



THE LUNAR OBSERVER

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

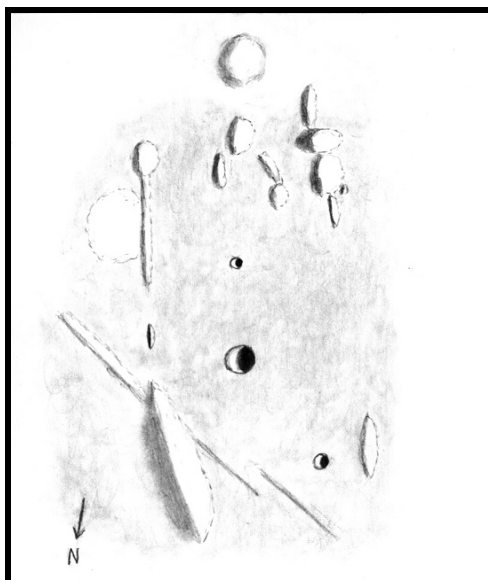
EDITED BY: Wayne Bailey wayne.bailey@alpo-astronomy.org

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

FEATURE OF THE MONTH – NOVEMBER 2012

LIPPERSHEY



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

July 11, 2012 09:08-09:34 UT, 15 cm refl, 170x, seeing 7-8/10

I sketched this area on the morning of July 11, 2012. This area is in southeast Mare Nubium between Rupes Recta and Pitatus. Lippershey itself is the central and largest of the three intact craters on this sketch. Lippershey T is the modest crater northwest of Lippershey, and Lippershey R is the small pit to the south. A short north-south ridge is west of Lippershey T, and a larger swelling is northeast of Lippershey. A strip of shadow, probably a low ridge, meets this swelling diagonally on either side, but was not noticed within it. A short, parallel shadow strip is northeast of Lippershey T. There is a short bit of shadow south of the large swelling, then a longer strip on the same line, ending at a round hill. The short shadow strip actually appeared darker than any of the nearby ones. A vague bright patch is just east of the southern shadow strip. The aforementioned round hill is just east of a varied assortment of peaks. These peaks are astride the southern

edge of Mare Nubium. A crude half-circle south of Lippershey R might be the ruined ring Pitatus ZA as shown on the Lunar Quadrant map. That map also shows Pitatus Z farther to the south, but I saw a round, knobby feature there with more shadowing on the east side, away from the sun. There may have been a bit on the western, sunward side. I had scribbled on my original notes 'circular plateau or raised ring.' It did not look like a discreet crater like Lippershey or its lettered companions. This feature was outside Mare Nubium and blending in with the southern highlands. A line of peaks is west of the possible Pitatus ZA. This line of peaks appears parallel to most of the detail east of Lippershey and points to the ridge west of Lippershey T.

LUNAR CALENDAR

NOVEMBER-DECEMBER 2012 (UT)

| | | |
|---------|-------|--|
| Nov. 01 | 15:31 | Moon at Apogee (406,049 km – 252,307 miles) |
| Nov. 02 | 01:00 | Moon 0.93 Degrees SSW of Jupiter |
| Nov. 02 | 08:12 | Extreme North Declination |
| Nov. 07 | 00:36 | Last Quarter |
| Nov. 08 | 14:00 | Comet Gehrels-2 0.62 Degrees WSW of Moon |
| Nov. 11 | 16:00 | Moon 5.1 Degrees SSW of Venus |
| Nov. 13 | 22:07 | New Moon (Start of Lunation 1112) |
| Nov. 14 | 10:00 | Moon 1.2 Degrees NNW of Mercury |
| Nov. 14 | 10:23 | Moon at Perigee (357,360 km - 222,053 miles) |
| Nov. 15 | 16:06 | Extreme South Declination |
| Nov. 15 | 21:00 | Comet Macholz-1 1.19 Degrees NW of Moon |
| Nov. 16 | 08:00 | Moon 4.1 Degrees NNW of Mars |
| Nov. 16 | 24:00 | Moon 0.28 Degrees ENE of Pluto |
| Nov. 20 | 14:32 | First Quarter |
| Nov. 20 | 19:00 | Moon 6.0 Degrees NNW of Neptune |
| Nov. 23 | 11:00 | Moon 4.9 Degrees NNW of Uranus |
| Nov. 28 | 14:46 | Full Moon (Penumbral Eclipse of Moon) |
| Nov. 28 | 19:36 | Moon at Apogee (406,364 km – 252,503 miles) |
| Nov. 29 | 01:00 | Moon 0.67 Degrees SSW of Jupiter |
| Nov. 29 | 14:30 | Extreme North Declination |
| Dec. 06 | 04:00 | Comet Gehrels-2 1.6 Degrees SSE of Moon |
| Dec. 06 | 15:32 | Last Quarter |
| Dec. 10 | 10:00 | Moon 4.0 Degrees SSW of Saturn |
| Dec. 11 | 14:00 | Moon 1.7 Degrees S of Venus |
| Dec. 12 | 00:00 | Moon 1.1 Degrees SSW of Mercury |
| Dec. 12 | 23:15 | Moon at Perigee (357,073 km – 221,875 miles) |
| Dec. 13 | 03:48 | Extreme South Declination |
| Dec. 13 | 08:41 | New Moon (Start of Lunation 1113) |
| Dec. 14 | 11:00 | Moon 0.28 Degrees NW of Pluto |
| Dec. 15 | 07:00 | Moon 5.5 Degrees NNW of Mars |
| Dec. 18 | 02:00 | Moon 5.8 Degrees NNW of Neptune |
| Dec. 20 | 05:19 | First Quarter |
| Dec. 20 | 19:00 | Moon 4.8 Degrees N of Uranus |
| Dec. 25 | 21:21 | Moon at Apogee (406,099 km – 252,338 miles) |
| Dec. 26 | 00:00 | Moon 0.42 Degrees S of Jupiter |
| Dec. 26 | 21:24 | Extreme North Declination |
| Dec. 28 | 10:22 | 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](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: Alphonsus

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 **January 2013** edition will be **the crater Alphonsus**. **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 Alphonsus to your observing list and send your favorites to:

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

Deadline for inclusion in the Alphonsus article is December 20, 2012

FUTURE FOCUS ON ARTICLES:

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

| <u>Subject</u> | <u>TLO Issue</u> | <u>Deadline</u> |
|------------------------------------|-------------------------|--------------------------|
| Wrinkle Ridges & Rilles | March 2013 | February 20, 2013 |
| Mare Insularum | May 2013 | April 20, 2013 |

Wrinkle ridges & rilles are most easily seen near the terminator, but some are visible even under a high sun. So send images of any ridges or rilles that you see.

FOCUS ON: Atlas

By Wayne Bailey

Coordinator: Lunar Topographical Studies

Atlas is one of the seven primary subjects of the ALPO Lunar Selected Areas Program. The Selected Areas Program (SAP) studies the effect of changing illumination on the appearance of features. Note that these changes differ from the subject of Lunar Transient Phenomena in that they are the normal appearance of the feature under the prevailing lighting conditions. For a more complete description of the SAP see Benton (2002), which is written for visual observers, but applies equally well to imaging observers.

For this article, I've arranged the images somewhat differently than usual. All images are combined into one figure. Within this figure they are arranged in order of increasing colongitude, starting from sunrise at Atlas, to illustrate the changes that occur during a lunation. In the electronic version, each image in the figure is linked to the original of that image.

Atlas, and its companion Hercules, are prominent features lying between Mare Frigoris to the northwest, Lacus Somniorum to the south, and Lacus Temporis to the east (figs. 1d, f, h). Atlas is a floor fractured crater, 87 km (54 miles) diameter, with a sharp rim that typically rises about 3 km (1.8 miles) above the lowest area of its floor. The interior walls are terraced. A ring of mountains, which sometimes looks like a small crater, marks the center of the floor. The floor itself is hummocky with noticeable elevation variations, numerous small craters, and several prominent rilles. The surrounding area is blanketed with ejecta deposits (figs. 1a-c, j-n). Atlas is easy to locate in the northeast quadrant of the moon, since the Hercules-Atlas pair is somewhat isolated from other large craters making them obvious when the sun is low, and Atlas' bright rim and dark spots clearly mark its position when the sun is high (fig. 1g).

A prominent rille passes by the east sides of the central mountain ring, continuing to the base of the south rim. Another prominent rille runs along the base of the west wall. These two are connected by another running northwest-southeast near the southeast wall. Several smaller sinuous rilles surround the central mountains.

What appears to be a ridge or scarp extends from the central mountains to the north wall with a small crater at its western side. This feature seems to align with the eastern edge of the flooded crater Atlas E. The eastern rim of Atlas E appears unusually straight, giving the crater a D shaped outline (figs. 1b, c). Is it possible that these are the result of a fault that extends from the central mountains of Atlas, under its rim and cuts across Atlas E?

Finally, two dark spots are visible in Atlas; one on the north floor, the other at the base of the south wall (figs. 1e-h). Both occur at the intersection of two rilles marked by small pits. They have been shown by spectroscopic analysis to be composed of volcanic glass and lava fragments (pyroclastic deposits).

Due to Atlas' position (46.7°N, 44.4°E) well away from the center of the lunar disk, libration causes significant changes in its appearance at different lunations. The purely geometrical effects are relatively easy to recognize and compensate. A more subtle effect is that even at the same solar colongitude, the solar illumination is not necessarily the same in different lunations. Since the moon's equator is inclined about 1.5° to the ecliptic, the apparent solar latitude ranges from +1.5° to -1.5°.

Aside from the usual low sun shadowing effects that emphasize low relief features, the visibility of other features change throughout the lunation.

The small crater on the north floor, which appears ordinary when the sun is low, becomes very bright when the sun is high. This is characteristic of a young crater that exposed fresh material that hasn't been weathered into dullness by the space environment.

The south dark spot is detectable early in the lunation and becomes quite dark when the sun is high, with a distinct edge. However, early in the lunation, the north dark spot is far less visible, although the entire northeast corner of the floor appears somewhat darker than the remainder of the floor. At higher sun elevation, the spot becomes more prominent, and the general darkening around it seems to fade so that the floor is a more uniform brightness.

This article has only briefly touched on the changes that occur within Atlas during a lunation. Careful examination will reveal analogous changes in many other features. So don't be afraid to make repetitive observations of the same feature, you may be surprised at what you see.

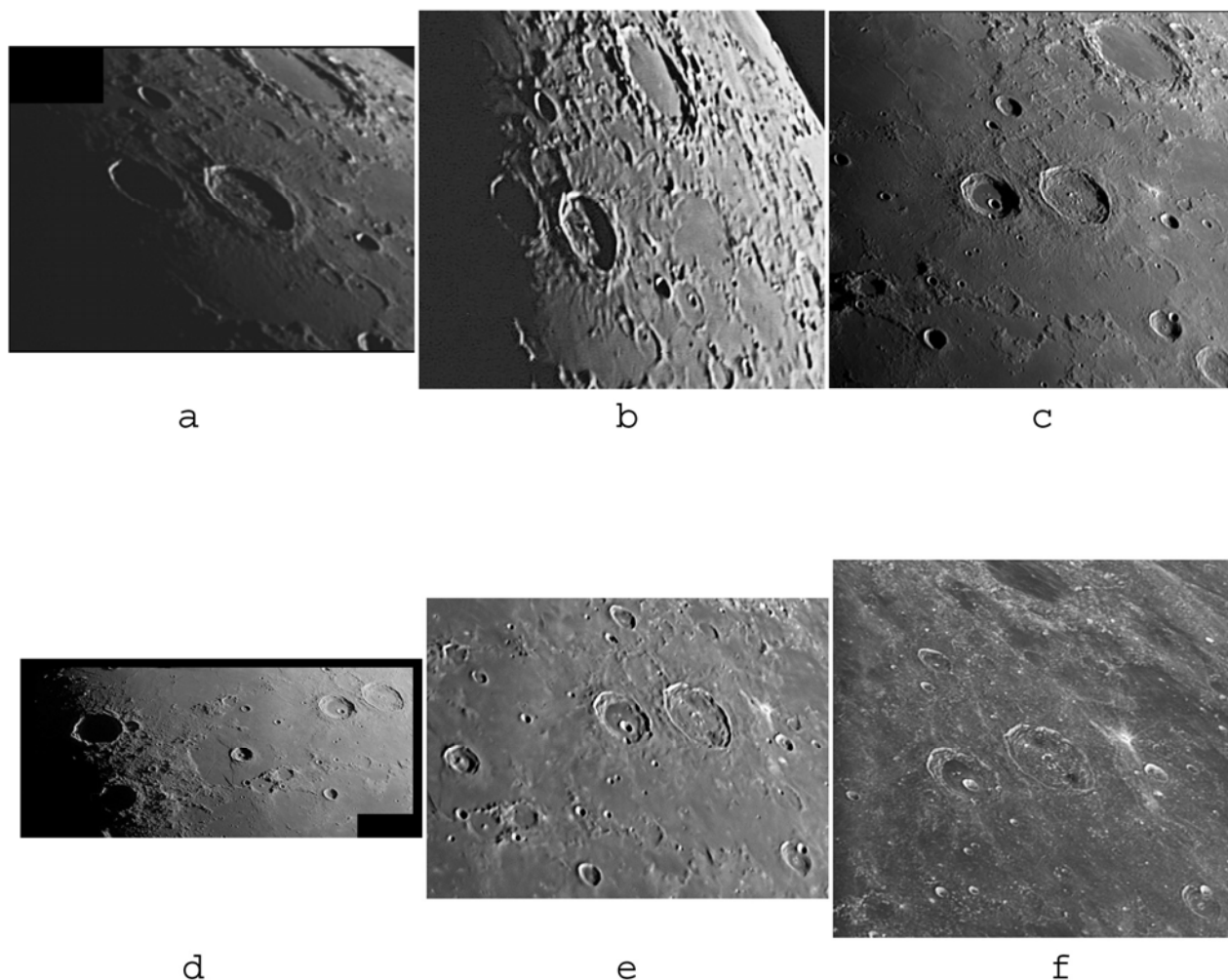


FIGURE 1. ATLAS at increasing solar colongitudes .

a. colong. 321.3°. Richard Hill, Tucson, Arizona, USA. April 10, 2008 0146 UT. Seeing 6/10. C-14, f/11 SCT, SPC900NC, UV/IR blocking filter.

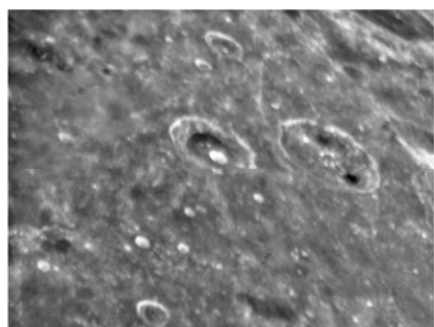
b. colong. 323.2°. William Dembowski, Windber, Pennsylvania, USA. November 24, 2006 22:08 UT, Seeing 4/10. Celestron 8" SCT f/10, NexImage, IR filter.

c. colong. 337.3°. Howard Eskildsen-Ocala, Florida, USA. September 14, 2010 00:05 UT. Seeing 7/10, Transparency 4/6. 6" f/8 refractor, Explore Scientific lens, 2X Barlow, DMK 41AU02.AS, W-8 yellow filters.

d. colong. 346.0°. Richard Hill, Tucson, Arizona, USA. September 4, 2011 02:08 UT. Seeing 8/10. C-5 f/10 SCT, 2X barlow, DMK21AU04. Wratten 23 filter. North up.

e. colong. 2.1 °. William Dembowski, Windber, Pennsylvania, USA. June 9, 2011 01:07 UT. Seeing 4 /10. Celestron 9.25" SCT, f/10, DMK41, UV/IR filter.

f. colong. °38.5 Howard Eskildsen-Ocala, Florida, USA. April 14, 2011 00:54 UT. Seeing 9/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 3X Barlow, DMK 41AU02.AS, IR block & V block filters.



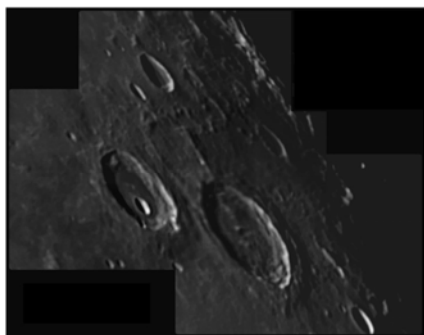
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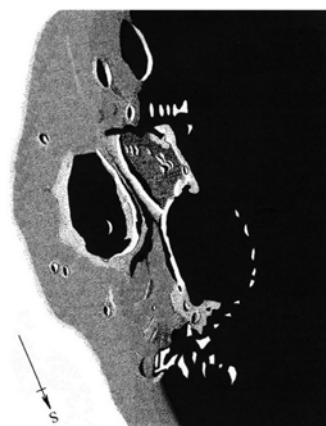
i



j



k



l

FIGURE 1 continued. ATLAS at increasing solar colongitudes .

g. colong. 54.7°. William Dembowski, Windber, Pennsylvania, USA. August 29, 2012 01:55 UT. Seeing 5/10. Celestron 9.25" SCT f/10, 2X barlow, DMK41, UV/IR filter.

h. colong. 111.3°. William Dembowski, Windber, Pennsylvania, USA. July 9, 2009 04:06 UT Seeing 5/10. Celestron 8," SCT f/10, DMK41, UV/IR filter.

i. colong. 123.7°. Richard Hill, Tucson, Arizona, USA. October 3, 2012 06:50 UT. Seeing 6/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 filter. North up.

j. colong. 123.7°. Richard Hill, Tucson, Arizona, USA. August 19, 2012 06:25 UT. Seeing 5/10. C-14 SCT, 2X barlow SPC900NC, UV/IR blocking filter.

k. colong. 132.4°. Fykatas Stergios-Vienna, Austria. April 10, 2012 0256 UT. Seeing 5/10. 8" LX-90 SCT, 2X barlow, Alccd5.

l. colong. 134.4-136.7°. Phillip Morgan –Lower Harthall-Tenbury Wells, Worcestershire, England. October 4, 2012 03:45-04:20 UT. 305 mm f/5 Newtonian, x400. Seeing 9/10 Transparency 5/5.

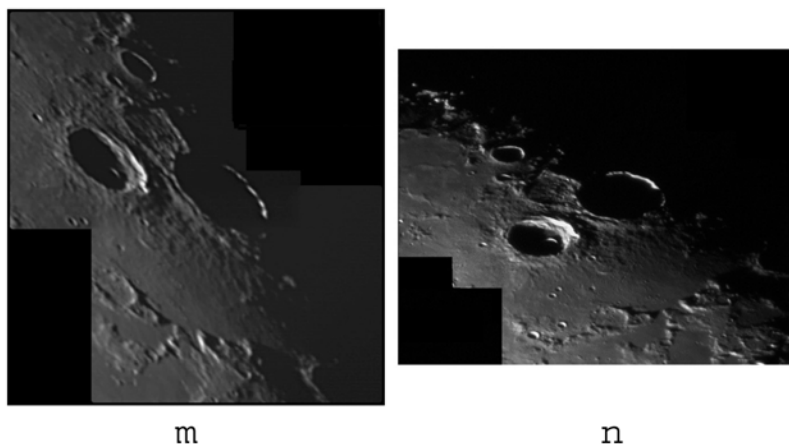


FIGURE 1 continued. ATLAS at increasing solar colongitudes .

m. colong. 134.5°. Richard Hill, Tucson, Arizona, USA. September 30, 2012 06:38 UT. Seeing 6/10. C-14 SCT, 1.6X barlow, SPC900NC, UV/IR blocking filter.

n. colong. 136.0°. Richard Hill, Tucson, Arizona, USA. April 10, 2012 10:07 UT. Seeing 6/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. Wratten 23 filter. North up.

ADDITIONAL READING

- Benton, Julius. 2002. A Manual for Observing the Moon: The ALPO Selected Areas Program. Association of Lunar & Planetary Observers. Downloadable version at <http://moon.scopesandscapes.com/sap-hdbk-5.pdf>.
- 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.
- Wlasuk, Peter. 2000. Observing the Moon. Springer-Verlag, London.
- Wood, Charles. 2003. The Moon: A Personal View. Sky Publishing Corp. Cambridge.
- The-Moon Wiki. <http://the-moon.wikispaces.com/Introduction>

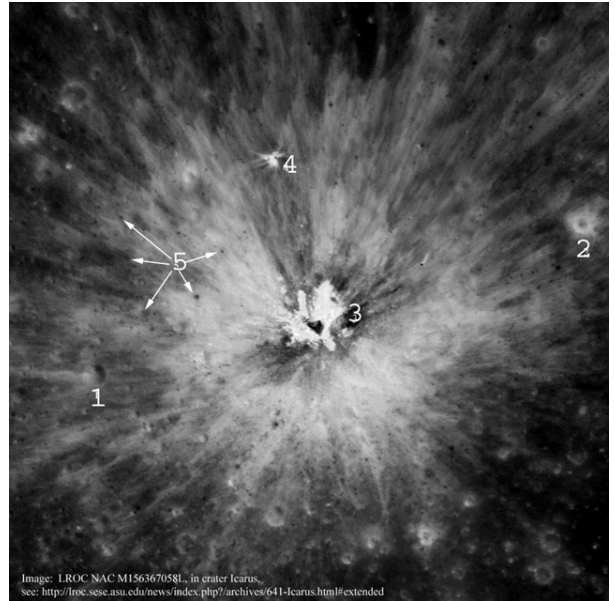
FRESH, FRESHER AND FRESHER, FRESHEREST

Howard Eskildsen

When I saw this image (fig. 1) of a small, fresh crater in the large far side crater, Icarus, in today's (10/23/2012) LROC image of the day I was dazzled by its bright, youthful freshness as a crater. But as the admiration settled, it became obvious that there was a whole series of craters varying in age on the image. Of course the oldest is the crater Icarus in which the rest of the craters formed. Crater #1 and others like it are tired and worn without rays, while crater #2 is relatively fresh with remnants

Figure 1. LROC NAC M156367058L. In crater Icarus.

of rays partly obliterated by the gorgeous rays of the fresher crater #3, the featured crater. But still fresher is the small rayed crater #4 that overlies the rays of crater #3. But even that is probably not the youngest visible crater. Still younger craters are likely some of the dark halo craters (#5 and others) that pierce the rays of #3 and possibly #4, though admittedly, some of the dark halos may be older than #4. So it is not totally clear exactly which of the dark halos are the "freshest," but it is fun to try and guess.



Getting back to poor old crater #2 with its tarnished rays; it reminds me of Pytheas (fig. 2) on the near side. For years I have wondered if the bright wings around it were remnants of its own rays, or simply a fortuitous emplacement of a section of Copernicus rays. It compares favorably to crater #2 in some ways, however. Though not absolutely certain, it is reasonable to attribute the markings to an oblique impact from the north forming Pytheas and producing asymmetrical rays that were later softened and partly obliterated by the Copernicus impact.

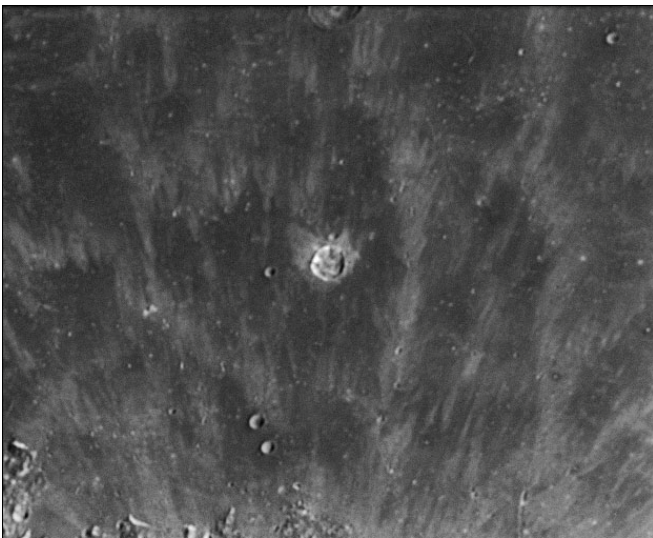


Figure 2. Pytheas. Howard Eskildsen-Ocala, Florida, USA. November 30, 2009 UT 01:59 UT. Seeing 810, Transparency 4/6. 6" f/8 refractor, 2X Barlow, DMK 41AU02.AS, no filter.

Curious how one observation can lead to insight into possible explanations of other observations on the opposite sides of the Moon. But that is what sometimes happens when you wonder too much about things that make others wonder about you. ☺

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 8 & 9 day Moon.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Albategnius, Albategnius-Albufeda, Alphonsus, Maurolycus & Playfair.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of 27.5 day crescent moon, Alphonsus, Clavius, Copernicus, Deslandres, Eastern Mare Imbrium, Eratosthenes(2), Feuilee-Beer, Kepler, Lalande-Wolf, Linne-Valentine Dome, Mare Cognitum, Mare Cognitum-Mare Nubium, Mare Humorum, Mare Imbrium, Mare Serenitatis(2) Oceanus Procellarum(2), Palas Purbach, Palus Epidemiarum, Pitatus, Pitatus-Moretus, Ptolemaus-Tycho, Pytheas, Pytheas-Guericke, Rhaeticus, Schickard, Schiller-Schickard, Thebit-Moretus, Tycho-Zucchiuss & Wichmann.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Atlas-Hercules, Cepheus-Macrobius, Endymion, Mare Crisium & Messier.

PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawings of Atlas-Hercules & Bessel.

THIERRY SPETH-METZ-LORRAINE, FRANCE. Digital image of Alphonsus.

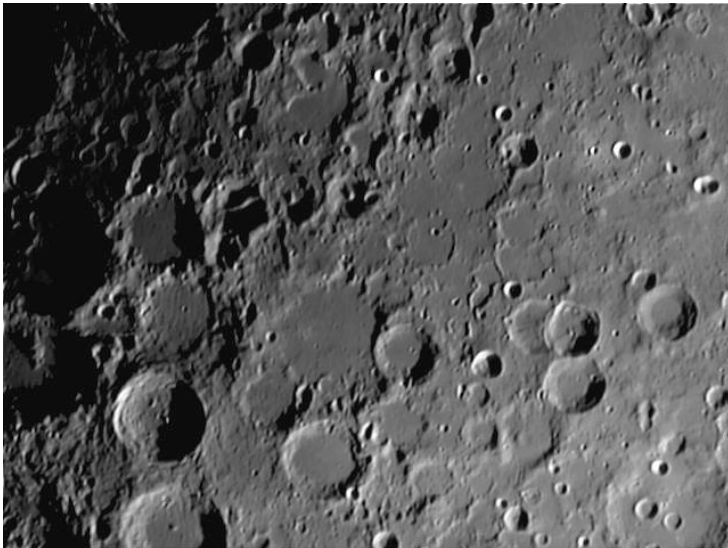
FYKATAS STERGIOS-VIENNA, AUSTRIA. Digital image of Atlas.

RECENT TOPOGRAPHICAL OBSERVATIONS

8 day MOON - Maurice Collins-Palmerston North, New Zealand. October 23, 2012 07:43-08:20 UT. C8 SCT, LPI.



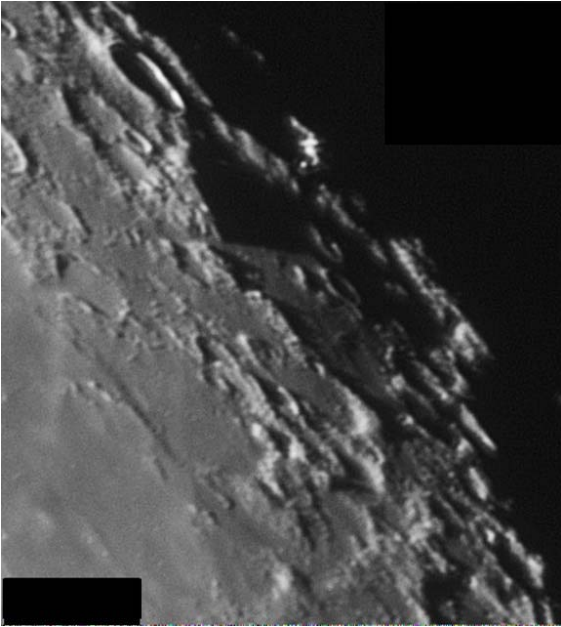
PLAYFAIR – Ed Crandall – Lewisville, North Carolina, USA. October 23, 2012 00:54 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.



27.5 day Moon- Howard Eskildsen-Ocala, Florida, USA. October 13, 2012 UT 11:05 UT. Seeing 5/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, DMK 41AU02.AS, IR block & V block filters.

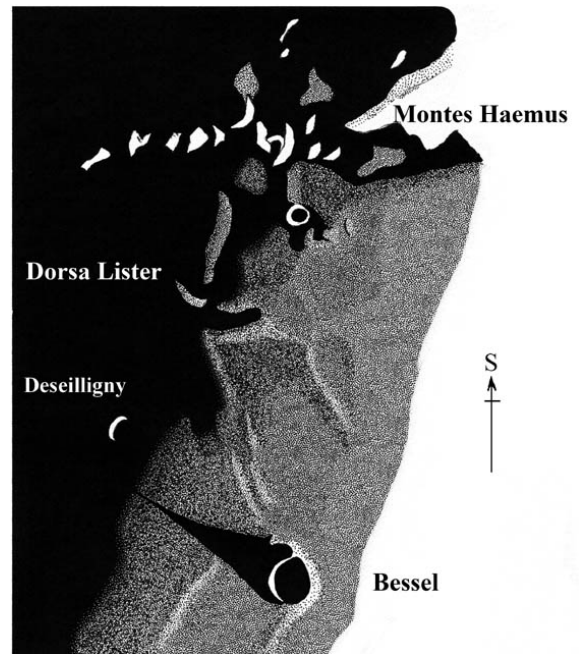


RECENT TOPOGRAPHICAL OBSERVATIONS



ENDYMION – Richard Hill – Tucson, Arizona, USA August 25, 2012 02:29 UT. Seeing 7/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. Wratten 23 filter. North up.

One very interesting sight is the sunset on Endymion. Notice how the crater rim has a mountain pass that defines the shadow line to the north. I love this kind of thing in various craters, and I've pointed it out before.



DORSA LISTER to BESSEL –Phillip Morgan –Lower Harthall-Tenbury Wells, Worcestershire, England. October 6, 2012 05:15-05:45 UT. 305 mm f/5 Newtonian, x400. Seeing 6/10 Transparency 3/6. Colongitude 159.6-159.9°.



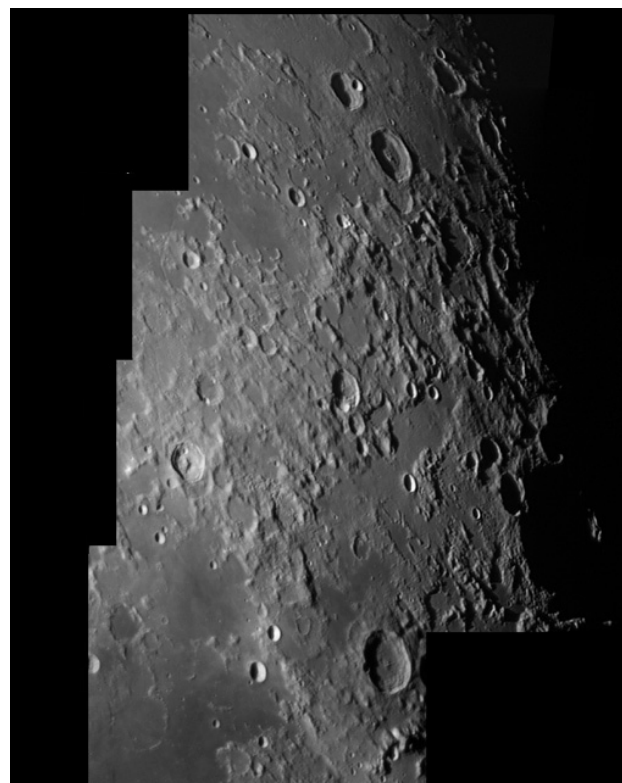
ALPHONSUS –Thierry Speth –Metz-Lorraine, France. September 7, 2012 00:16 UT. Seeing 5/10 Transparency 4/6. 120 mm, f/8.3, refractor, 3X barlow, LPI.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

MAUROLYCUS – Ed Crandall – Lewisville, North Carolina, USA. October 23, 2012 00:56 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.



FEUILLEE, BEER, COLLAPSE PITS & RILLE - Howard Eskildsen-Ocala, Florida, USA. October 7, 2012 UT 10:22 UT. Seeing 8/10, Transparency 4/6. 6" f/8 refractor, Explore Scientific lens, 1.44X Barlow, DMK 41AU02.AS, IR block & V block filters.



CEPHEUS-MACROBIUS – Richard Hill – Tucson, Arizona, USA October 3, 2012 06:50 UT. Seeing 7/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter. North up.

We had a night of reasonable seeing on the night of Oct. 2/3. As I set up I noticed Cleomedes filled with shadow in the lunar sunset. Lacus Bonitatis, usually overlooked, is very dramatic on the terminator. At the bottom left of the image flooded Miraldi, Miraldi D and E made and interesting and obvious trio. Note the odd shape of Cepheus at the top of the image. This is probably just a lighting effect but interesting. At top left is Rima G.Bond looking more concentric to its namesake crater than I recalled.

Lots of fun things to see in this image.

BRIGHT LUNAR RAYS PROJECT

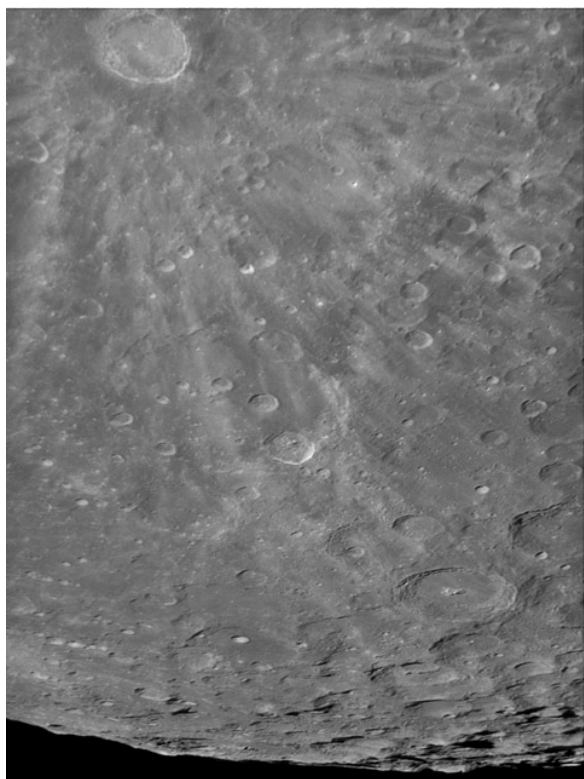
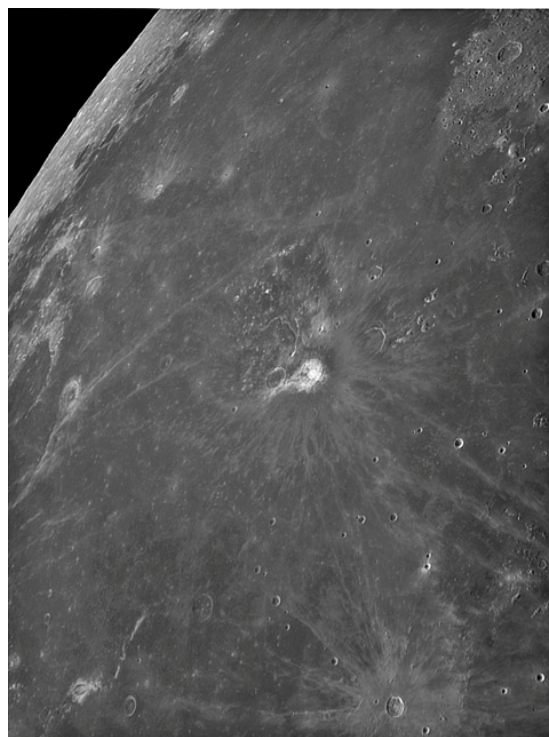
Coordinator – Wayne Bailey – wayne.bailey@alpo-astronomy.org

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

Bright Lunar Rays Website: <http://moon.scopesandscapes.com/alpo-rays.html>

RECENT RAY OBSERVATIONS

OCEANUS PROCELLARUM - Howard Eskildsen-Ocala, Florida, USA. October 7, 2012 UT 10:26 UT. Seeing 8/10, Transparency 4/6. 6" f/8 refractor, Explore Scientific lens, 1.44X Barlow, DMK 41AU02.AS, IR block & V block filters.



CLAVIUS REGION - Howard Eskildsen-Ocala, Florida, USA. August 4, 2012 UT 09:38 UT. Seeing 7/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2X Barlow, DMK 41AU02.AS, IR block & V block filters.

LUNAR TRANSIENT PHENOMENA

Coordinator – Dr. Anthony Cook – atc@aber.ac.uk

Assistant Coordinator – David O. Darling - DOD121252@aol.com

LTP NEWSLETTER – NOVEMBER 2012

Dr. Anthony Cook - Coordinator

Routine observations for September 2012 were received from the following observers: Jay Albert (Lake Worth, FL, USA) observed: Aristarchus, Barocius E, Birt, Copernicus, Grimaldi, Ricioli, and Tycho. Gary Beal (New Zealand) imaged Albategnius, Arzachel, Clavius, Hyginus, Plato, Posidonius, Rima Ariadaeus, and Theophilus. Dietmar Büttner (Germany) observed Moretus and Tycho. Maurice Collins (New Zealand) took whole disk image mosaics of the Moon. Marie Cook (Mundesley, UK) observed: Aristarchus and Plato. I obtained time lapse images of the Moon in narrow wavebands, using the robotic telescope at Aberystwth University. Eileen Horner (Salisbury, UK) observed Copernicus. George Ionas (New Zealand) imaged Mare Crisium, Schickard, and Schiller. Norman Izett (New Zealand) took whole disk images of the Moon. Alexey Mineev (Russia) imaged Aristarchus, Gassendi and Kepler. Bob O'Connell (Keystone Heights, FL, USA) observed Copernicus, Gassendi, and Tycho. Thierry Speth (Metz, France) observed the Alphonsus area.

LTP Reports: Three reports are worth mentioning this month:

On 2012 September 07 UT 00:16 Thierry Speth took an image of Alphonsus and noticed that instead of the usual three dark patches on the floor, a fourth was present between the eastern most two. Thierry mentioned that a check with some atlases under Full Moon conditions did not show this 4th patch, or at least as well as it was seen on September 7th. However subsequent analysis, using ALVIS (akin to LTVT) lunar visualization software shows that there is a 4th, albeit elongated dark shading visible here at this stage in the illumination – therefore this effect is perfectly normal – but observers should be aware of this in future.

On 2012 September 24 UT 22:00-23:00 Eileen Horner from Salisbury, UK, was observing the Moon with her Celestron 150, primarily with a 9 mm eyepiece, under moderate seeing, when she spotted a line of red light at the boundary between where the crater shadow met the illuminated western rim. Her account is as follows:

"I first spotted a line of red light in the interior of Copernicus, just where the sunlight met the shadowed part of the interior wall; it was a narrow line but the color was solid. At first I thought it was a reflection of the red light from the 'scope's hand set, as it was that shade. I moved the handset but the line stayed and remained even when I covered the handset completely. Sometimes it made a quarter-circle round the interior of Copernicus, but sometimes it extended to a half circle. I looked at the same spot with other eyepieces (20ml and 25ml with Barlow) and the line remained. I then looked at other parts of the moon, this time again with the 9ml lens. Again, there were no red lines, But I briefly saw splashes of green color on Longomontanus (which was now on the terminator) and other splashes of green 'inland' from the terminator. There were also little splashes of green on the craters above Mare Frigoris too, lasting for a brief time.

I asked my husband to come and look through the 'scope, now with a 20 mm lens plus Barlow in place. I asked: 'what can you see on Copernicus?' and after a short time he said: "a little bit of green at the top and some red near the bottom"; i.e. along the line of the internal shadow, which he was thinking was the bottom of the crater. Without any prompting, he'd seen the colors I'd seen! And these were strong, definite colors too, the red being like a red LED light and the green reminding me of that seen in photos of the Northern Lights."

Given that the Moon was setting towards the west and was at 17° to 11° above the horizon, from the start to the end of the observing period, and green was seen elsewhere on the Moon, I am very tempted to invoke spurious color in our atmosphere combined with seeing flare, especially the way color was seen to arc $\frac{1}{4}$ to $\frac{1}{2}$ the way around the interior of Copernicus. However she did the correct procedure in looking for red color elsewhere, changing the eyepiece, and getting independent confirmation - although this would have been better from another telescope situated at a different geographical location. Although the most likely cause is the atmosphere, given that no red was seen elsewhere on the Moon, I think that this LTP report deserves at least a weight of 1 until we have observations at the same time from somewhere else, in order to verify the report.

Incidentally, if you do see atmospheric spectral dispersion, alias spurious color, how can you confirm that this is the cause? Apart from checking bright/dark borders on other craters, as was done above, checking the Moon's altitude (if it is low you will see a lot more spurious color), try viewing the suspected area through red and blue filters. In the past we have used Kodak Wratten 44a (blue-green) and 25 (red) filters, but these are very expensive. A much cheaper alternative is the red and blue filters that you find in 3D stereo anaglyph glasses. If the color seen on the Moon is due to atmospheric spectral dispersion, then all that will happen is that there may be a very slight shift between images when you switch between filters - otherwise the red and blue views will look the same. Now if there is true red or blue color on the Moon, then it will look brighter in one filter and darker in the other. Switching between filters will make the area concerned appear to "blink". If you are using a camera, then a color web camera, handheld compact camera, or even a mobile phone camera, held up to the eyepiece, which should then be refocused, maybe sufficient to record color, which we can then analyse later to check out whether it is due to the atmosphere, or on the Moon. However as we saw last month with the color in Eratosthenes, even this is not a perfect solution, but at least we get some kind of permanent record. The very best solution though is to alert other observers who are separated geographically, and with different equipment, to check out the feature on the Moon concerned - without telling them what to look for. We have a telephone No. below, or my email address, that you can contact me on so that I may communicate the news to other observers.

On 2012 Sep 09 UT between 23:11-23:37 Alex Mineev observed a bright flash in the vicinity of Encke crater. Flashes can be caused by a number of mechanisms, the most likely being cosmic ray detection in the back of the eye. Atmospheric seeing conditions can also trigger a flash if there is a pinpoint size, bright crater, which most of the time is blurred out by seeing conditions, but perhaps for a brief fraction of a second comes into view when the atmosphere steadies. Impact flashes from meteorite strikes against the lunar surface are very rare, about one per several hours across the whole lunar disk, and these are usually only visible on the night side of the Moon. So I suspect that Alexey's sighting is probably is one of the first two explanations, however it is important to record this, just in case.

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

Schickard: On 2012 September 29 UT 10:59 George Ionas imaged Schickard under very similar illumination conditions to Sir Patrick Moore's LTP report from 1940 May 20 UT 20:00 (according to the Cameron catalog). Moore's description of the LTP was of "*Fog on floor – milky appearance, less pronounced than on 1939 Aug 02*". Alas I do not have a copy of the original 1940 observation, only the abridged version from the Cameron catalog. I have always wondered about the description "*milky appearance*" meant? The 1939 apparition, described in Moore's Survey of the Moon, p132, mentions, that the "*whole interior*" was filled with what was described as a "*whitish mist*". I had wondered if the milky appearance had referred to the large area of light albedo material that covers the middle section of the crater, but from the 1939 description of covering over the "*whole*" crater, this is evidently not the case. Anyway at least we now have a good image of what the 1940 normal appearance of the crater should have looked like (ignoring libration) for any future studies. The ALPO/BAA weight for the 1940 Schickard LTP will remain at 3.

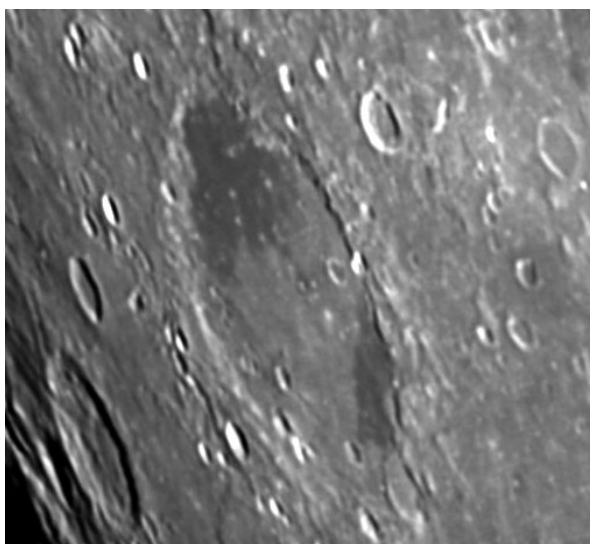


Figure 1. *Schickard imaged by George Ionas on 2012 Sep 29 UT 10:59 with north towards the top.*

Plato (part 1): On 2012 Sep 24 at UT 06:53 Garry Beal imaged Plato at very similar illumination to an observation by Walter Haas, that ended up being described as a LTP in the Cameron catalog. The Catalog states that in “1940 Jun 14 UT 04:00 Walter Haas (NM, USA), using a 12” reflector, observed two hazy streaks on Plato, of medium intensity, showing complex detail.”. The catalog assigns a weight of 4, although the current ALPO/BAA weight is only 1 following Walter’s comments in an email to me from 2002 Nov 5 that the appearance was probably normal. In his 1942 paper “Does Anything Happen on the Moon”, the precise description for the hazy streaks, are of intensities 5 (or 4.5), and are just regions between the two long shadows from the eastern peaks – nothing abnormal is noted in these, other than the complex detail. As indeed we can see some floor detail in the floor in Fig 2(Right), I think that we can safely agree with Walter, and say that there was nothing abnormal about the 1940 observation of Plato. We already covered this 1940’s observation back in the 2012 Sep newsletter, with an image from Maurice Collins. Therefore in view of this additional background information, I think that this LTP can now be removed from the ALPO/BAA catalog.

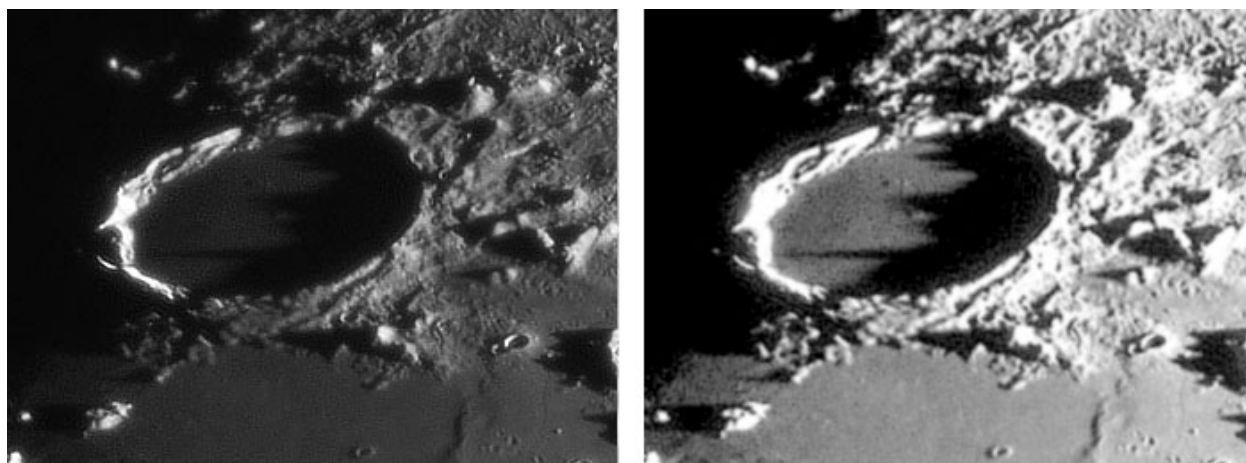


Figure 2. *Section of an image by Gary Beal from 2012 Sep 24 UT 06:53 with north towards the top. (Left) Original image – contrast stretched. (Right) sharpened and further contrast stretched.*

Plato (part 2): On 2012 Sep 25 UT 19:25-19:40 Marie Cook re-observed Plato, under similar illumination to two past LTPs, both of which were also similar libration to within $\pm 1^\circ$.

Plato 1975 Sep 15 UT 19:25-21:50 Observed by Foley. Color seen, mostly blueness on inner SSW rim. Blueness also seen on south rim and exterior of south rim at Bullialdus crater. No color reported on any other craters. Seeing III, 12" reflector used x200 and x360. ALPO/BAA weight=1.

Plato 1976 Sep 04 UT 02:35-03:35 Observed by Porter (Sarragansett?, Rhode Island, USA, 6" reflector x100, S=5, T=?). "At 0235h albedo of floor was est. at 3. At 0325h the pt. was albedo =1, 2 whole steps darker than earlier & noticeable to the obs. 10-15 min later it returned to normal. (the few meas. of albedo for this age were 1.5-2 which suggests that the meas. of 3 was the anomalous one. Another pt. did darken -- as reported). NASA catalog weight=3 (average). NASA catalog ID #1448. ALPO/BAA weight=2.

Marie notes that the floor appeared normal, and did not vary in shade. A thin shadow was seen to the east. No color was seen anywhere in the crater, and the rim was clear and sharp, somewhat different to the second report. The first report of course could be atmospheric spectral dispersion related, although colors were not seen on craters at the time other, than Plato and Bullialdus. For now the weights of both LTP reports will remain as they are.

Tycho: Lastly we shall revisit the shadowed floor of Tycho again to see if we can see detail on the floor/peak and explain some past LTP reports. A report appeared in Lunar Picture of the Day (LPD) on 2012 Sep 13 entitled: "Seeing in the Dark" (<http://lpod.wikispaces.com/September+13%2C+2012>), where Rik der Horst recorded an image on 2012 Sep 09 UT 03:10 that had been contrast stretched and showed clearly the central peak visible in shadow, as well as some wall terrace detail inside the completely shadow filled section of the crater. The source of illumination was presumably from the eastern sunlit wall at local sunset. A less publicized fact was that two other observers were also observing on that night: Dietmar Büttner and Jay Albert, both making visual observations. In table 1 you can see the solar altitudes for the centre of Tycho. So it was clearly possible to see Tycho's central peak with certainty down to a solar altitude of 0.6° at local sunset, but by 0.3°, presumably the illumination from the eastern rim was becoming too weak, as Jay only suspected the central peak was there.

| UT | Sel. Col. ° | Az. ° | Alt. ° | Observer | Telescope | Description |
|-------------|-------------|-------------|---------|-----------|-----------------|-----------------------------|
| 01:56 | 188.4 | 270.8 | 3.1 | Büttner | 10 cm O.G. | c.p. seen as a sunlit point |
| 03:10 | 189.0 | 270.4 | 2.6 | der Horst | 40 cm Spec | c.p. imaged + terraces |
| 03:49 | 189.4 | 270.2 | 2.4 | Büttner | 10 cm O.G. | c.p. now v.weak |
| 07:30-08:02 | 191.2-191.5 | 268.9-268.7 | 1.0-0.8 | Albert | 28 cm Celestron | c.p. a dim pin point |
| 08:25-08:30 | 191.7 | 268.6-268.5 | 0.7-0.6 | Albert | 28 cm Celestron | c.p. still visible |
| 09:30 | 192.3 | 268.2 | 0.3 | Albert | 28 cm Celestron | c.p. just suspected |

Table 1. Summary of sightings of the central peak (c.p.) of Tycho from 2012 Sep 09, as observed by three different observers.

On 2012 Sep 23 / 24 Bob O'Connell (23cm SCT telescope with seeing 5/10 and transparency 5/6) re-observed Tycho under sunrise conditions and at 23:18 UT the solar altitude was just 0.3° above the horizon, but this was too low to detect the central peak in a CCD image. The central peak was not visible in another image at 23:49 (solar altitude 0.5°). He continued by making periodic visual observations from 23:15 until 02:45UT, but failed to see visually the central peak, even at the end of the session when the solar altitude was 1.5° - remember Brendan's image recorded the central peak at a solar altitude of 1.2°. Figure 3 shows the last image that Bob took at 02:40UT, and after carrying out extensive enhancement, a central peak is perhaps

just visible, although this could be image noise too? This is surprising as several attempts on previous repeat illumination events (e.g. see Newsletter from 2012 Feb) have failed to detect the central peak. So why at sunset can the central peak still be seen when the Sun is only 0.6° above the horizon, but at sunrise it is 1.5° ? If scattered light off the opposite sunlit crater rims is the explanation, then it must have something to do with the direct line of sight visibility of the sunlit slopes from the central peaks. But I think that we still need to continue observing sunrise over Tycho a few more times to confirm how repeatable the start of the visibility of the central peak is, to be able to lay to rest the notion that the Shaw observation was in some way unusual.

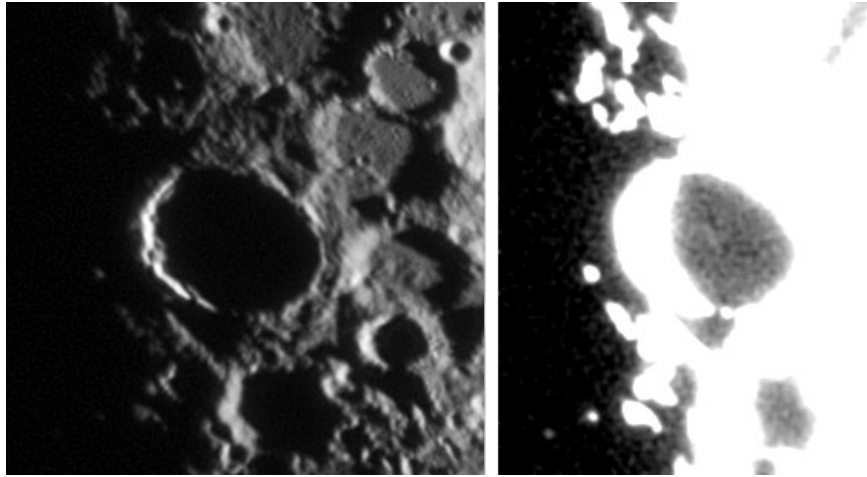


Figure 3. Section of an image showing Tycho, by Bob O'Connell from 2012 Sep 24 UT 02:40 with north towards the top. **(Left)** original image. **(Right)** contrast stretched version followed by some Gaussian blurring to reduce image noise – a central peak is now just visible.

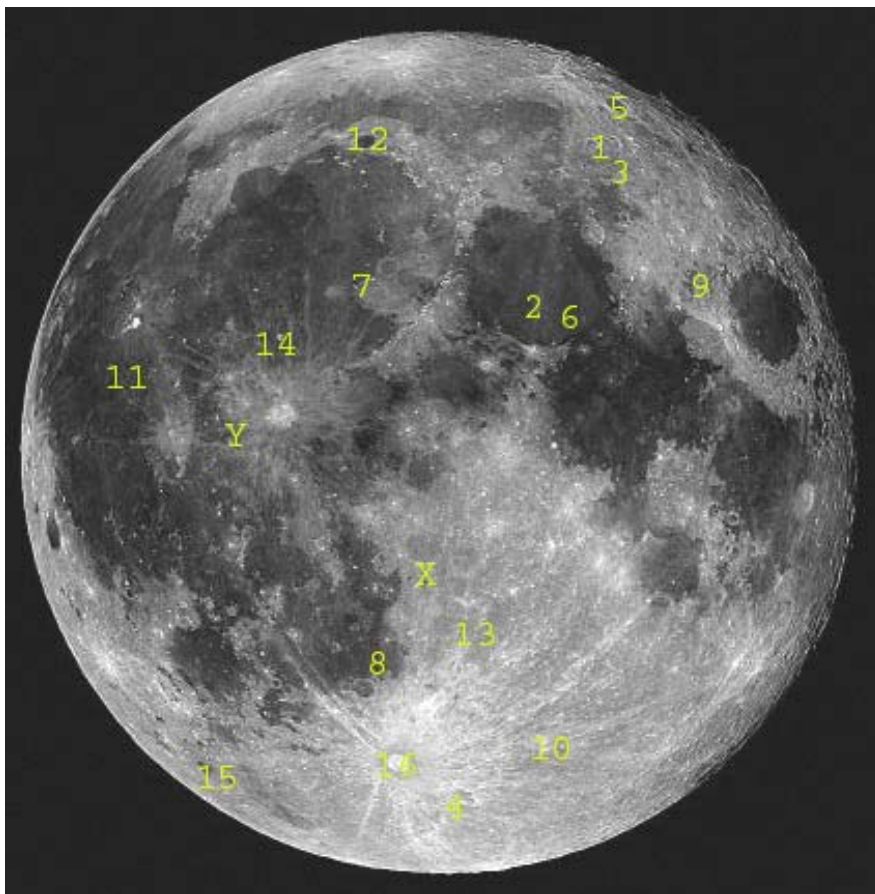
Suggested Features to observe in November: For repeat illumination (only) LTP predictions for the coming month, these can be found on the following web site: <http://users.aber.ac.uk/atc/tlp/tlp.htm>. By re-observing and submitting your observations, we will get a clear understanding of what the feature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

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. Atlas
2. Bessel
3. Cepheus
4. Clavius
5. Endymion
6. Dorsum Lister
7. Feuilee
8. Lippershey
9. Macrobius
10. Maurolycus
11. Oceanus Procellarum
12. Plato
13. Playfair
14. Pytheas
15. Schickard
16. Tycho



FOCUS ON targets

X = Alphonsus (January)

Wrinkle Ridges & Rilles (March)

Y = Mare Insularum (May)