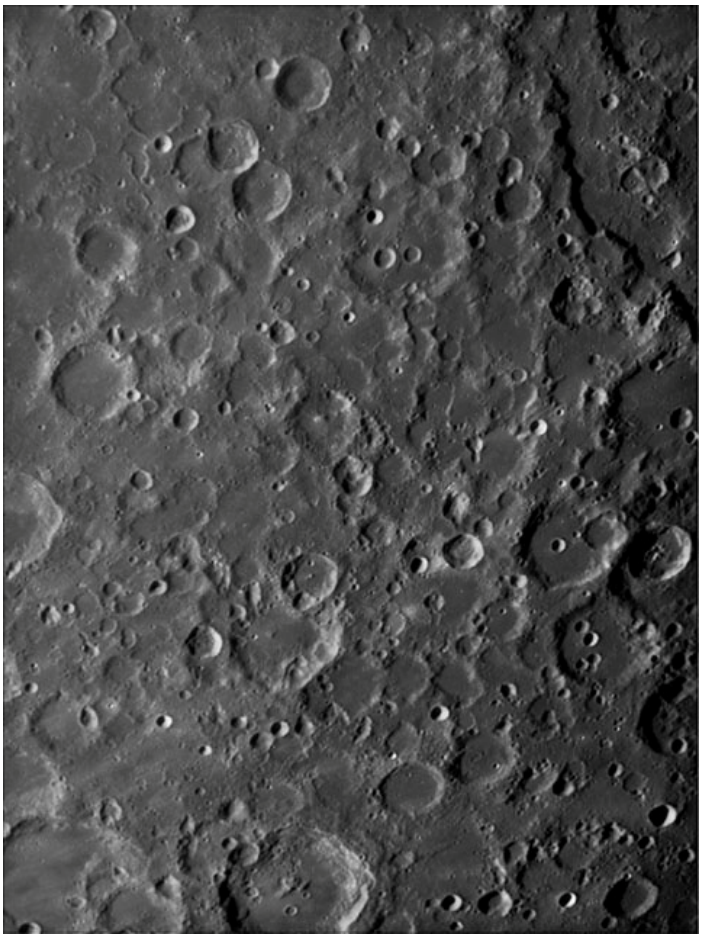
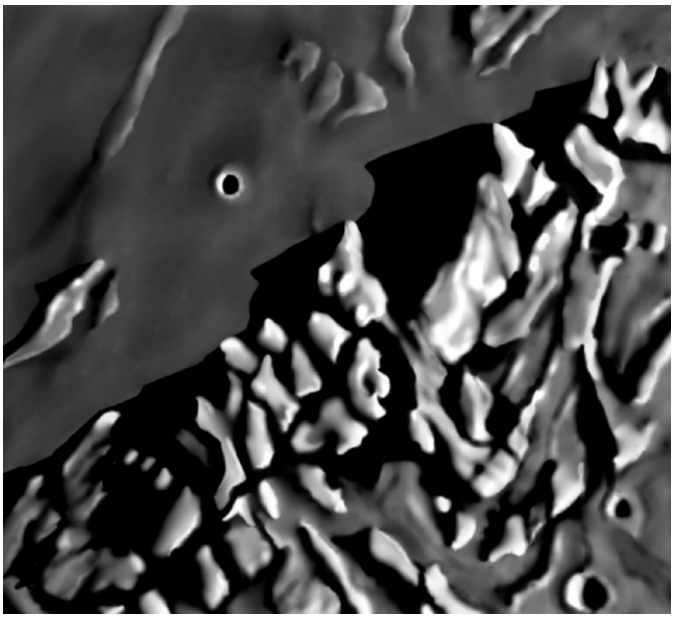
**PLATO** - Maurice Collins-Palmerston North, New Zealand. July 27, 2012 left: 07:25, middle: 09:05, right: 09:12 UT. C8 SCT, 3x barlow.



**SACROBOSCO** - Howard Eskildsen-Ocala, Florida, USA. July 8, 2012 UT 10:27 UT. Seeing 6/10, Transparency 3/6. 6" f/8 refractor, Explore Scientific lens, 2X Barlow, DMK 41AU02.AS, IR block & V block filters.

# RECENT TOPOGRAPHICAL OBSERVATIONS



**MONTES APENNINES**- Peter Grego, St. Dennis, Cornwall, UK. August 25, 2012 19:45-21:45 UT. Seeing AII, frequent clouds, low altitude moon.. Colongitude 14.9-15.9º. 200 mm SCT, 250x, integrated light.

A challenging area that was only attempted in order to complete a tutorial article on sketching the lunar mountains for Astronomy Now magazine. The Moon was at a low altitude (falling from 17 to 11° high during the course of the observation) and conditions were far from satisfactory, with a great deal of cloud and clear spells throughout. Nevertheless, a generally satisfactory representation of a small section of Montes Apenninus at mid-morning was made, including the large block of Mons Huygens, the highest mountain on the Moon, along with Mons Ampère to its southwest and part of eastern Mare Imbrium including the small crater Huxley. Mons Huygens itself presented an intricate appearance, and once the initial glare of the mountain peaks was accommodated a lot of fine shading and variations in brilliance was discerned. A general northwest-southeast trend to the mountains was evident (radial to the centre of the Imbrium basin) and visible amid the lower foothills of the Apennines in the east were the craters Mons Huygens A and Marco Polo B and H. Within the mare was the crater Huxley and a number of hills and ridges that spread south from Montes Archimedes and the unnamed hills between them and Mons Bradley (not included in this observation). There was an indication of a ridge running north from the shadow of Mons Ampère, east of Huxley. Under better observational circumstances a much smaller area would have been better to portray, perhaps concentrating on Mons Huygens and Mons Ampère alone. Some of the detail portrayed was only glimpsed momentarily, as it is difficult to fix one's concentration on a particular feature when there are spells of intervening cloud lasting minutes. Therefore this observation is to be considered low in accuracy but a reasonable impression.

**MAGINUS** – Richard Hill – Tucson, Arizona, USA May 29, 2012 02:51 UT. Seeing 7/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. Wratten 23 filter. North up.

I did this region about a year ago with almost identical lighting and libration. But, I missed overlap between several of the images leaving some blank areas in the middle. Very frustrating. This time I got it. One thing is unusual, an area south of Maginus looks blurry in both images. Is this a region of ejecta deposition? Note the 'V' shaped shaft of light in the bottom of the crater from the first rays of the sun coming through the pass in the crater wall. I like the area around Heraclitus K and, of course, Heraclitus itself.

Ed. Note: Also see last month's TLO for an image with different illumination.

# RECENT TOPOGRAPHICAL OBSERVATIONS

**ARISTARCHUS –**Damian Peach –Selsey, West Sussex, United Kingdom. August 11, 2012 04:55 UT. 356 mm reflector, PCR Flea3.

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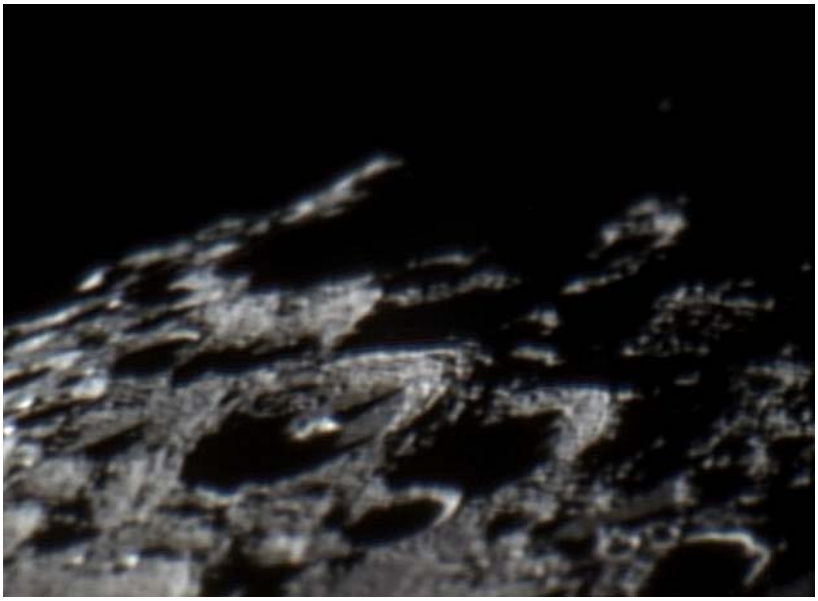
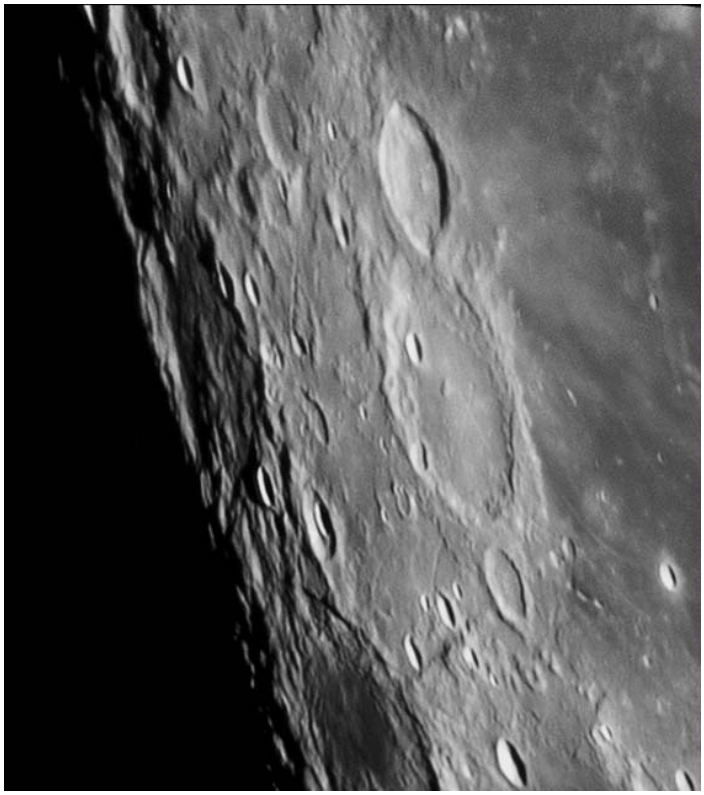
# ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



**MORETUS** - Maurice Collins-Palmerston North, New Zealand. July 12, 2012 08:28 UT. C8 SCT, 3x barlow.

# ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

**SINUS ASPERITATIS** - Howard Eskildsen-Ocala, Florida, USA. July 8, 2012 UT 10:10 UT. Seeing 6/10, Transparency 3/6. 6" f/8 refractor, Explore Scientific lens, 2X Barlow, DMK 41AU02.AS, IR block & V block filters.



**OLBERS-RICCIOLI** – Richard Hill – Tucson, Arizona, USA May 5, 2012 06:03 UT. Seeing 7/10. TEC 8" Mak-Cass, f/20. DMK21AU04. Wratten 23 filter.

This view is of the near limb region from Olbers to Riccioli. Many things pop out here. The quasi-valley from Lohrmann to Riccioli. The extensive rille system in and about Hevelius and the parallel rilles to the north of Hevelius are immediately obvious. Notice how these younger rilles cross right through Riccioli C and the crater just to the north. It's a fun region!

# BANDED CRATERS PROGRAM

**Coordinator – Wayne Bailey – wayne.bailey@alpo-astronomy.org**
**Assistant Coordinator – William Dembowski - dembowski@zone-vx.com**
**Banded Craters Program Website: http://moon.scopesandscapes.com/alpo-bcp.html**

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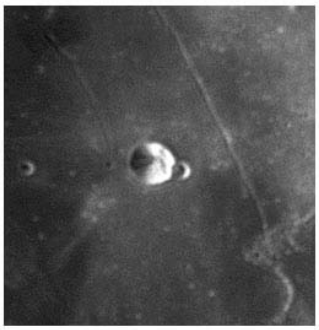
A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Birt
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: 6" Refractor, Explore Scientific Lens 15.2 cm f/8
Imaging: DMK 41AU02.AS, 2X Barlow Filters: IR Block, V-Block
Seeing: 6/10 Transparency: 3/6
Date (UT): 2012/07/08 Time (UT): 10:31
Colongitude: 146°
Position of crater: Selen. Long. Selen. Lat.
8.5° West 22.4° South
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):



Comments:

Dark band on western portion of Birt has lighter central band. North/south bands on the eastern side of Birt are associated with slumped material when viewed on the LROC ACT-REACT QuickMap. Birt A has an area of slumped material adjacent to the wall separating it with Birt. Curiously, elevation measurements using LROC show the top of the slumped material to be the same elevation as the lowest portion of the rigde between the two craters.

# LUNAR TRANSIENT PHENOMENA

**Coordinator – Dr. Anthony Cook – atc@aber.ac.uk**
**Assistant Coordinator – David O. Darling - DOD121252@aol.com**

## LTP NEWSLETTER – SEPTEMBER 2012

Dr. Anthony Cook - Coordinator

Routine observations for July 2012 were received from the following observers: Jay Albert (Lake Worth, FL, USA) observed: Aristarchus, Eimmart, Gassendi, Hyginus N, Mare Crisium, Mons Piton, Plato, Proclus, Promontorium Agarum, Vendelinus, Vallis Schroteri, Promontorium Laplace, Schickard, and Torricelli B. Gary Beal (New Zealand) took images of Rupes Recta, Vallis Alpes, and took whole disk images of the Moon. Maurice Collins (New Zealand) took images of Clavius, Eratosthenes, Hadley, Montes Appeninus, Moretus, Plato, Rupes Recta, Tycho, and also took whole images of the Moon. Marie Cook (Mundesley, UK) observed: Aristarchus. I obtained time lapse images of the Moon in narrow wavebands, using the robotic telescope at Aberystwth University. George Ionas (New Zealand) took images of Copernicus, Tycho, an image of the lunar crescent, and images of large areas of the Moon. Norman Izett (New Zealand) took an image of the Copernicus area and whole disk images of the Moon. Malcom Locke (New Zealand) took images of Copernicus and Plato. Jim McAloon (New Zealand) took an image of Alphonsus. Bob O'Connell (Keystone Heights, FL, USA) imaged Theophilus.

**LTP Reports:** No LTP reports were received for July 2012. However Charles Galdies (Malta) did image color on the inside NW and W rim of Eratosthenes on 2012 Aug 25 UT 19:44-19:52 – this is very interesting because it overlapped with an area that Paul Abel and two others saw color back in 2009, under the same illumination. The images had some spectral dispersion present, but the color inside the rim remained, even after the spectral dispersion was calibrated out with image processing. Unfortunately the same color was present on at least a couple of other features too. At the time of writing I am still investigating and will report back on this next month.

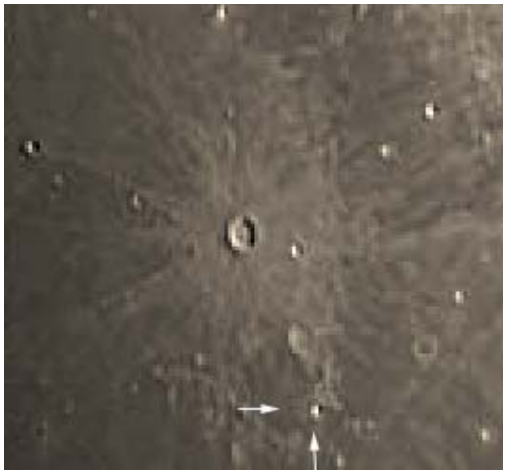


***Figure 1.*** *Section of Gary Beal's image of the Moon, with north towards the top. Encke B is arrowed.*

**Routine Reports:** Here is a selection of reports received during July that can help to re-assess some past LTP observations:

On 1990 Sep 01 J. Blanco of Gijon, Spain (3" refractor, x72) detected an unfamiliar very bright spot, near to Encke crater. In Cameron's 2006 LTP catalog, she suspects that it was Encke B crater and assigns a weight of 2. On 2012 Jul 01 at 07:38 UT, Gary Beal of New Zealand took an image of the Moon, and as we can see from a section of this in Figure 1, although not of great resolution, Encke B does indeed have the appearance of a bright spot. This conclusion is also backed up in Norman Izett's images from the same day. The ALPO/BAA weight was already 1, and will remain so, until we get some more details about the original observation, as at present all we have to go on is the very brief description in the Cameron catalog.

On 1966 Jan 28 UT 01:24-03:45 Cross and Ariola (Whittier College, CA, USA, 19" reflector, x300, S=6-4, T=4) observed 3 red patches that appeared and disappeared at different times on Theophilus crater. There was also an obscuration at sunrise. Later on a red patch appeared on the crater floor. The 1978 NASA LTP catalog assigns a weight of 5 to this report. Although not using a color camera, Bob O'Conner imaged the region under similar illumination conditions on 2012 Jul 25 UT 00:36, and you can see the result in Figure 2. This shows the floor slightly featureless on the northern half – could this have been mistaken for an

obscuration? I am somewhat surprised that the description in the catalog mentions sunrise because the illumination is quite clearly well past the sunrise stage. Bob comments that he did see visually through an eyepiece some atmospheric spectral dispersion induced red and blue colors, but not red alone. The ALPO BAA weight for the original LTP report was 4, but in view over the use of the word “sunrise”, the weight has been lowered to 3 until we find out any further information about this LTP.

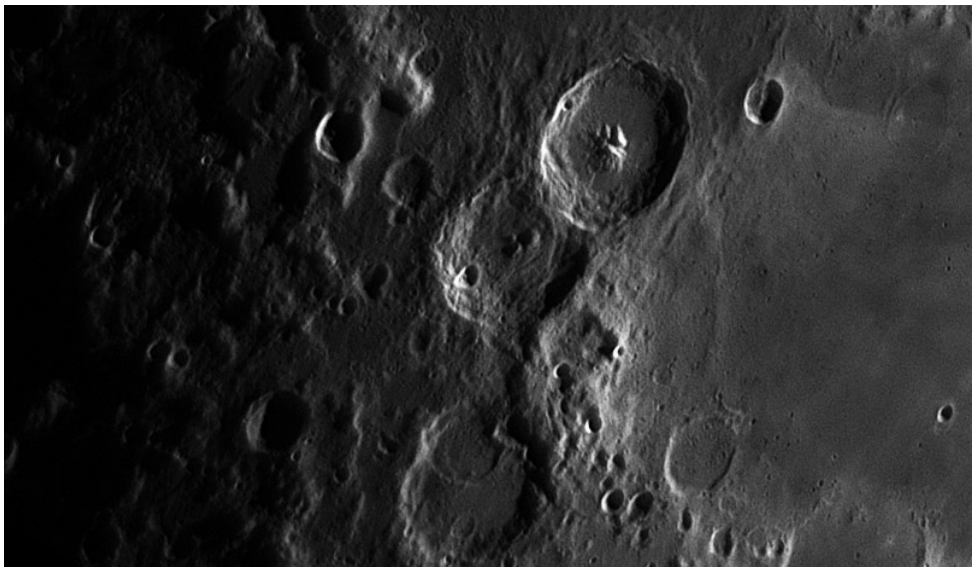


***Figure 2.*** *Monochrome image of the Theophilus area by Bob O’Connell, taken on 2012 Jul 25 UT 00:37. North is towards the top. Taken with a Celestron 8.25” SCT, seeing 5/10, transparency 5/6.*

On 2012 Jul 12 UT 08:55-10:09, the centre of the crater Tycho had a solar altitude of 0.8° to 0.3°. An effort was made to observe Tycho in daylight from Aberystwth University to see if the central peak could still be seen. Unfortunately, despite using a near IR filter to reduce daylight scatter from our atmosphere, no sign could be seen of the central peak. On the other side of the Atlantic, Jay Albert was thwarted from taking part by the weather. So we are no closer to solving the puzzle of finding out if scattered light off the illuminated rim can make the central peak visible, when it should be in shadow. Please refer to table 1 in the July newsletter to see the remaining observing opportunities this year to capture the ghostly central peak of Tycho in shadow.

On 2012 Jul 04/05 UT 23:50-00:05 Marie Cook observed Aristarchus under similar illumination to Bartlett’s 1976 Aug 11 LTP when he reported:

*“Aristarchus 1973 Aug 11 04:44 Observed by Bartlett (Baltimore, MD, USA,4.5" reflector, 45-300x, S=4-3, T=4) "Pale viol. radiance (gas?) on plateau m. Dark viol. tinge on nimbus. C.p.=10 deg walls=8deg, & all of floor=8 deg. W.wall out of focus due to haziness (gas?)." NASA catalog weight=4 (high). NASA catalog ID #1441. ALPO/BAA weight=2.”*

Marie could not see any color, and the nimbus was a dark grey. The usual bands and spots were seen, but not sharp due to the haze. The west wall was nice and sharp and appeared normal. The ALPO/BAA weight will remain at 2, because Bartlett’s description is slightly different to what he normally report for Aristarchus.

On 2012 Jul 26 Jay Albert re-observed Mons Piton under similar illumination conditions to David Darling’s LTP report from 1987 Feb 06. The original LTP is described in the 2006 Cameron catalog as follows:

*“1987 Feb 06 UT 02:35 Observed by Darling (Sun Praire, Wisconsin, USA,12.5" Newtonian x342) "I was using a 12.5 f5 Newtonian reflector with a 9mm eyepiece and 2x Barlow with no filters. I had been observing other features on the Moon when I had panned to the area where the sunrise was taking place on Mount Piton. The mountain peak looked like a shimmering block of ice with a*

*phosphorescence luminescence cloud around the peak. What was really interesting was the shaft of light streaming across the lunar mare that appeared like a cone and it came to a point near Mount Piton. The Mountain had the appearance of mother of pearl and the lustre or glow that surrounded the peak only lasted about 20 minutes." The Cameron 2006 catalog ID=296 and the weight=4. The ALPO/BAA weight=3."*

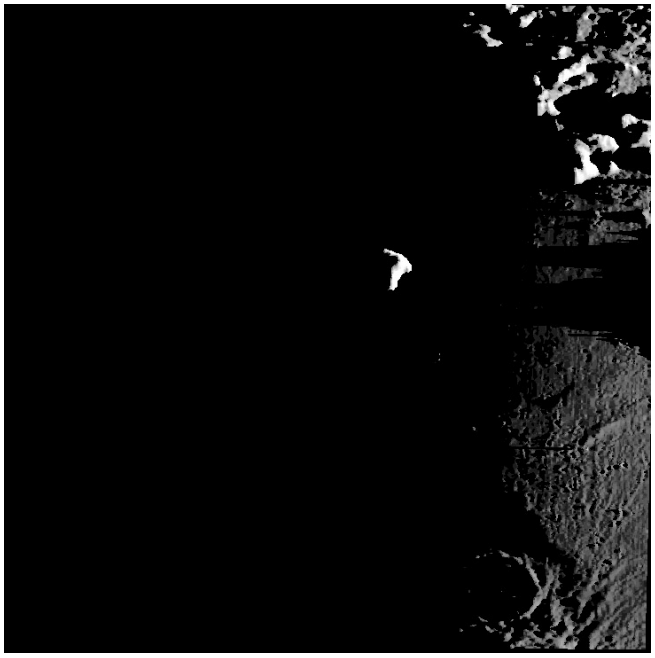


***Figure 3**. ALVIS simulation for the Mons Piton LTP from 1987 Feb 06 UT 02:35. North is towards the top. The vertical striping on the mare is due to artefacts in the LOLA dataset. N.B. ALVIS software is not publically available, but you can use LTVT as an alternative from: [http://ltvt.wikispaces.com/Downloads](http://ltvt.wikispaces.com/Downloads) .*

Jay commented as follows: "Mount Piton [296]- David Darling's description of sunrise on Mt. Piton was beautiful, poetic and right on. The mountain glowed brightly in the rising Sun and its highest peak in the center shimmered brilliantly in the slightly diminished seeing (the Moon had dropped to an elevation of less than 25º). It did not appear to me to have a cloud around the peak, but it did flicker a bit in the seeing. I did not see a cone shaped shaft of light extending across the mare to Mt. Piton, however, I did see breaks in the mountains to the E where such a light cone could come through when the sun gets high enough. I used 311x from 02:25 to 02:45U". The ALVIS simulation above does appear to show a cone of light on the mare to the east of Mons Piton – possibly it might extend further towards Mons Piton, allowing for the 0.5° diameter of the Sun that the simulation does not cater for. As Jay points out, several aspects of the LTP report might be explained by seeing conditions.

Interestingly enough, another repeat illumination observation of Mons Piton has cropped up. On 2012 Jul 26 at 06:45 Norman Izett obtained an image of the whole lunar disk, which again shows Mons Piton jutting out of the nightside on the morning terminator. This corresponds to the same illumination as a LTP report from P. and J. Home from 1983 Mar 21 UT 21:05-22:00 where they reported it to be the brightest object on the Moon, but no variability. Norman's recent image, although showing the mountain to be bright, certainly does not show it as the brightest feature on the Moon. It maybe that the original LTP report can be explained by the usual sunward facing slope effect, but possibly extenuated by viewing angle (libration). This old report needs further examination, especially if I can find the original photographs involved.

According to the NASA catalog on LTP, on 1940 Jun 14 at 04:00 UT Walter Haas (New Mexico, 12" reflector) observed *"two hazy streaks in Plato, of medium intensity, showing complex detail. Haas later comments that the appearance was probably normal"*. The NASA catalog assigns a weight of 4 to this report. The ALPO/BAA LTP catalog already has a weight of just 1. On 2012 Jul 27, under non-ideal seeing conditions, Maurice Collins obtained an image of Plato that appears to show at least one hazy streak adjacent to the northern side of the main southern shadow spire on the crater floor. There is some detail elsewhere on the floor due to shadow intersections with floor craterlets. This leads me to suspect that any hazy streaks are almost certainly due to sub-resolution width shadow spires that are present on the floor and are just blurred out - but nevertheless contribute to some faint streakiness on the grey floor. This 1940's LTP will remain at a weight of 1 for now.

**News and Comments:** Concerning Jim Moeller's image of a bright spot on the SW limb of the Moon from 2012 May 26 UT 21:21. John Westfall has very kindly sent me a fir of the lunar limb that he did to Jim's image. This shows that the bright spot was actually outside the limb of the Moon (see Figure 5), which makes it even less likely to be of lunar origin. I suspect that it could possibly be scattered light off of a fluffy plant

seed that was lofted into the air. Unfortunately without a 2nd image from somewhere else in the world we shall not be able to make much headway in solving this problem.

***Figure 4.*** *Image of Plato by Maurice Collins from 2012 Jul 27 UT 07:52, under non-ideal seeing. North is towards the top.*

A Lunar Science Forum conference, organized by the Lunar Science Institute (LSI) took place 17-19 July 2012, at NASA Ames. Details (including most of the video recorded lectures) can be found at http://lunarscience.nasa.gov/lsf2012/welcome . Although I could not attend myself, the majority of the lectures were streamed live over the Internet, There was quite a lot of discussion over dust and lunar volatiles. It seems that a careful study of the Clementine horizon glow images that had been assumed to be scattered light off dust at an altitude of 100+ km above the lunar surface, can probably now be explained away as a combination of the solar corona, Zodiacal light, and scattered light inside the camera optics. Nevertheless there are definitely

***Figure 5.*** *John Westfall's limb fit to Moeller's image of a bright spot on the SW limb of the Moon. This image has been sharpened and contrast stretched for reproduction in this newsletter.*

theories to explain how dust could beaccelerated from the surface upto such an altitude, and there are still the Apollo astronaut sightings of streamers above the horizon that need to be explained. There were several discussions of experiments that showed that charged dust particles on the surface redistribute themselves cyclically as shadows move across the surface. Another exciting piece of news was that extremely high electric fields can be set up beneath the lunar surface during solar proton events. These cause sub-surface voltages of several kilovolts per metre – sufficient enough to break down chemical bonds in some minerals. How this all affects LTP research is uncertain, suffice to say that the Moon is a lot more complex a body than we previously thought.

A paper on the Greenacrre and Barr Aristarchus LTPs from October and November 1963 has been submitted to the BAA Journal.

**Suggested Features to observe in September:** For repeat illumination (only) LTP predictions for the coming month, these can be found on the following web site: http://users.aber.ac.uk/atc/tlp/tlp.htm. By re-observing and submitting your observations, we will get a clear understanding of what the feature ought to have looked like at the time. Only this way can we really fully analyze past LTP reports. 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! Twitter LTP alerts can be accessed on http://twitter.com/lunarnaut.

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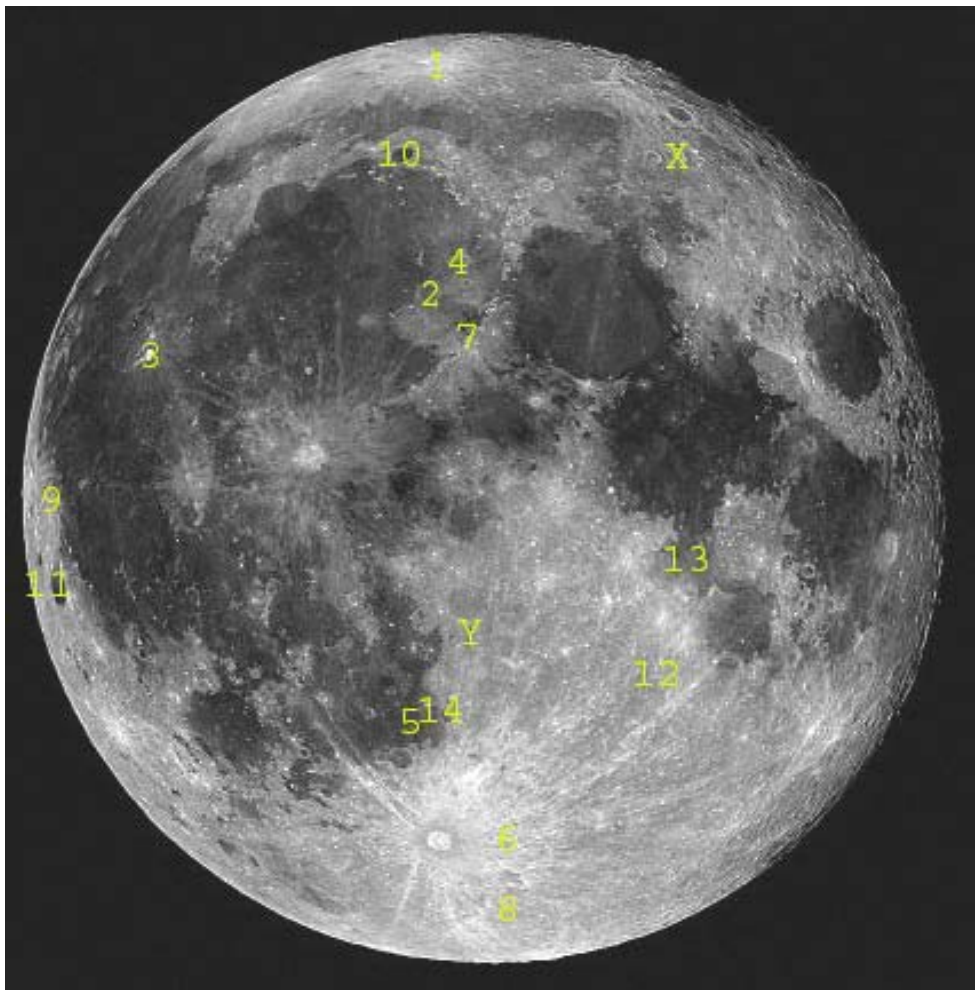
# KEY TO IMAGES IN THIS ISSUE

1. **Anaxagoras**
2. **Archimedes**
3. **Aristarchus**
4. **Aristillus**
5. **Birt**
6. **Maginus**
7. **Montes Apennines**
8. **Moretus**
9. **Olbers**
10. **Plato**
11. **Riccioli**
12. **Sacrobosco**
13. **Sinus Asperitatis**
14. **Straight Wall**




## FOCUS ON targets

**X = Atlas (November)**
**Y = Alphonsus (January)**