ASSOCIATION OF LUNAR & PLANETARY OBSERVERS
ALPO
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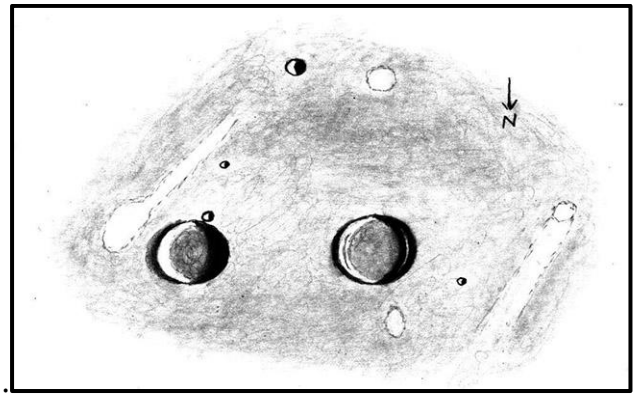
# THE LUNAR OBSERVER

**A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.**
**EDITED BY: Wayne Bailey wayne.bailey@alpo-astronomy.org**
**17 Autumn Lane, Sewell, NJ 08080**
**RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html**

# FEATURE OF THE MONTH – JANUARY 2015

## Le VERRIER & HELICON




**Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA**
**September 16, 2014 10:40-11:02 UT, 15 cm refl, 170x, seeing 7-8/10**

I sketched these craters and vicinity on the morning of Sept. 16, 2014. These are two somewhat isolated craters in northern Mare Imbrium. Le Verrier is the eastern one, and showed moderate internal shadow at that time. The small crater just to the south is Le Verrier T and Le Verrier S is the smaller pit farther to the south. The latter appeared as a tiny bright spot with a bit of shadow. Helicon is to the west and is slightly larger. This crater showed evidence of terracing with shadowing inside its east rim and a sunlit strip within its internal western shadow. Helicon E is the tiny crater to the west, and a shadowless bright spot is nearby, north of Helicon. Helicon B is farther to the south and forms a nearly equilateral triangle with the two larger craters. Another bright spot is west of Helicon B. A substantial bright patch is just southeast of Le Verrier. It has a raylike streak extending southwestward toward Helicon B, but peters out before reaching that crater. The conspicuous bright area Helicon C is west of Helicon. The Lunar Quadrant map indicates Helicon C as a 'spot' rather than a 'crater.' A vague, raylike streak extends northeast from Helicon C, approximately paralleling the feature south of Le Verrier. None of these bright areas, except for Le Verrier S, had any noticeable shadowing.

# LUNAR CALENDAR

## JANUARY-FEBRUARY 2015 (UT)

| | | | |
|---|---|---|---|
| Jan | 02 | 11:35 | Moon-Aldebaran: 1.5° S |
| | 03 | 17:53 | Moon North Dec.: 18.7° N |
| | 05 | 04:53 | Full Moon |
| | 09 | 18:17 | Moon Apogee: 405400 km |
| | 12 | 15:33 | Moon Ascending Node |
| | 13 | 09:47 | Last Quarter |
| | 16 | 11:52 | Moon-Saturn: 1.9° S |
| | 18 | 06:17 | Moon South Dec.: 18.6° S |
| | 20 | 13:14 | New Moon |
| | 21 | 20:06 | Moon Perigee: 359600 km |
| | 22 | 05:01 | Moon-Venus: 5.5° S |
| | 23 | 04:40 | Moon-Mars: 3.9° S |
| | 25 | 10:23 | Moon Descending Node |
| | 27 | 04:48 | First Quarter |
| | 29 | 17:07 | Moon-Aldebaran: 1.3° S |
| | 31 | 00:59 | Moon North Dec.: 18.5° N |
| Feb | 03 | 23:09 | Full Moon |
| | 06 | 06:25 | Moon Apogee: 406200 km |
| | 08 | 17:10 | Moon Ascending Node |
| | 12 | 03:50 | Last Quarter |
| | 13 | 00:10 | Moon-Saturn: 2.3° S |
| | 14 | 17:18 | Moon South Dec.: 18.4° S |
| | 17 | 06:20 | Moon-Mercury: 3.5° S |
| | 18 | 23:47 | New Moon |
| | 19 | 07:29 | Moon Perigee: 357000 km |
| | 21 | 00:56 | Moon-Venus: 2° S |
| | 21 | 01:28 | Moon-Mars: 1.5° S |
| | 21 | 16:05 | Moon Descending Node |
| | 25 | 17:14 | First Quarter |
| | 25 | 23:02 | Moon-Aldebaran: 1° S |
| | 27 | 07:19 | Moon North Dec.: 18.3° N |

# 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.alpo-astronomy.org.** 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:

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

Full resolution images are preferred-it is not necessary to compress, or reduce the size of images. *Additional commentary accompanying images is always welcome.* **Items in bold are required. Submissions lacking this basic information will be discarded.**

Digitally submitted images should be sent to both
Wayne Bailey – wayne.bailey@alpo-astronomy.org
and Jerry Hubbell –jerry.hubbell@alpo-astronomy.org

# CALL FOR OBSERVATIONS:

## FOCUS ON: Hainzel

***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 **March 2015** edition will be **Hainzel.** 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 this to your observing list and send your favorites to (both):

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

**Jerry Hubbell** –jerry.hubbell@alpo-astronomy.org

**Deadline for inclusion in the Hainzel article is February 20, 2015**

# FUTURE FOCUS ON ARTICLES:

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

| Subject | TLO Issue | Deadline |
|---|---|---|

# Focus On: Oceanus Procellarum and Reiner Gamma


## Jerry Hubbell
## Acting Assistant Coordinator Lunar Topographical Studies


Oceanus Procellarum (Ocean of Storms) is the largest Maria surface on the moon and covers approximately 1,500,000 square miles. It stretches 1,600 miles across the lunar surface (Figure 1). Figure 1 shows three views of the Maria: from left to right, visible light, topographic view, and the NASA Gravity Recovery and Internal Laboratory (GRAIL) gravity gradient view showing a large rectangular area which outlines Oceanus Procellarum.

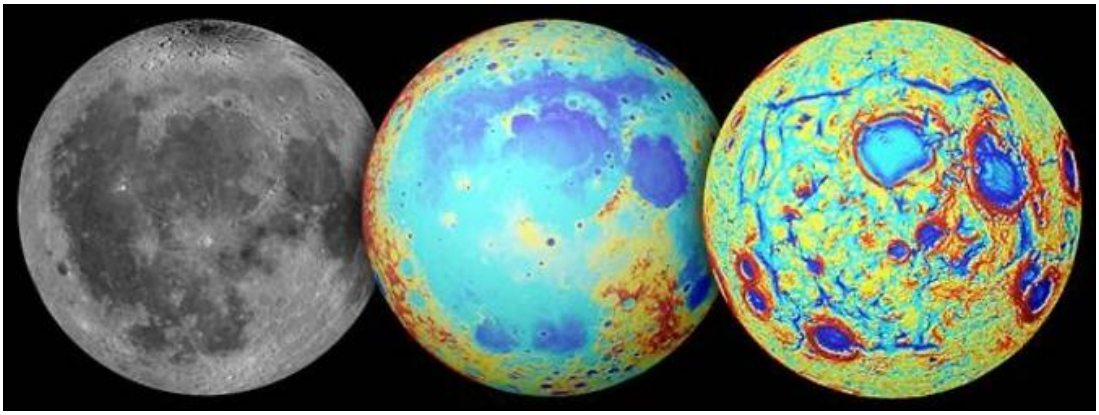


***Figure 1****: Oceanus Procellarum*
*Image Credit: NASA/GSFC/JPL/Colorado School of Mines/MIT*

The NASA website has a good overview of the GRAIL spacecraft and its mission (http://www.nasa.gov/mission_pages/grail/overview/index.html):

> *"As the GRAIL spacecraft fly over areas of greater and lesser gravity, caused both by visible features such as mountains and craters and by masses hidden beneath the lunar surface, they will move slightly toward and away from each other. An instrument aboard each spacecraft will measure the changes in their relative velocity very precisely, and scientists will translate this information into a high-resolution map of the Moon's gravitational field."*

The GRAIL spacecraft pair was launched in September 2011 and the mission ended in December 2012.

## Oceanus Procellarum

Originally thought to be the largest impact basin on the moon, Oceanus Procellarum is now thought to be the result of the formation of multiple rift valleys. The gravity data from GRAIL shows several lava conduits that were formed and flooded the basin. This recent analysis based on the data from the GRAIL mission provides an alternative explanation from the prevailing idea that the basin was formed via a large impact. It's interesting to note that prior to the modern view that most craters and basins were formed via impacts, most scientists thought that the moon's features were primarily formed via volcanic activity. It seems in this case that is indeed the fact. Future studies of these rift valleys by ALPO members interested in lunar topography would be welcome to help understand the physical extent of these features.

There are several prominent craters and other interesting features within the boundaries of Oceanus Procellarum (Figures 2 & 5) including the craters Copernicus and Kepler to the east, Aristarchus to the north and Reiner Gamma in the central western region. Reiner Gamma (Figures 3 & 4) is a particularly interesting feature that is not a true physical object in the way that craters and rills are. Reiner Gamma is an albedo feature believed to be created by a magnetic anomaly. These features are created through the interaction of the solar wind, micro-meteoroid bombardment and the lunar surface regolith. As the surface is exposed over the eons, the regolith gets stirred up and darkens. Those areas shielded by the magnetic field maintain their original lightness.

***Figure 2.*** *Oceanus Procellarum. Taken with a Questar telescope, 3.5 inch. Skyris 445M. Exposure 1/200 second, 8.16 dB. 150 of 300 frames stacked. Seeing 6/10. 14 November 2014 1140 UT. David Teske. Starkville, MS.*

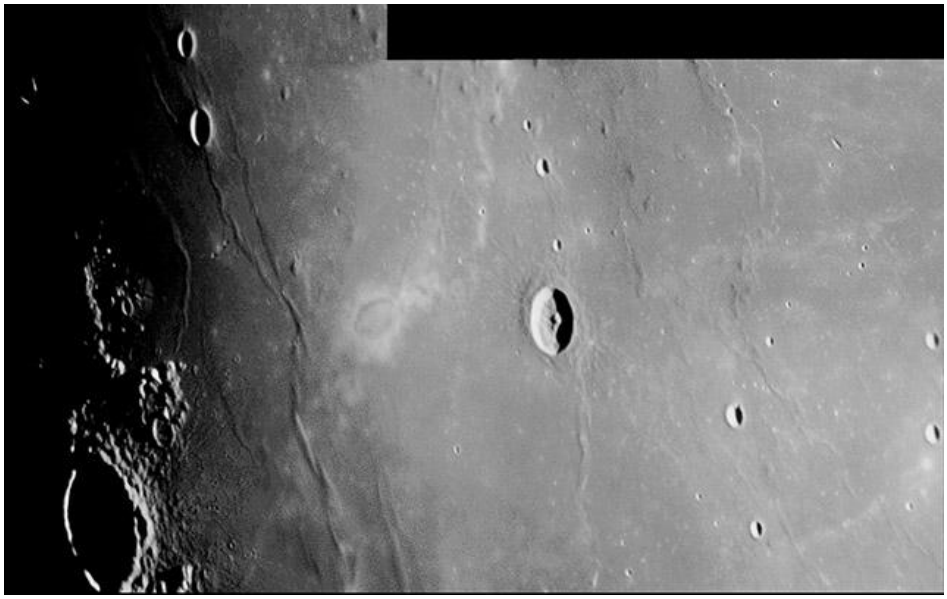


***Figure 3.*** *Reiner_gamma 2011-02-16-C14+2x barlow f/22 DMK21AU04 UV/IR Blocking filter Seeing 7/10 North Up Rick Hill Tuscon AZ*

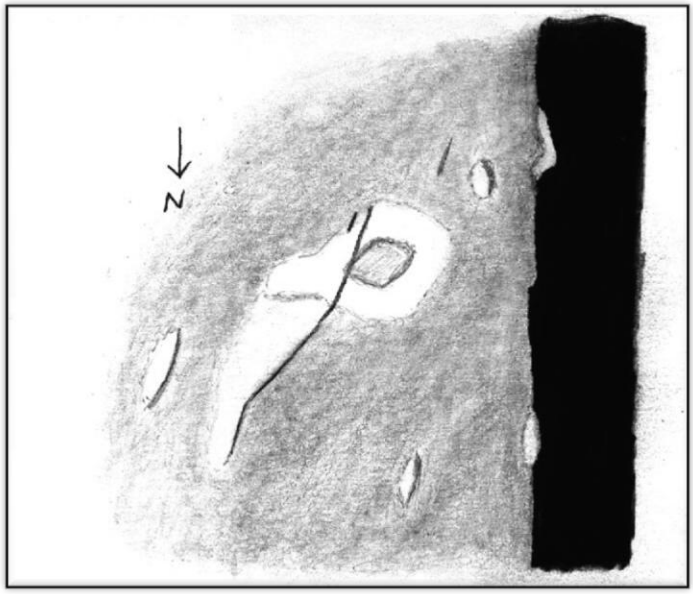



***Figure 4.*** *Reiner_Gamma.jpg June 30 2004 0332 – 0350 UT 15cm reflector, 170x Seeing 8/10 Robert Hays*

***Figure 5.*** *Oceanus Procellarum 2014-12-16 10-54-15UT b&w.jpg Oceanus Procellarum December 16, 2014 1054 UT Nextstar 6 f/6.3 Jay Albert Lake Worth, FL*

# ADDITIONAL READING


Bussey, Ben and Paul Spudis. 2004. *The Clementine Atlas of the Moon*. Cambridge University Press, New York.

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"NASA Mission Points to Origin of "Ocean of Storms" on Earth's Moon" (Press release). NASA. 2014-10-01. Retrieved 2014-12-30.

# Piazzi Smyth-Mons Piton-Montes Alpes

Peter Grego

Taking advantage of sunrise over the eastern reaches of Mare Imbrium, an observation was made centred on the crater Piazzi Smyth, which lay on the morning terminator. To its north stretched a prominent (unnamed) dorsum which curved west of Plato K and its partner (Figure 1, top centre), while another, less-distinct rille (part of the same system) stretched south of Piazzi Smyth. The outer

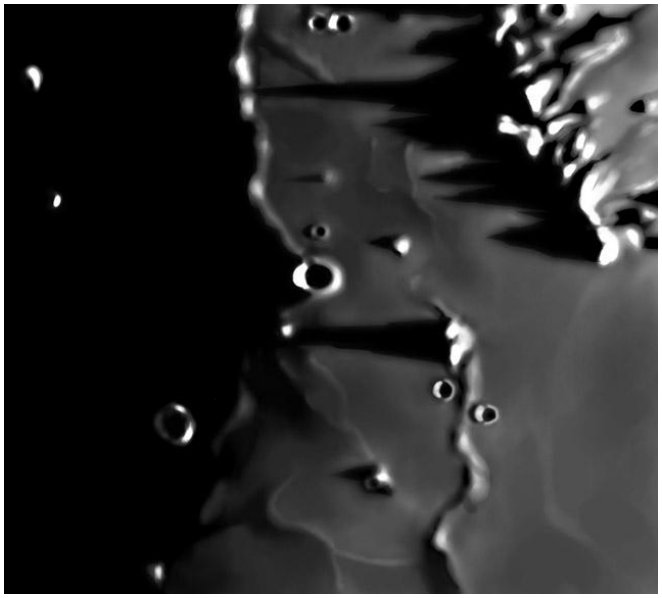

***Figure 1*. Piazzi Smyth Area.** *Peter Grego, St. Dennis, Cornwall, United Kingdom. November 29, 2014 19:07-19:50 UT. Seeing AII, clear, no wind. Colongitue 3.º6-3.9º. 200mm SCT, 200x, binoviewer, no filter.*

eastern ramparts and inner western wall of Kirsch caught the sunlight beyond the terminator southwest of Piazzi Smyth. Also protruding from the darkness were Mons Pico (upper left in image) and its companion Mons Pico Beta to its south; right on the terminator at the bottom of the area portrayed was one of the northernmost peaks of the Montes Spitzbergen range. In the upper right of the area portrayed was a southern section of Montes Alpes, including a brilliant Prom. Agassiz in the far south, and to its north Prom. Deville and Mons Blanc. The range cast long dark shadows westward across the mare, the longest of which was produced by Mons Blanc, whose shadow just about crossed the dorsum to join the terminator. A number of small dorsa could be seen in the area, both north and south of the shadow cast by Mons Blanc. Mons Piton was bright and prominent, casting a bold shadow west to a small illuminated elevation on the terminator just south of Piazzi Smyth. South of Mons Piton was another prominent (unnamed) dorsum that flowed south between the small craters Mons Piton A and B. Nearer the terminator was the small mountain massif Mons Piton Gamma, which appeared to cast a surprisingly small shadow. Further south on the mare were several fainter dorsa.

Shadow lengths shown here were sketched early in the session: by the end of the session most of them had receded notably, particularly the shadows of Mons Piton and Montes Alpes.

This observation was made with pencil on a pre-printed blank of smooth A5 cartridge paper that faintly showed the main features (so that positional accuracy for the drawing was not greatly compromised). The original at-the-eyepiece drawing was then scanned when indoors after the session and then tone/smoothness modified and overdrawn in various ways on Serif PhotoPlus X2, but while always maintaining the integrity of the original observation, while all of the detail was still fresh in mind.

# THE SOUTH SEAS

## Richard Hill

If you are a new lunar observer you should treat yourself to observing just around the edge of the limb. The moon rocks back and forth by varying amounts, every month. This is called the "libration". If you plan ahead, or are lucky, you can catch some features that are only observable for a short while. Mare Australis is one of those features. It is dominated by the large 145km crater Lyot seen here in the middle of the image (Figure 1) as a large well defined dark oval. If you are sharp eyed you can spot this "walled plain" about 2 days after new moon. In fact it appears that the whole of Mare Australis is composed of flooded, dark oval craters.

If you are an old lunar observer like me (been observing the moon since 1961) then you probably remember Lyot as being the small crater on the floor of Ptolemaeus. That was all changed by the IAU later in the 1960s.

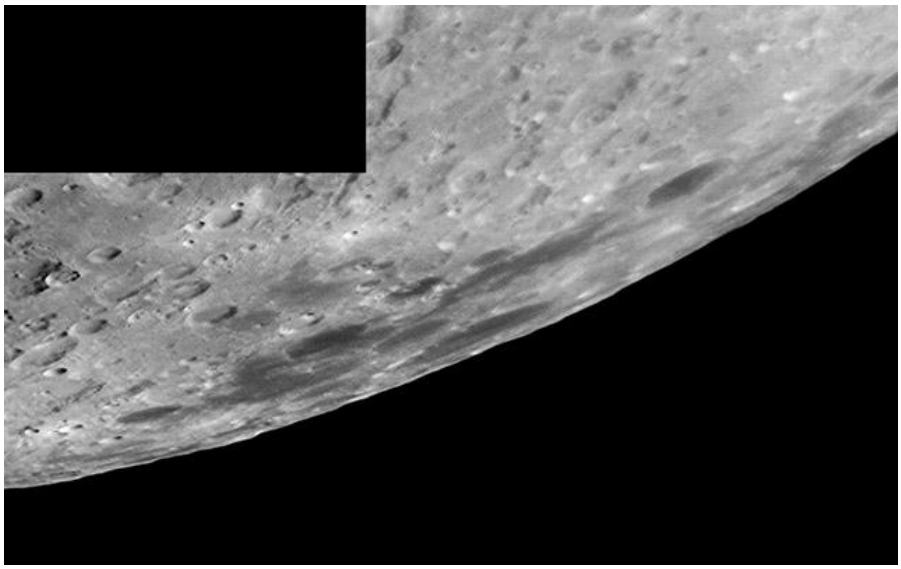

***Figure 1*. Mare Australis.**
*Richard Hill, Tucson, Arizona, USA*
*November 29, 2014 23:57 UT.*
*Seeing 8/10. TEC 8" f/20,*
*MAK-CASS, SKYRIS 445M.*
*656.3 nm filter.*

To the upper right, along the limb, is another smaller dark oval, Oken. Towards the limb from Oken is the well defined bright crater Hamilton. It hints of terraced walls and a central peak. Straight up from Lyot and slightly to the left is the crater Brisbane. Near the right edge of the image is another even smaller oval. This is the 58km crater Hanno.

At the vertex where the two images that made this montage, overlap is a trough. This is the southern end Vallis Rheita. Not as dramatic and obvious as the northern end so it's not often mentioned or highlighted.

As mentioned above, this is a two image montage. Each image made from a 500 frame stack selected from a 3000 frame AVI. The stacking was done with AutoStakkert and further processing with GIMP and IrfanView.

# LUNAR TOPOGRAPHICAL STUDIES

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

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

**Assistant Coordinator – Jerry Hubbell – jerry.hubbell@alpo-astronomy.org**

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

## OBSERVATIONS RECEIVED

JAY ALBERT – LAKE WORTH, FLORIDA, USA. Digital images of Mons Rumker-Aristarchus & Oceanus Procellarum.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Eastern Mare Imbrium, Hipparchus-Mare Nubium, Mare Frigoris-NE Mare Imbrium, Mare Vaporum, Montes Apenninus & Rima Archytas.

PETER GREGO – ST. DENNIS, CORNWALL, UK. Drawing of Piazzi Smyth-Mons Piton-Montes Alpes.

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawings of Carlini & Reiner gamma.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Clairaut, Gemma Frisius, Heraclitus, Mare Australis, Reiner gamma(2) & South Pole..

DAVID TESKE-STARKVILLE, MISSISSIPPI, USA. Digital images of Reiner gamm(3) & Oceanus Procellarum(2).

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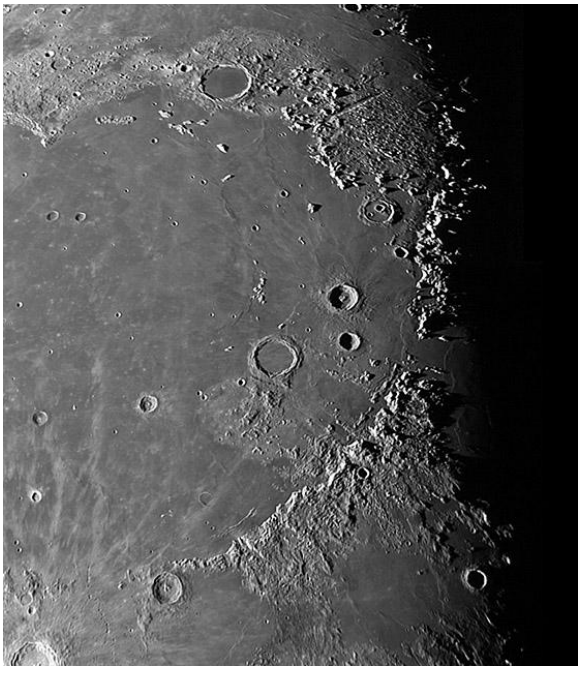
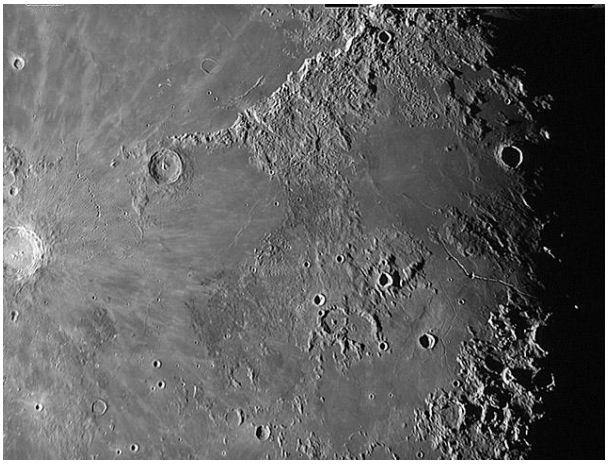
## RECENT TOPOGRAPHICAL OBSERVATIONS

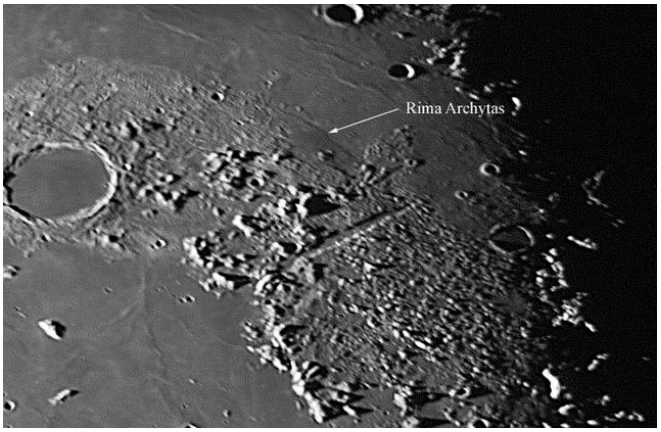


**EASTERN MARE IMBRIUM** - Howard Eskildsen-Ocala, Florida, USA. December 13, 2014 11:46 UT. Seeing 5/10, Transparency 6/6. Mewlon 250, 0.73x focal reducer, DMK 41AU02.AS.

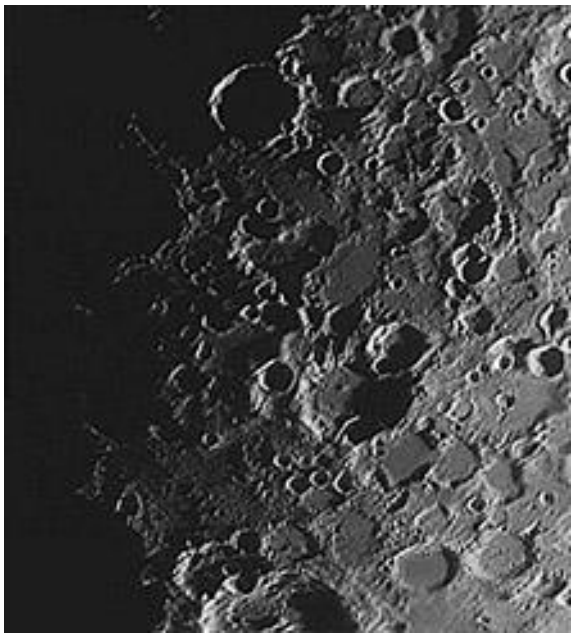
# RECENT TOPOGRAPHICAL OBSERVATIONS



**SINUS AESTUUM, MARE VAPORUM, SINUS MEDII** - Howard Eskildsen-Ocala, Florida, USA. December 13, 2014 11:48 UT. Seeing 5/10, Transparency 6/6. Mewlon 250, 0.73x focal reducer, DMK 41AU02.AS.




**RIMA ARCHYTUS** - Howard Eskildsen-Ocala, Florida, USA. December 13, 2014 11:52 UT. Seeing 5/10, Transparency 6/6. Mewlon 250, 0.73x focal reducer, DMK 41AU02.AS.



**GEMMA FRISIUS** – Richard Hill – Tucson, Arizona, USA November 28, 2014 23:34 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M. 656.3 nm filter.

Here we have the region about Gemma Frisius. Gemma Frisius itself is the 90km diameter, tortured crater in the center of this image best seen about 6 days after new moon or 5 days after full. That bent bright line off the south wall is the remnant of some ancient crater that was destroyed during the the Gemma Frisius impact. This region, like in an earlier image is considered "saturated" meaning you cannot make more craters through impact without destroying another. Here's some proof of that.

Notice the north-south oval plain above Gemma Frisius. This feature is unnamed! To its left is the crater Poisson with the ruins of previous formations almost forming an "X" on its floor.

The crater immediately to the left of Gemma Frisius is Gemma Frisius D. Note on the far wall the bright wall shared with a polygonal depression to its left. Also notice the polygonal appearance of the two craters to the lower right of Gemma Frisius, Gemma Frisius A & B. I suppose this is inevitable when so many impacts crowd into one area.

Straight over to the right edge of this image you see another crater with one straight wall. This is Celsius. Forming a isosceles triangle, to the north, with Gemma Frisius and Celsius is the heavily eroded crater Pontanus. I like this one as its appearance changes dramatically with changing sun angle. Watch it as the moon goes to full.

The crater at the top that's filled with shadow is Apianus and at bottom the half crater is Maurolycus.

# RECENT TOPOGRAPHICAL OBSERVATIONS

**HERACLITUS** – Richard Hill – Tucson, Arizona, USA November 30, 2014 01:10 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS, SKYRIS 445M. 656.3 nm filter.

Here is another impact saturated highland region on the moon. It's easy to see fresh sharp craters and older ones softened by the ejecta from more recent ones. Just below center in this image is the odd crater Heraclitus with the long straight central peak. This central peak is probably the remnants of some earlier formation that was largely destroyed by the Heraclitus impact. But Heraclitus itself has been greatly eroded by the impact that formed Licetus to the upper right of Heraclitus and Heraclitus D to the lower left. Due south of the latter crater is Lilius with its distinct and sharp central peak. Notice the big crater all in shadow taking a notch out of the central left edge of this image? That's the great crater Maginus. Above it we can see the wall of Orontius just coming into view with a wealth of detail. on the upper right side of the image is the large flat bottomed crater Stofler. In the area between Stofler and Maginus, craters as small as 1km were identified using LROC Quick map.

There is a circular arc formed by some craters and ruined craters that is concentric with Lilius, best seen to the left. I can't help but wonder if this is some ghostly remnant of a very old formation that was destroyed by later impacts.

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# LUNAR TRANSIENT PHENOMENA

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

## LTP NEWSLETTER – JANUARY 2015

Dr. Anthony Cook - Coordinator

Best wishes for all our readers for 2015. Observations from the following observers were received in November: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Gassendi, Herodotus, and Promontorium Agarum. Thomas Bianchi (Italy – UAI) imaged Plato. Maurizio Cecchini (Italy – UAI) imaged Plato. Maurice Collins (New Zealand - ALPO) imaged: Alphonsus, Deslandres, and obtained whole lunar disk images. Marie Cook (Mundesley, UK - BAA) observed Herodotus, and Philolaus. Rik Hill (Tucson, AZ - ALPO) imaged Gemma Frisius and the lunar South Pole. Thierry Speth (France - ALPO) imaged: Plato, Rutherford, and Timocharis. Franco Taccogna (Italy – UAI) imaged Aristarchus, Gassendi, Messier, Mons La Hire, Plato, Proclus, and Promontorium Laplace.

**News:** In the 2014 Dec BAA Lunar Section Circular (http://www.baalunarsection.org.uk/circulars.htm ), Nigel Longshaw discussed the rille depicted in T.G.E. Elger's sketch book that we covered in the 2014 Nov LTP newsletter (http://moon.scopesandscapes.com/tlo_back/tlo201411.pdf ) and why Wilkins and others failed to find this cleft. As with many entries in the NASA LTP catalog, and the Corliss book, anything anomalous gets entered, often without question. Therefore after reading Nigel's article, I am happy with my decision in the November newsletter, to remove Elger's report from the ALPO/BAA LTP catalog.

Following on from the 2014 Dec LTP newsletter, concerning Herodotus, Prof Bill Leatherbarrow has kindly forwarded onto me some additional observations of this crater by Axel Firsoff. Firsoff, drew a pseudo central peak in the crater, in 1955 Jul 07 at UT 03:50, but unlike other observers, this was under sunset conditions, and showed a shadow next to the peak - for further details, see: The Moon: Notes and Records of the Lunar Section of the British Astronomical Section, p22-35 (http://www.baalunarsection.org.uk/tmnr2_december2012.pdf). The interesting thing about this paper, was that simulations of the appearance of Herodotus, at the date and UT that Firsoff gave, sometimes showed the wrong amounts of shadow - in certain places. At least with the additional sketches by Firsoff, at other dates and UTs, it should be possible to check the accuracy of these too. One possibility, having taken a closer look at sketches of Firsoff, was that sometimes, what appeared to be shadows in his illustrations, were perhaps just areas darker than their surroundings? When I get some free time I will run some simulations of what the Moon should have looked like at the other dates and UTs that Firsoff provides, and test out this theory.

At the start of 2015, we have a healthy situation in the LTP group in that we are progressively reducing the number of LTPs, or at least demoting some of them in weight, through our repeat illumination programme. There is quite a lot of international collaboration in this activity. However new results from spacecraft, such as LADEE, and LRO, may profoundly affect what theories for LTP remain viable. Indeed the results from LADEE (still to be published in full) may rule out certain types of LTP altogether. However geologically recent volcanism, is now back on the agenda (http://lroc.sese.asu.edu/posts/818 ), but may still be so in frequent that it cannot explain any LTP. I have decided to review the observing programme strategy around April time, and am formulating some ideas on how to go about this. In the mean time, if you have any suggestions, please feel free to get in touch and have your say.

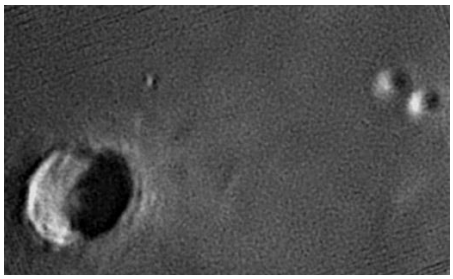

***Figure 1.*** *Timocharis with north towards the top, as imaged by Thierry Speth (ALPO) on 2014 Nov 01 UT at 18:00-18:01.*

**LTP Reports:** No actual LTPs were seen in November. Thierry Speth (ALPO) suspected that the shadow inside Timocharis was grey on 2014 Nov 01 UT 18:00-18:01, however a check on past imagery, and indeed some other craters in the supplied image, revealed that this was probably normal – but he did the correct thing to query the appearance because some LTPs have involved transient grey shadows in the past. A candidate LTP was suspected by on 2014 Dec 05 UT 20:20-21:30 by David Scanlon on the NE rim of Plato, but I will have more to say about this next month, when we cover the December observations.

**Routine Reports:** Below is a selection of reports received for November that can help to re-assess some past LTP observations.

**Mare Crisium:** On 2014 Nov 01 UT 07:35-08:06, Maurice Collins imaged the Mare Crisium area under the same illumination conditions as to when a bright spot was reported by John Westfall in 1991:

> *On 1991 Jun 21 at UT 04:30 J. Westfall (San Francisco, CA, USA) videoed a very bright pin-point white spot on the NW-shore of Mare Crisium. The ALPO/BAA weight=0 because the observer now thinks it is the usual to see a bright spot on the NW shore of Mare Crisium.*

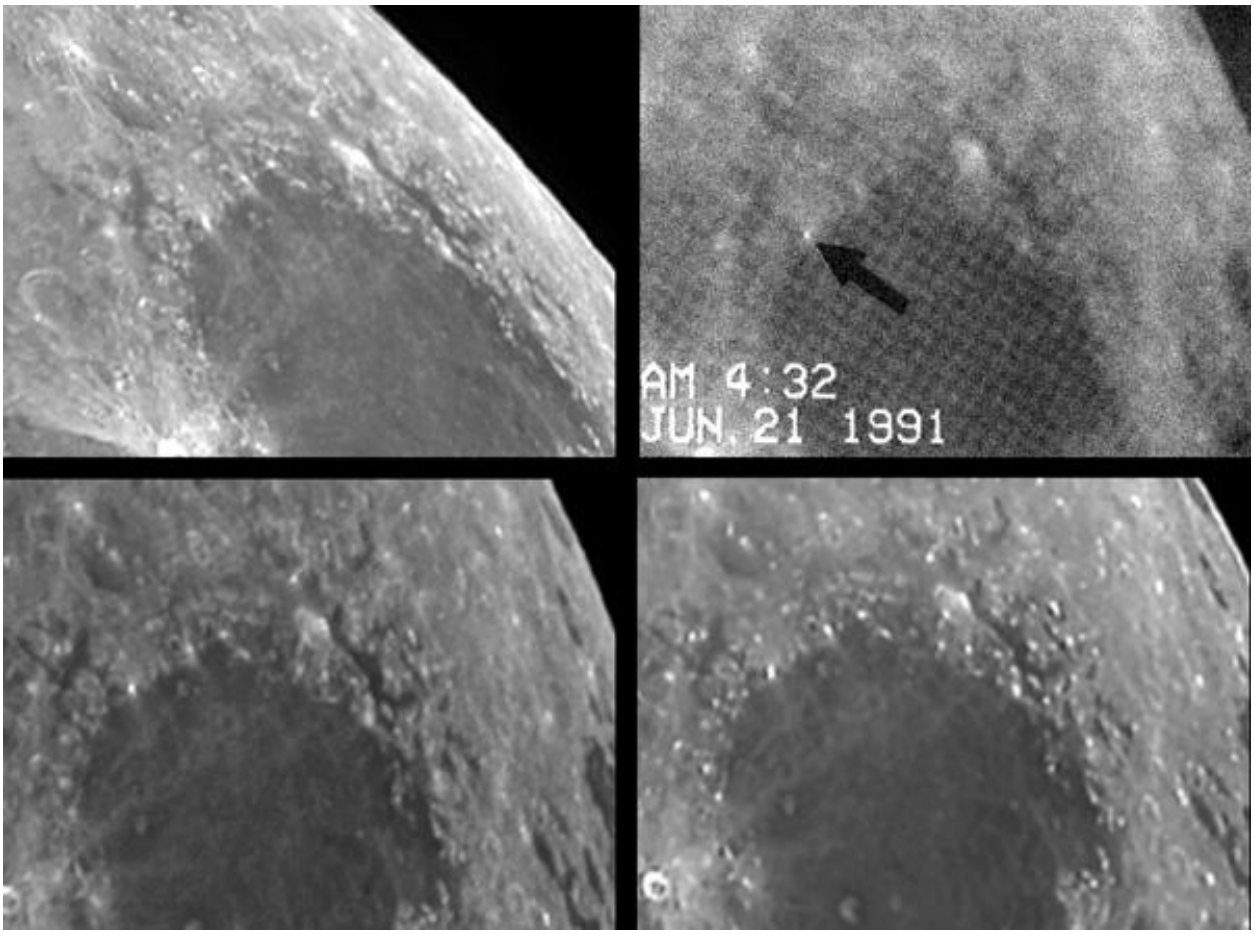


***Figure 2.*** *Mare Crisium orientated with north towards the top.* ***(Top Left)*** *Image by Maurice Collins (ALPO) from 2014 Nov 01 UT 07:35-08:06.* ***(Top Right)*** *Image by John Westfall from 1991 Jun 21 UT 04:30, with an arrow indicating the location of the bright spot - reproduction from the Strolling Astronomer, Vol 35, No. 3, p143.* ***(Bottom Left)*** *Image by Steve Lang (NZ Astronomers) from 2009 Jul 01 UT 09:00-09:30.* ***(Bottom Right)*** *Image by Mike White (NZ Astronomers) from 2009 Jul 01 UT 10:10-10:46.*

Although this was not a LTP, seeing a bright white spot on the NW shore-line of Mare Crisium, has triggered some LTP reports in the past, and will undoubtedly do so in the future for those unfamiliar with this region. I therefore show Maurice's image alongside the original John Westfall image (See Fig 2 (Top Left & Top Right)), as a reminder, that it is perfectly normal to see a white spot here. NASA LROC images confirm that it is just a bright ray craterlet on the slopes of a NW shoreline hill, catching the sunlight. What is interesting though is that where as in John's image the white spot is clearly brighter than any other spots in the image, in Maurice's image this is not so clear cut. Although the illumination is similar to within +/-0.5°, the libration (viewing angle) is different as can be seen by the different aspect ratios of Mare Crisium, and the position of the limb. Although repeat illumination predictions concentrate primarily upon the illumination, sometimes viewing angle matters too, and this NW Mare Crisium shore line white spot observation proves the point! For illustration, Figs 2 (Bottom Left) and (Bottom Right) were taken in 2009 and have similar illumination again, but this time topocentric libration (viewing angle) are also similar to John Westfall's original observation, at least to within +/-2°. They both recorded the spot as very bright, and brighter than in Maurice's image. The weight of John's 1991 report was already at 0 (non-LTP status) and will continue to remain so.

**Plato:** On 2014 Nov 01 UT 17:34-19:29, 17:35, 18:03, Franco Taccogna (UAI), Maurizio Cecchini (UAI), and Thierry Speth (ALPO) respectively, imaged Plato under the same illumination conditions as to the following LTP observation:

*Plato 1932 Apr 15 UT 06:57 Observed by A.V. Goddard & friend (Portland, Oregon, USA, 16" telescope, S=G steady).*

*The floor of the crater was devoid of its usual craterlets. Sudden appearance of a white spot like a cloud noticed – it moved across the crater in a NW direction, until reaching the rim in less than a minute. NASA catalog weight=4. NASA catalog ID #403. ALPO/BAA weight=4.*

The repeat illumination observing window of this LTP, to within +/-0.5°, was 16:36-18:21UT, and the closest UT to the 1932 appearance was at 17:33. Three images are shown in Fig 3, which (with the exception of libration effects) show what the crater should have looked like. It is quite clear that despite Goddard, and friend, using a 16" telescope back in 1932, the fact that they did not see any floor craterlets was not unusual, because the lower resolution images in Fig 3 (perhaps more akin to what the eye would see looking through the telescope), do not show them either, with the exception perhaps of the central craterlet, which is just visible as a spot in Franco's image. However, as you can see from Maurizio's image, under the very best atmospheric conditions, several craterlets could be seen.

Concerning the moving cloud effect from 1932, it is quite clear that no repeat illumination observations will reproduce this effect, but at least if we were to ever wanted to make a simulation animation, we have the necessary back ground image to do this against. It seems unlikely that the effect could have been caused by a cloud here in the Earth's atmosphere, somewhere along the line of site, because the Moon was as high as 38° above the horizon of Portland at the time of the observation, and I have never seen a cloud either that small, or move so slowly past the Moon – except perhaps when the Moon is a lot closer to the horizon. If the cause of the effect took place in the vicinity of the Moon, then the horizontal velocity of the moving cloud, if it started in the centre of the 109 km diameter Plato, would have to have been faster than 1 km/sec if it were to have moved from the crater's centre out to the wall in < 1 minute. If it had started out on one side of Plato (the observers do not state the source location), then it would have to had traveled at 2 km/sec. Both these velocities are within the realms of speeds achieved by ejecta from large meteorite impacts – though these are invariably radial to the source and disperse rapidly. If a hypothetical impact were nearly tangential to the lunar surface, then the ejecta would be more directional, but there would still be a problem with the ejecta dispersing and fading over time. Of course another more routine explanation could be internal reflection (or eyepiece lens flare), which might appear to drift across the crater if the telescope tracking was off. However although this has caught out lunar photographers before, using Barlows, I am not aware of any visual observers being fooled this way. This LTP will remain at a weight of 4, because it was seen by two observers (albeit with the same instrument), and we cannot explain the effect.

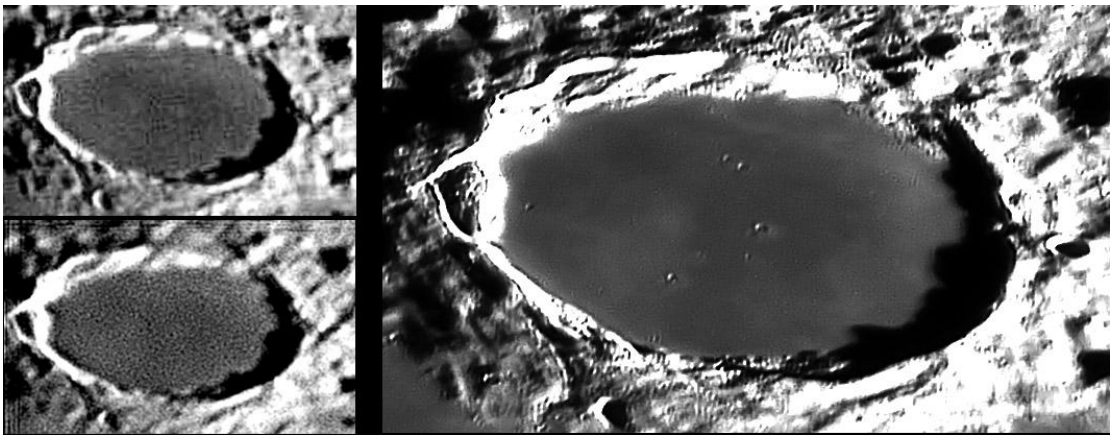

***Figure 3.*** *The following images have been orientated with north towards the top and were taken on 2014 Nov 01.* ***(Top Left)*** *Image taken by Franco Taccogna (UAI) at 17:34 UT – this image has been sharpened and contrast enhanced to reveal more floor detail.* ***(Right)*** *Image taken by Maurizio Cecchini (UAI) at 17:35 UT – again contrast enhanced to show additional floor detail.* ***(Bottom Left)*** *Image taken by Thierry Speth (ALPO) at 18:03 UT – image has been contrast enhanced.*

**Aristarchus:** On 2014 Nov 03 UT 21:51-22:45, Franco Taccogna (UAI) observed Aristarchus under the same illumination conditions as the following LTP observation:

*Aristarchus 1975 Dec 14/15 UT 17:05-00:30 Observed by Foley, Warwick, Pallet, and Gallen (Dartford, UK, 12" reflector, S=II) and Moore (Sussex, UK, 15" reflector x250 S=IV) and Argent and Brumder (Sussex, UK) "In early sunrise conditions, W. wall was less brilliant than usual -- matched only by Sharp, Bianchini, & Marian. Extraordinary detail could be seen on this wall. Also noted intense & distinctly blue color along the entire length of the W. wall. Warwick, Pallet and Gallen, corroborated the amount of detail, but not color. Moore found things normal & saw Aris. brightest at 2030-2125h, though Argent & Brumder made it < Proclus" NASA catalog weight=4. NASA catalog ID #1422. ALPO/BAA weight=3.*

Fig 4 shows two of Franco's images from the repeat illumination slot showing the crater at sunrise. Definitely in the 20:32UT image, the western rim has a blue cast, and parts of this blueness can still be seen in the unsaturated area in the 20:52UT image. So the blue color is normal. Whether the wall was less brilliant than usual is debatable because it depends when one looks at it during sunrise as more and more of the wall comes into view. Do Franco's images show extraordinary detail as the 1975 observation describes, or is that an issue to do with the seeing? As you can read from the description above, there was some disagreement between the observers concerned over color – this may simply be due to when they observed as the color may have been drowned out as the rim became brighter, but also perhaps due to respective color sensitivities of their eyes. In view of this I will lower the weight of this observation from a 3 to 2. We need more observations of color on this crater under sunrise conditions to be sure that the effect is repeatable.

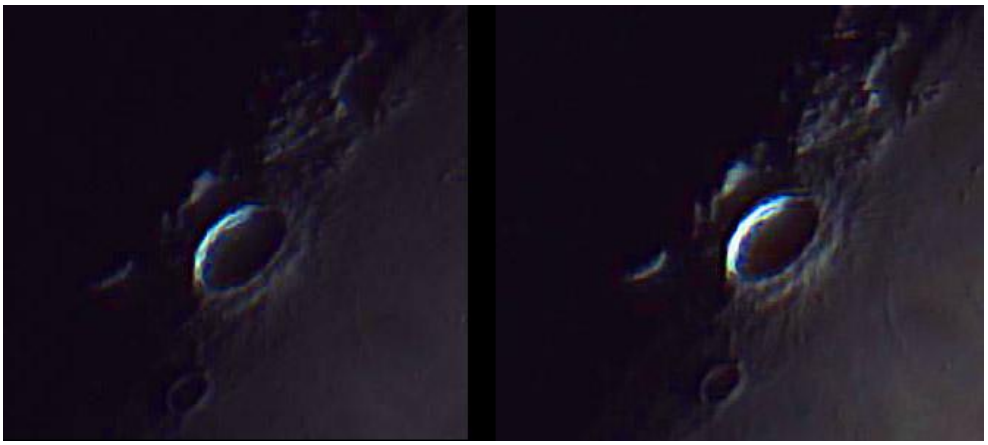

***Figure 4.*** *Aristarchus with north towards the top, taken by Franco Taccogna (UAI) on 2014 Nov 03. Color saturation on images turned upto 70%.* ***(Left)*** *at 20:32 UT.* ***(Right)*** *at 20:52 UT.*

**Philolaus:** On 2014 Nov 04 UT 20:00-20:10, Marie Cook (BAA) observed the Philolaus area under the same illumination conditions as to the following LTP observation:

*NE of Philolaus 1948 May 20 UT 22:00 Observed by Baum (Chester, England, 4.5" refractor) "Red glow". NASA catalog weight=3 (average). NASA catalog ID #505.*

Marie was using a 3.5" Questar, at x80-x130, seeing Antoniadi III, but found no red glow, despite seeing sharp detail. The weight of this 1948 LTP report will stay at 2.

**Gassendi:** On 2014 Nov 05 UT 01:50-02:35 Jay Albert (ALPO) observed Gassendi under the same illumination conditions to a LTP seen by Sir Patrick Moore in 1987:

*Gassendi 1987 Sep 05 UT 20:25-21:30 Observed by Moore (Selsey, Sussex, UK, Antoniadi III seeing, 12.5" reflector) "Intensely bright craterlet south of central peak, surrounded by a luminous nimbus. Foley confirmed the crater was highly luminous at 21:20, and surrounded by a blue halo that had a darker blue band within it. This craterlet faded over time, and by 21:20 Moore considered that it was no longer prominent, by 21:22 Foley (Kent, UK, 12" reflector) confirmed the reduced brilliance, and by 21:30 Moore considered it to be perfectly normal. Moore regards the nimbus effect to be normal too. The Cameron 2006 catalog ID=306 and weight=5. The ALPO/BAA catalog weight=3.*

Jay was using a 6" SCT (x214), under hazy sky conditions (Transparency 2), seeing 3-5 out of 10. He noted that the craterlet south of the central peak was extremely bright, even slightly brighter than the east slopes of the central peaks and the sunlit west interior wall. He also saw a thin, black shadow lined the base of the

interior eastern wall and the prominent rimae on the eastern floor was brightly lit and plainly visible. The brightness of the craterlet seemed to vary only during wind gusts and when fast moving clouds passed over, or close to the Moon. The brightness held steady during calmer moments. Jay's brightness variations seen on the craterlet seem to be seeing related, though he observed only for 45 minutes, compared to the $1^h$ $5^m$ time span by Moore. It seems that the brilliance of this craterlet is not unusual, however we do need to confirm the fade, therefore I shall lower the weight from 3 to 2.

**Suggested Features to observe in January:** Repeat illumination (and a few repeat libration) LTP predictions for the coming month 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, firstly read the LTP checklist on http://users.aber.ac.uk/atc/alpo/ltp.htm, and if this does not explain what you are seeing, 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. **Aristarchus**
2. **Gassendi**
3. **Gemma Frisius**
4. **Heraclitus**
5. **Le Verrier**
6. **Mare Australis**
7. **Mare Crisium**
8. **Mare Imbrium**
9. **Mare Vaporum**
10. **Piazzi Smyth**
11. **Philolaus**
12. **Plato**
13. **Rima Archytus**
14. **Sinus Aestuum**
15. **Sinus Medii**
16. **Timocharis**

## FOCUS ON targets

**X= Reiner gamma**
**Y = Hainzel**