THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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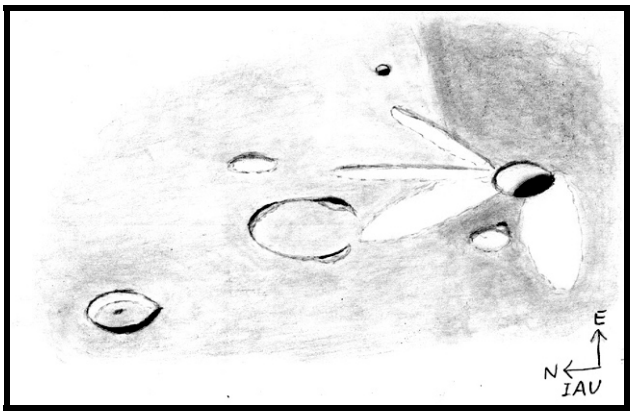
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JANUARY 2013

LICHTENBERG & VICINITY



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
October 10, 2012 10:32-11:08 UT, 15 cm refl, 170x, seeing 6-8/10

I drew this area on the morning of Oct. 10, 2012 after watching two 8th-magnitude stars reappear from occultation. This area is in far northwest Oceanus Procellarum, and was favorably placed by lunar librations. Lichtenberg itself is a modest, sharply-outlined crater with a bright interior. There are two wide, bright patches north and west of Lichtenberg, and two narrow, raylike features to the north and northeast. The raylike streaks had some shading indicating that they are relief features as well as albedo features. The tiny pit Lichtenberg F is near the end of the northeast streak. There is a low bright mound between the wide, bright patches with the small peak Lichtenberg epsilon perched on the side nearest Lichtenberg. There is a dark slot in this area; this may be a contrast effect. A sharp demarcation between dark terrain to the south and less dark to the north is east of Lichtenberg and south of Lichtenberg F, but there is no such boundary to the west. The largest crater in this view is the broken ring Lichtenberg R. This feature has a high point on its southeast rim, and other noticeable ridges on its north and west sides. There is weak shadowing between these high areas except to the south where no rim is evident. A low ridge is east of Lichtenberg R; and appears to be a continuation of the raylike feature north of Lichtenberg. Lavoisier A is the crater northwest of Lichtenberg R. This crater is shallower than Lichtenberg, and has a pointed south end. A minute bit of shadow in Lavoisier A might indicate a central peak, but I couldn't tell for sure.

LUNAR CALENDAR

JANUARY-FEBRUARY 2013 (UT)

Jan. 05	03:58	Last Quarter
Jan. 06	24:00	Moon 3.7 Degrees SSW of Saturn
Jan. 09	15:24	Extreme South Declination
Jan. 10	10:27	Moon at Perigee (360,047 km – 223,723 miles)
Jan. 10	11:00	Moon 2.8 Degrees NNW of Venus
Jan. 11	00:00	Moon 0.32 Degrees NNW of Pluto
Jan. 11	12:00	Moon 5.8 Degrees N of Mercury
Jan. 11	19:44	New Moon (Start of Lunation 1114)
Jan. 13	07:00	Moon 6.2 Degrees NNW of Mars
Jan. 15	10:00	Comet Enke 1.2 Degrees SE of Moon
Jan. 17	02:00	Moon 4.5 Degrees NNW of Uranus
Jan. 18	23:45	First Quarter
Jan. 22	02:00	Moon 0.81 Degrees SW of Jupiter
Jan. 23	05:12	Extreme North Declination
Jan. 22	10:53	Moon at Apogee (405,311 km – 251,849 miles)
Jan. 22	18:00	Moon 1.2 Degrees NE of asteroid 4-Vesta
Jan. 27	04:39	Full Moon
Feb. 03	07:00	Moon 3.5 Degrees SSW of Saturn
Feb. 03	13:57	Last Quarter
Feb. 06	00:24	Extreme South Declination
Feb. 07	11:00	Moon 0.57 Degrees NW of Pluto
Feb. 07	12:10	Moon at Perigee (365,313 km – 226,995 miles)
Feb. 09	10:00	Moon 5.8 Degrees NNW of Venus
Feb. 10	07:22	New Moon (Start of Lunation 1115)
Feb. 11	01:00	Moon 5.5 Degrees NNW of Neptune
Feb. 11	10:00	Moon 9.0 Degrees NNW of Mars
Feb. 11	16:00	Moon 5.0 Degrees NNW of Mercury
Feb. 12	07:00	Comet Enke 1.1 Degrees ESE of Moon
Feb. 13	15:00	Moon 4.2 Degrees NNW of Uranus
Feb. 17	20:30	First Quarter
Feb. 18	12:00	Moon 0.90 Degrees S of Jupiter
Feb. 19	01:00	Moon 0.97 Degrees SSW of asteroid 4-Vesta
Feb. 19	07:00	Moon at Apogee (404,473 km – 251,328 miles)
Feb. 19	13:36	Extreme North Declination
Feb. 25	20:28	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: Wrinkle Ridges & Rilles

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 2013** edition will be **wrinkle ridges & rilles.** 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. 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 the moon for objects to your observing list and send your favorites to:

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

Deadline for inclusion in the Wrinkle Ridges & Rilles article is February 20, 2013

FUTURE FOCUS ON ARTICLES:

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

Subject	TLO Issue	Deadline
Mare Insularum	**May 2013**	**April 20, 2013**

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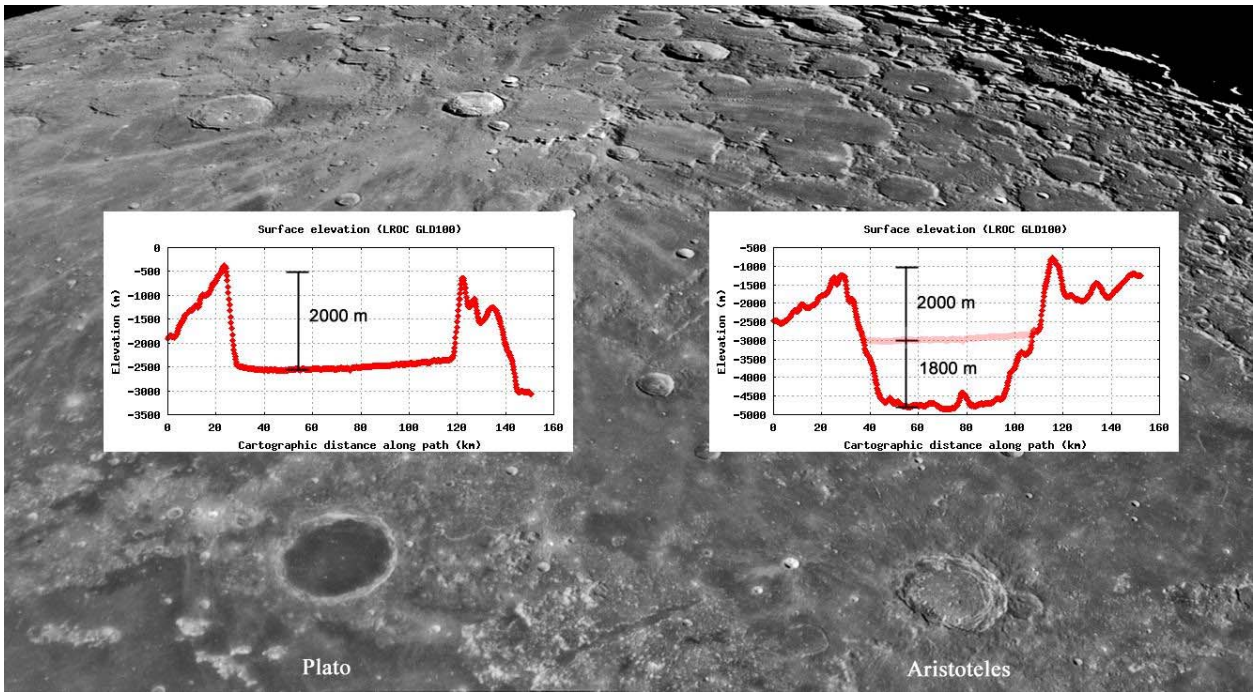
EDITORIAL NOTE

Due to the length of this issue, the scheduled Focus On article on Alphonsus will appear in the next issue. This is a problem I don't mind having, so thanks to everyone who contributed.

Tale of Two Craters

Howard Eskildsen



Aristoteles and Plato on the northern hemisphere have similar diameters but distinctly different depths and interiors. The LROC Act-React QuickMap was used to generate a north-south profile through the approximate centers of the craters and their depths compared. Aristoteles measured 87 km diameter at the profile location and Plato measured 99 km (geodetic distance). Depths were determined by subtracting the lowest crater elevation from the mean of the north and south rim elevations. As noted on the diagram above, Plato appears to have a mare basalt fill of approximately1800 m. The measurement data and depth/diameter (d/D) ratios are listed below:

	Elevation North Rim	Elevation South Rim	Elevation Mean	Elevation Floor	Crater Depth	Geodetic Diameter	d/D
Crater	**(m)**	**(m)**	**(m)**	**(m)**	**(km)**	**(km)**	**Ratio**
Aristoteles	-1250	-800	-1025	-4800	3.78	87	0.043
Plato	-400	-600	-500	-2500	2.00	99	0.020

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

JAY ALBERT – LAKE WORTH, FLORIDA, USA. Digital image of Alphonsus.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 2, 6(2), 7, 9, 10, 12(2), & 20(2) day Moon, Mare Australe, Theophilus, & Tycho.

ED CRANDALL – LEWISVILLE, NORTH CAROLINA, USA. Digital images of Birt, Clavius, South Polar Region, & Tycho.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Agatharchides A, Archytas G, Fracastorius E, & Mare Australe with measurements of the 3 craters.

STERGIOS FYKATAS-VIENNA, AUSTRIA. Digital image of Alphonsus-Arzachel.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Clavius, Kepler & rays(3), Lambert, Mairan, & Petavius-Langrenus.

JERRY HUBBELL – LOCUST GROVE, VIRGINIA, USA. Digital image of 17 day Moon.

PHILLIP MORGAN –LOWER HARTHALL-TENBURY WELLS, WORCESTERSHIRE, ENGLAND. Drawings of Campanus, & Colombo.

JERRY ORR-ORACLE, ARIZONA, USA. Digital image of Wargentin.

MICHAEL SWEETMAN – TUCSON, ARIZONA USA. Digital image of Alphonsus(2).

HONGSUN YOON –SEOUL, REPUBLIC OF KOREA. Digital image of Alphonsus.

RECENT TOPOGRAPHICAL OBSERVATIONS

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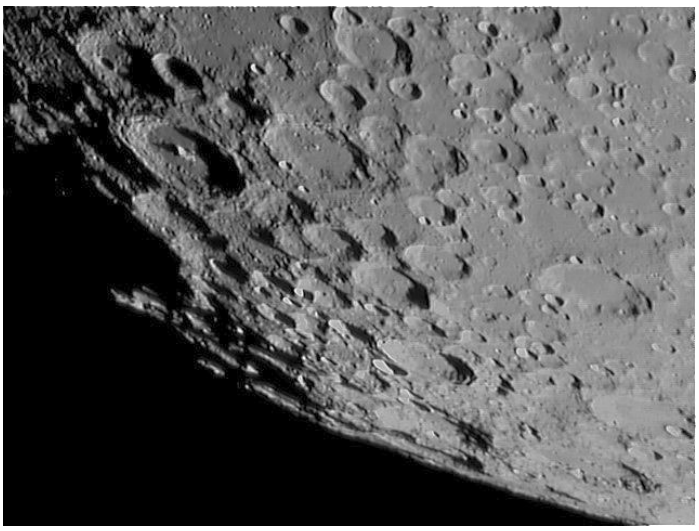
MARE AUSTRALE - Maurice Collins-Palmerston North, New Zealand. December 20, 2012 07:24-07:26 UT. WO FLT-110, Refr, 2x barlow, LPI.



SOUTH POLAR REGION – Ed Crandall – Lewisville, North Carolina, USA. November 23, 2012 01:13 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.

MARE AUSTRALE- Howard Eskildsen-Ocala, Florida, USA. November 22, 2012 UT 01:37 UT. Seeing 6/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

RECENT TOPOGRAPHICAL OBSERVATIONS

LAMBERT– Richard Hill – Tucson, Arizona, USA October 26, 2012 04:41 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

This was an area of the moon not well represented in my lunar database. I had images of many of the features on the rim of Imbrium but not much in the middle. So I went after this as soon as I got a chance.

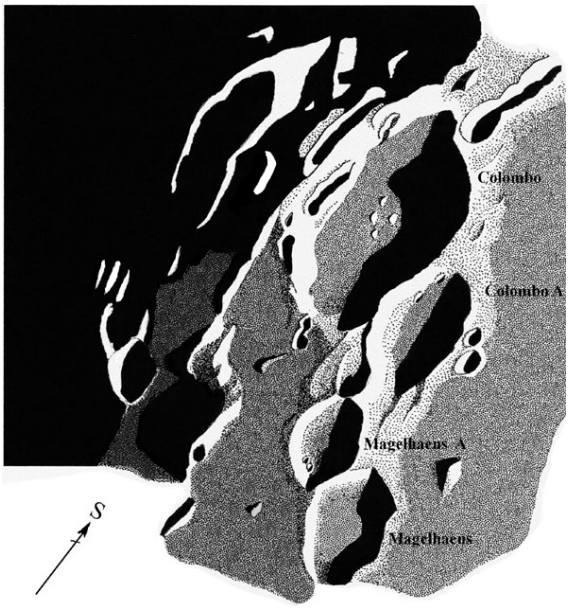
I named the image after the central crater, Lambert, but much more is present. In the bottom of Lambert is what looks like a central crater. LROC Quick Look website showed a very complex structure to the material in the bottom. It looks like a central peak that did quite fully form but only made concentric ridges. Interesting how in Euler you have a crater with a clear central peak, in Lambert a mild depression with what look like it was nascent central peak and then in Timocharis a clear central crater in the bottom.

To the left of Lambert is the isolated Mons La Hire and the two dorsa Dorsum Zirkel and Dorsa Stille that form a nearly right angle with the vertex on the north wall of Lambert. In this image only a short portion of the latter dorsum can be seen and Dorsum Higazy andDorsum Grabau cannot be seen at all in the higher sun.

In the image, between Diophantus and Diophantus C, a small dorsum or rille can be seen. A look at LROC Quick Map seems to indicate the former but it's not clear with the high sun in those images. I was surprised to see Rima Delisle just to the right of Delisle itself. It's just a little white dash but clearly seen.

17 day MOON– Jerry Hubbell, Locust Grove, Virginia, USA. December 30, 2012 07:00 UT. Colongitude 115.3º, Seeing 2/10, Transparency 5/6. 0.13m refr, TEC CCD.

RECENT TOPOGRAPHICAL OBSERVATIONS



COLOMBO–Phillip Morgan –Lower Harthall-Tenbury Wells, Worcestershire, England. December 1, 2012 22:50-23:30 UT. 305 mm f/5 Newtonian, x400. Seeing 5/10 Transparency 3/6. Colongitude 130.5-130.9°.

WARGENTIN - Jerry Orr-Oracle, Arizona, USA. December 27, 2012 03:05 UT. Seeing 7/10, Transparency 5/6. 90 mm f/10 refractor, Fujifilm finepix. Northeast up.

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ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

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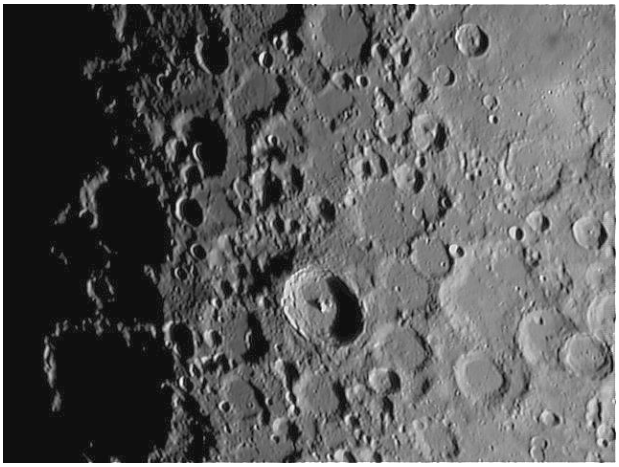
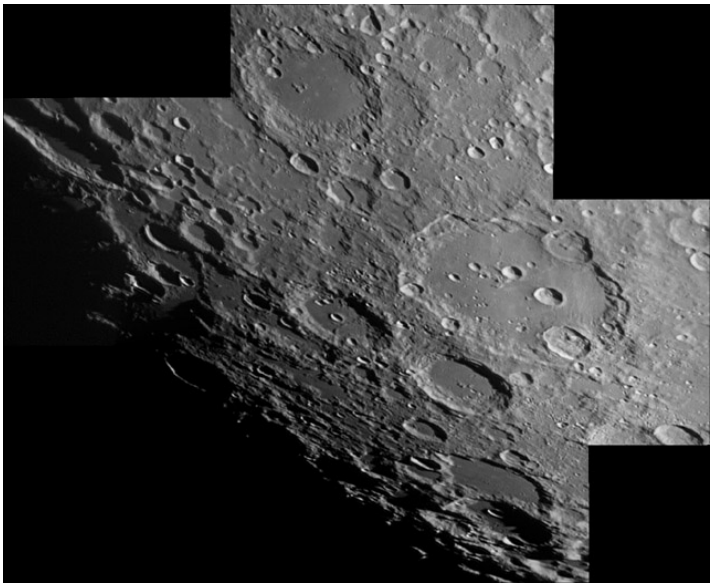
TYCHO - Maurice Collins-Palmerston North, New Zealand. December 22, 2012 08:12 UT. WO FLT-110, Refr, 2x barlow, LPI.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



TYCHO – Ed Crandall – Lewisville, North Carolina, USA. November 23, 2012 01:16 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.



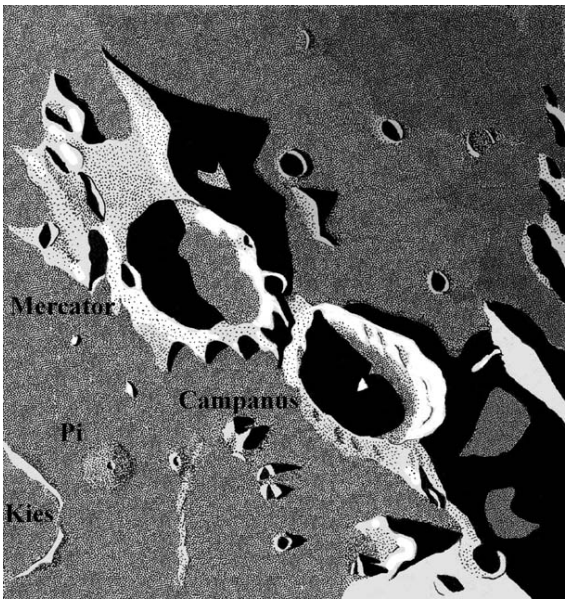
CLAVIUS– Richard Hill – Tucson, Arizona, USA October 26, 2012 04:53 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

Here we see an old friend dominating the view, lavius. But the trick is to not be distracted by this 'elephant in the room'. What I find interesting in this image are the linear features. For example, on the floor of Scheiner just to the left of Clavius, is an unusual ridge of low mountains. Is this the remnants of an old crater wall or ejecta from Blancanus?

The next prominent ridge runs from Scheiner W to Weigel G just south of Rost. I can't decide what we are seeing here. It's not prominent at all on LROC images so this is probably just an artifact of the lighting.

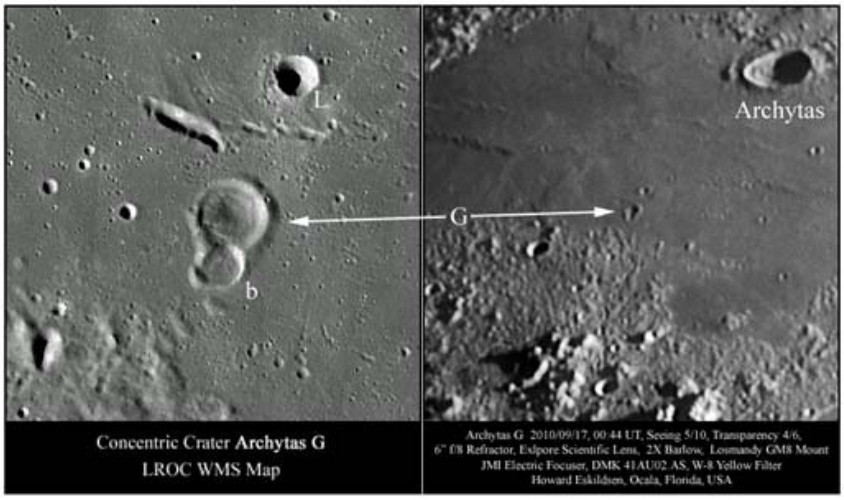
Another quasi-linear feature that is not at all prominent in the LROC imagery and not see at all in Virtual Moon Atlas, is between Rost A and Weigel. It looks like a small rille. Again, made more obvious by the low angle lighting of sunrise.

I'm sure you can find much more of interest, if you ignore the familiar!



CAMPANUS–Phillip Morgan –Lower Harthall-Tenbury Wells, Worcestershire, England. November 23, 2012 19:10-19:40 UT. 305 mm f/5 Newtonian, x400. Seeing 6/10 Transparency 4/6. Colongitude 31.2-31.4°.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

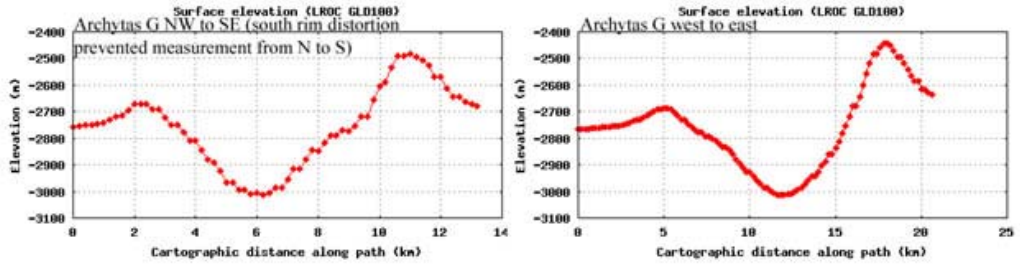


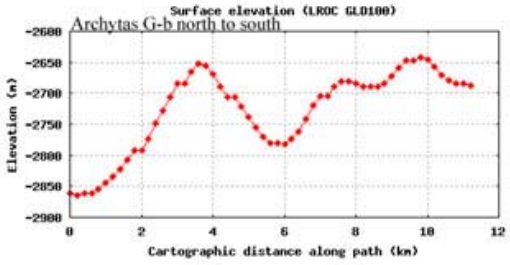
Concentric Crater **Archytas G**
LROC WMS Map

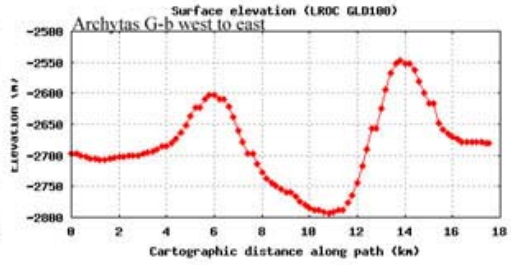
Archytas G 2010/09/17, 00:44 UT, Seeing 5/10, Transparency 4/6,
6" f/8 Refractor, Exlpore Scientific Lens, 2X Barlow, Losmandy GM8 Mount
JMI Electric Focuser, DMK 41AU02 AS, W-8 Yellow Filter
Howard Eskildsen, Ocala, Florida, USA

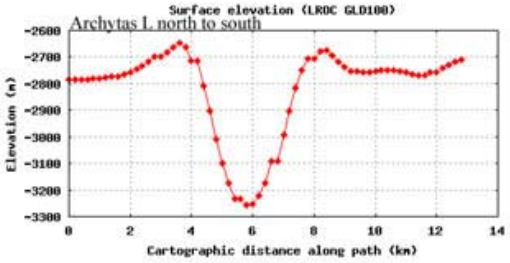
Crater	Coordinates	Mean Depth (d)	Geodetic Mean Diameter (D)	d/D Ratio
Archytas G	0.53E 55.74N	0.435	7.02	0.062
Archytas G-b	0.48E 55.56N	0.304	4.34	0.070
Archytas L	0.91E 56.19N	0.633	3.99	0.159

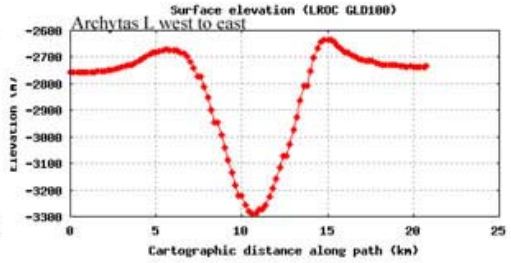
Depths and diameters (km) are from LROC Act-React QuickMap. Lowest crater elevation was subtracted from the mean of four rim elevations (N, S, W, E, where possible) to determine depth in kilometers. Diameter is the mean of the geodetic distances from the north to south rims and the east to west crater rims. d/D ratio accuracy limited to two significant figures. Coordinates from the QuickMap compared with the LROC WMS Image Map agreed to within 0.02°. Geodetic distances were used since cartographic distances were distorted by the map's cylindrical projection.









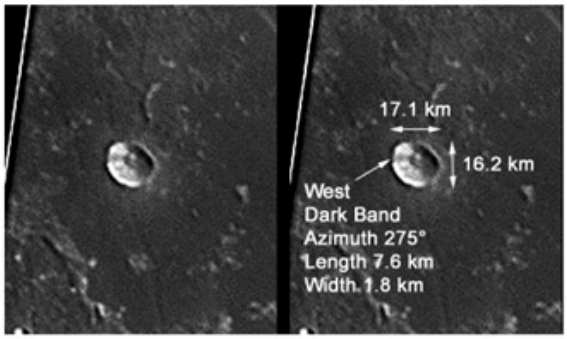


BANDED CRATERS PROGRAM

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

Agatharchides A 28.4° W, 23.3° S
Date & Time: 2012/02/03, 01:28 UT, Colongitude: 38.8°, Seeing: 6/10, Transparency: 4/6
Optics: 6" f/8 Meade Refractor. 2X Barlow, Filters: IR and V-block Filters
Imager: DMK 41AU02.AS
Observer: Howard Eskildsen, Location: Ocala, Florida

Image (north up):



Comments:

Measurements of Agatharchides A were made using LTVT and error estimated at <10%. Now that the LROC Act-React QuickMap exists, it is possible to determine the actual error.

Diameter Measurements from:

	LTVT	LROC QuickMap	% Error
N-S	16.2	15.8	2.5
W-E	17.1	16.4	4.3

LROC QuickMap Rim and Floor Elevation Data

Elevation North Rim	Elevation South Rim	Elevation West Rim	Elevation East Rim	Rim Elevation Mean	Elevation Floor
-1000 m	-1000 m	-1200 m	-1100 m	-1075m	-3800 m

Depth and Diameter Data

Mean Crater Diameter (D)	Crater Depth (d)	d/D Ratio
16.1 km	2.73 km	0.169

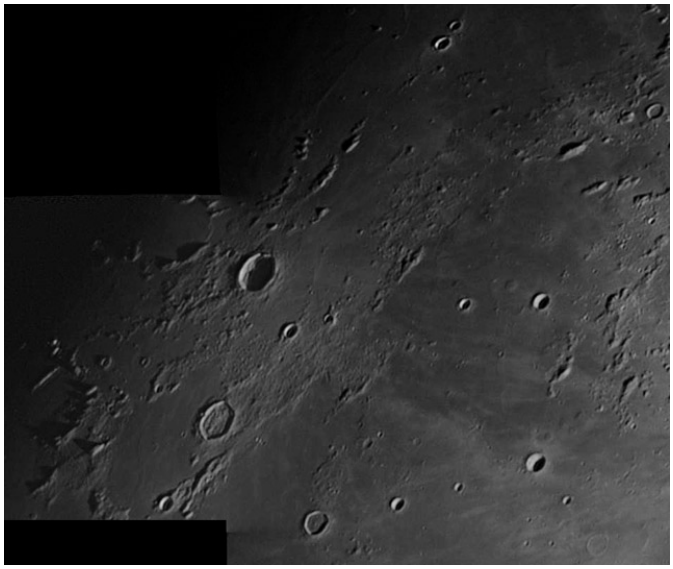
BRIGHT LUNAR RAYS PROJECT

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



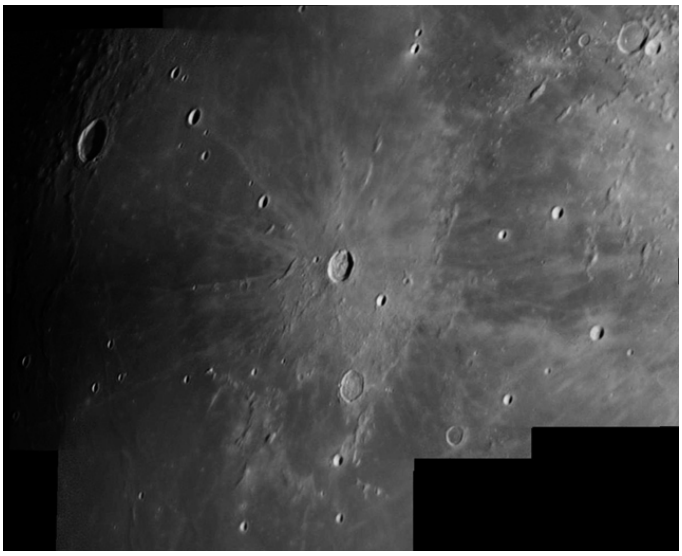
KEPLER– Richard Hill – Tucson, Arizona, USA
Seeing 8/10. TEC 8" f/20 MAK-CASS, DMK21AU04. 656.3 nm filter.

This is the first of three Kepler region images. This one, taken on Oct.26, 2012 04:30UT, shows sunrise on the region. Kepler is still full of shadow and the rays do not dominate the view as they do with higher sun.

Two features popped out at me right away in this image. First are the domes. Dome Milichius is seen between Milichius and Milichius A. It's one of the more obvious domes on the moon. Another dome field can be seen just north of Hortensius with at least 3 prominent domes.

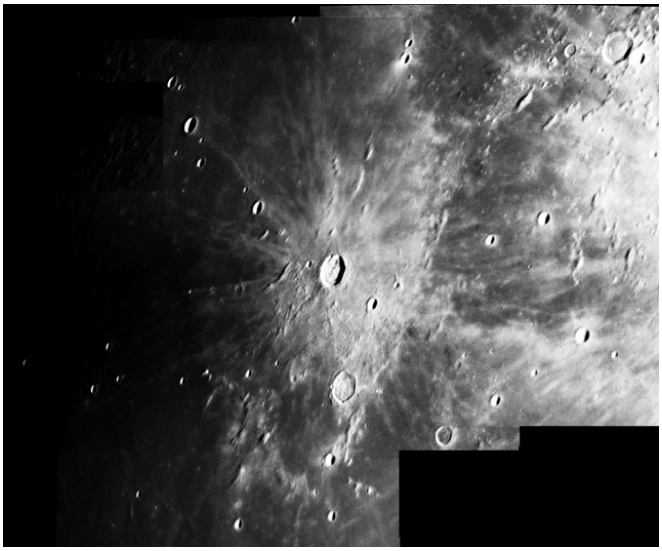
The second thing is the hexagonal crater Encke just south of Kepler. In the LROC Quick Look it's not as polygonal but still a rather strange shaped crater.

Before leaving the image, take a moment to enjoy the shadows in the bottom of Maestlin R. The jagged peaks have left fingers of shadow stretching for kilometers. Just south of these can be seen the Rimae Maestlin.



Here are two more images (Oct. 27 2012 04:22 UT) of the Kepler region. Actually, this is just one image processed in different ways.

The first image shows Kepler a day after the one I sent yesterday. The domes so clearly seen in the earlier image are lost in the rays and high sun. Dome Milichius can still be made out but the dome field north of Hortensius is all but lost in the rays of Copernicus and Kepler.



Just catching the first rays of sunlight we can see Marius and barely see it's system of hills on the terminator.

The true majesty of this region is seen in the second image processed to bring out the ray system. Here you see the rays from Kepler mingling with the rays of nearby Copernicus. One "ray" stretching from Kepler A to Hortensius appears to be an extension of the "tail" of Reiner Gamma some distance away.

LUNAR TRANSIENT PHENOMENA

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

LTP NEWSLETTER – JANUARY 2013

Dr. Anthony Cook - Coordinator

New Years greetings, to all our observers! Routine observations for November 2012 were received from the following observers: Jay Albert (Lake Worth, FL, USA) observed: Agrippa, Alphonsus, Ariadaeus, Aristarchus, Plato, Proclus, Tycho and several other features. Maurice Collins (New Zealand) took whole disk image mosaics of the Moon. Marie Cook (Mundesley, UK) observed: Alphonsus, Aristarchus, and Proclus. Rik Hill (Tucson, AZ, USA) imaged: Toricelli. Norman Izett (New Zealand) took image sequences of Earthshine. Jim McAloon (New Zealand) imaged Julias Caesar. Bob O'Connell (Keystone Heights, FL, USA) imaged Plato. Brendan Shaw (UK) imaged Alphonsus, Cenosorinus, Linne, Magninus, Plato, Schneckenberg, Sharp, and Sinus Iridum. Franco Taccogna (UAI , Italy) imaged Aristarchus and Ross D. Claudio Vantaggiato (UAI , Italy) imaged Aristarchus. Paul Zeller (Indianapolis, IN, USA) imaged Aristarchus.

News: December brought the very sad news that Sir Patrick Moore had passed away. Reading through some of the tributes on the BBC News web site (http://www.bbc.co.uk/news/uk-20663883), it is apparent that he probably kick started many tens of thousands of amateur astronomers interests as well as the careers of many professional astronomers in the UK and abroad. His enthusiasm has kept the hobby going since the 1940's and hopefully his books will continue to do so. I know for a fact that I probably would not have taken the career choices I did if my parents had not taken me down to see him at his home in Selsey Bill, Sussex, UK back in 1975 – to give me some advice on what to do next once I had read my entire (but then limited) collection of astronomy books from cover to cover. One thing that really puzzles me though is how Patrick Moore found time to do everything; as he authored over 70 books, wrote magazine and journal articles, had astronomy guests visit him at his house, composed music, dabbled in politics, gave lectures to many local and national astronomical societies in the UK (and internationally), gave radio interviews, and did a monthly 25 minute Sky at Night TV programme, that was still running after 55 years! He was even president of the BAA and director of its Lunar Section at one point too. Patrick Moore also made some important LTP observations, and I would like to encourage all observers reading this article to watch out for these in the repeat illumination predictions for the coming year, so as to see what these events might have been.

The results from NASA's lunar gravity field mission GRAIL have now been made public, and it appears that the lunar crust is 10-20 km thinner than expected, or just 34-43 km thick on average, i.e. similar to the Earth's continental crustal thickness. Crustal thickness maps show that under some impact basins it is only a few km thick (http://www.nasa.gov/mission_pages/grail/multimedia/pia16589.html)– Mare Crisium having the thinnest crust of them all, akin to oceanic crusts here on Earth. What this means for LTP studies I would not like to speculate for sure, but perhaps it may imply that Mare Crisium might stand more chance of volcanic outgassing from the mantle underneath than elsewhere on the Moon. However this notion is at odds with Aristarchus, which is the most LTP prone site on the Moon (after removing observational bias) but has a much thicker crust. At the time of writing (Dec 29), the two GRAIL satellites involved (Ebb and Flow) having almost run out of fuel, were deliberately crashed into a mountain slope near the north of the Moon on purpose in the hope that these would leave a visible mark that could be detected by comparing old and new LRO images of the area.

LTP Reports: No LTP reports were submitted for November, except possibly color seen in Alphonsus on 2012 Nov 21, however this has been placed in the routine report section as it is doubtful whether this was lunar in origin, even though it looks very intriguing.

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

Alphonsus: On 2012 Nov 21 UT Brendan Shaw imaged Alphonsus in color between 17:39-17:50 and 20:44-20:45 UT, using a monochrome camera working with red, green and blue filters. Marie Cook observed visually at 21:10-21:25 and 21:45-21:55 UT respectively. There were several occurrences during this night when the illumination matched the following past LTP listed below. It is unusual to have four LTP of the same crater bunched so close together under similar illumination, and three of these involved color.

(UK time for repeat illumination: 2012-Nov-21 UT 17:34-19:23)

Alphonsus 1966 May 27 UT 21:10 Observed by Sartory, Moore, Mosely (England and Ireland, 8.5" reflector, 10" refractor) "Red color on central peak area" NASA catalog weight=5 (very high). NASA catalog ID 937. ALPO/BAA weight=4.

(UK time for repeat illumination: 2012-Nov-21 UT 20:14-21:09)

Alphonsus 1931 Apr 25 UT 18:00 Observed by Vasilev (Russia) "The triang. dark spot close to the w.bank was not vis. after SR & appeared along the length of the term. , 8-9 deg" NASA catalog weight=1 (very poor). NASA catalog ID #401. ALPO/BAA weight=1.

(UK time for repeat illumination: 2012-Nov-21 UT 20:44-21:55)

Alphonsus and limb 1967 Apr 17 UT 21:30 Observed by Wise (England, 6.5" reflector, x90) "3 dark patches (Alphonsus) prominent. Suspected red patch (blink ?). (indep. confirm. of Cross 1h later?)." NASA catalog weight=3 (average). NASA catalog ID #1024. ALPO/BAA weight=2.

(UK time for repeat illumination: 2012-Nov-21 UT 21:59-22:34)

On 1967 Apr 17 at UT 22:45 Cross (Preston, UK, 9" reflector x150) observed a suspected blink in Alphonsus on the south east (astronomical rather than IAU?) floor between the peak and the wall, but it was never very marked and probably due to turbulence. Cameron thinks that this might be a confirmation of the LTP report by Wise from a little earlier. The Cameron 1978 catalog ID=1026 and the weight=2. The ALPO/BAA weight=1.

Figure 1. Alphonsus as imaged by Brendan in color on 2012 Nov 21. Both images have been color normalized and then undergone a color saturation increase to 50%. North is towards the top. (Left) Alphonsus at 17:39-17:50 UT. (Right) Alphonsus at 20:44-20:45 UT.

Brendan's image, on the left in Figure 1, clearly shows no sign of the red color seen by Sartory and others in 1966, therefore that LTP will remain at a weight of 4. Figure 1 (right) does however show a very faint trace of a dark spot on the western floor of Alphonsus, but whether this can explain a lack of a dark spot on the west bank as seen by Vasilev in 1931 is uncertain. Perhaps the spot visibility at this stage may depend upon observing conditions, or the telescope aperture that was being used at the time, and these are unknown. Therefore I will leave this 1931 report with a low weight of 1 for now until we find further information. The Wise observation from 1967 does mention the usual three dark floor patches, but also infers a color (a blink as seen in a red/blue Moon Blink device), but not its location. The Cross report from a little later does however

mention a possible location in the south west? However Brendan's image shows no color here, so again both these old LTP reports should stay at their current weights. Marie Cook was observing on 2012 Nov 21 during two sessions. The first session 21:10-21:25 UT she suspected that the brightest part of the west wall appeared brighter in the red filter than in the blue (seeing was III and transparency good), but in another observing session at 21:45-21:55 UT the wall was the same brightness in both filters, however atmospheric haze was now present. She wonders if the blink reaction in the first session may have been due to the brightness of the western rim, logically however this should not be the case, unless there was some scattering of light in our atmosphere that lowered the contrast at shorter wavelengths, and left longer wavelengths unaffected. Brendan's 2nd image, which overlaps with Marie's observation, shows no color on the western rim, but the image was captured earlier.

Brendan's later image is (Figure 1 (right)) is rather interesting too in that on the south east rim of Alphonsus, at the point where secondary crater ejecta incises into the rim, you can see a pinkish color on the ridge, and a blue-green color on the southern floor of Alphonsus. So have we struck gold here at the end of the rainbow? Is this a real LTP? A quick test is to look for similarly strong color elsewhere on other features in Figure 1 (right) and indeed the earlier image Figure 1 (left). None is found, or even in the full sized images from which this newsletter shows only part of. That is at least no color anywhere else as prominent as this. By the time that Marie Cook observed visually, there was no color seen in the south east – although she was using a smaller telescope and did suspect color on the west rim. What I think might have happened was that there was a dust speck on Brendan's camera, and as the Moon was drifting slightly by a few pixels between each filter shoot, the speck of dirt produced a faint out of focus ring, or donut, shading on the CCD chip, and when the images were recombined this gave rise to the color spectrum effect that we see in the enlargement in Figure 2. The red channel image in Figure 2 is a lot sharper than the green filter image, and that is a sharper and less noisy than the blue filter image. Brendan and I have had a look at the other images from that night and have failed to find a dust ring effect directly in the individual images. However when blinking between red and green filter images, I have seen on the west floor of Alphonsus something very faint that moves, which might be a dust ring induced in the camera/filter optics. There is a very faint spectrum effect akin to the SE rim visible in Figure 2 if you look closely. The apparent amount of movement is similar to the spatial scale of changes seen on SE rim. I think that the reason why the dust ring might not be visible in the earlier images could also have something to do with the way that Registax works? Therefore the most likely explanation is that the effect is dust speck related in the optics. To illustrate this theory, take a look at the computer generated dust ring experiment in Figure 3, and compare the colors to Brendan's color composite image in Figure 2 – it is not a perfect replica, but does demonstrate the generation of a similar rainbow-like effect.

The alternative to this instrumental explanation is that this was a real LTP and it varied in shape and density over the duration of the three color filter image captures, i.e. 2 minutes. Or it was a multi-colored event that remained reasonably static. In the old days of LTP research, having two observations of color, albeit separated by a short time and location in a crater, would have constituted a confirmed LTP, and thus would result in a weight of 4. However we operate with a more strict validation procedure now, and the fainter spectrum-like patch on the western floor lends support to the dust speck explanation. Nevertheless, if anybody else was observing at this time and has images taken through filters, then I would be very happy to be sent these so that we can rule out, or confirm, the optics based explanation for this observation. Please show this image (Figure 2) around, and ask your colleagues in case any of them were observing that night. I would also be interested to hear from observers who have experienced dust speck problems in three color composite images, if they think that my hypothesis for the cause of the colors is correct?

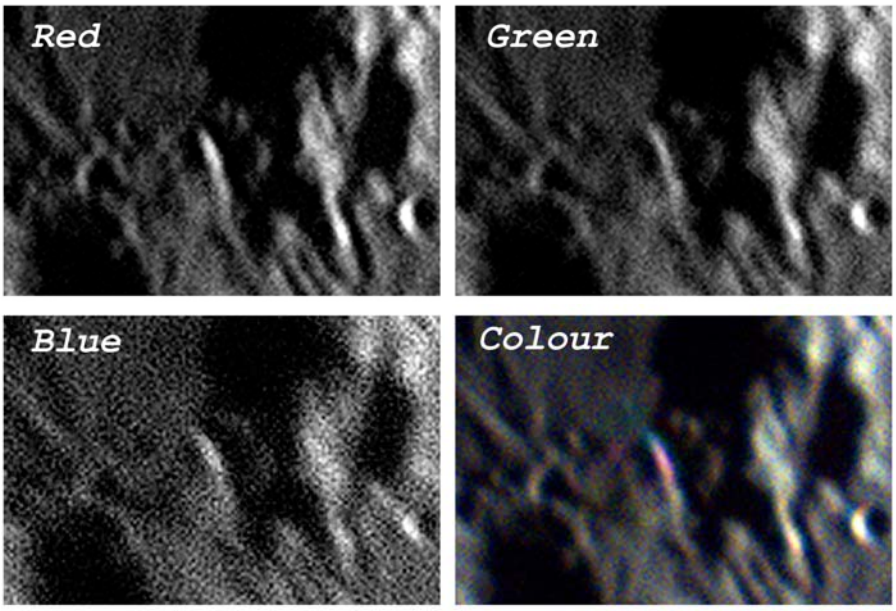


Figure 2. Enlargements from Brendan Shaw's 2012 Nov 21 UT 20:44-20:45 color composite image of Alphonsus with north towards the top.

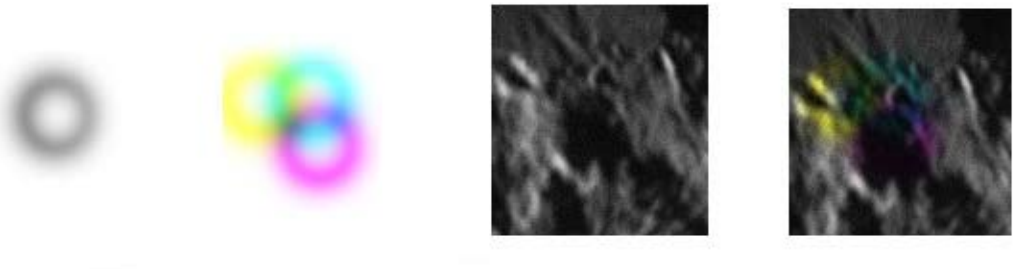


Figure 3. An experiment to illustrate how a dust ring can generate an artificial multi-colored LTP. **(Far-Left)** An example dust ring from an out of focus speck of dirt on a camera CCD window. **(Left)** A color composite of the same dust ring, but offset to simulate the Moon drifting between the three separate color filter exposures. **(Right)** A sample lunar image. **(Far-Right)** The lunar image multiplied by the offset color composite dust ring image. The strengths of the colors will vary according to how dense/optically absorbent the dust particle is. The displacement of the colors will depend how many pixels the Moon has drifted between filter exposures.

Plato: On 2012 Nov 22 Both Bob O'Connell and Jay Albert observed Plato under similar illumination conditions to a LTP report by Kelsey from 1967 April 18. Kelsey's sketch appears in Figure 4 (right) and the description, partly out of ALPO's Strolling Astronomer (Vol 20 (5-6), p108), is given below along with three other similar illumination LTPs for Plato:

(Florida time for repeat illumination: 2012-Nov-22 UT 02:25-03:36)

Plato 1967 Apr 16 UT 03:10-04:00. Kelsey (Riverside, CA, USA, 20cm reflector, x300, S=8, T=4-5). Sunlit streak on the floor showed an enhancement in red light (Wratten 25) as compared to blue light (Wratten 47). By 04:30 UT another ray had appeared parallel to the south on the floor; sunlight was striking the floor through gaps in the eastern peaks. The floor peak appearances are normal, however they should not be colored. NASA catalog weight=3 and ID=1027. ALPO/BAA weight=3.

(Florida time for repeat illumination: 2012-Nov-22 UT 02:37-04:01)

Plato 1887 Feb 01 UT 18:00 Observed by Elger (England) "Ill-defined shadow of peaks of W.border-in contrast to sharpness of mts. outside it. Never seen before. Such phenomena

occur on floor, but never on ramparts. (Drawing)." NASA catalog weight=4 (high). NASA catalog ID #254. ALPO/BAA catalog weight=1.

(Florida time for repeat illumination: 2012-Nov-22 UT 03:02-04:40)

Plato 1916 Jul 8 UT 19:00? Observed by Markov (Russia) "Light on the shadow of the bands at the bottom (similar to #362)" NASA catalog weight=3 (average). NASA catalog ID #364. ALPO/BAA weight=2.

(Florida time for repeat illumination: 2012-Nov-22 UT 04:11-04:53)

Plato 1907 Jan 22 UT 20:00 Observed by Fauth (Germany?) "Glow of light in part of crater" NASA catalog weight=3 (average). NASA catalog ID 327.ALPO/BAA weight=3.

Jay observed Plato from 03:40 to 04:10 UT using a C11 telescope, with seeing going from 6 to 4-5 to 3, as the general lunar observing session progressed (03:12-05:15 UT). The transparency was 3. Jay mentions that for the Kelsey repeat illumination appearance for Plato, that he performed a blink with a Wratten 38A (blue) vs. a Wratten (29) red + 13% polarizer filters (compensates for filter density difference). He plainly saw the main light streak and noticed that it was lightly, but definitely brighter, in red than blue light. He could in fact see two streaks on the floor of Plato in red, but could not see the central streak in blue. Also the N streak was dimmer in blue than in red. Bob O'Connell was observing 33 minutes earlier (03:07UT) and captured an image, as can be seen in Figure 4 (left), that compares a close resemblance the sketch made by Kelsey back in 1967. Therefore the accuracy of Kelsey's sketch is not far off, the big question is why did both he and Jay see the gaps in the shadows brighter in red light? There have been a number of reports of these features being red in the past, though I have never experienced it myself. It is possible that due to Rayleigh scattering of light in our atmosphere, that affects shorter wavelengths more, that this will lower the image contrast in blue light, but leaves red light unaffected. As a consequence they appear more contrasty in red light? For a tentative alternative LTP explanation, then this might invoke the electrostatic lofting of dust clouds on the night side of the terminator, and sunlight reaching the floor would be reddened (blue light absorbed more) passing through these, giving rise to a red color on the floor of Plato - if the particles were in a large size range. However the simplest theory of scattered light in our own atmosphere is almost certainly the correct explanation – though the best way to check on this in future is to see if regions near other shadows on the terminator, elsewhere, are also red. If they are not, then the observed effect is a true LTP.

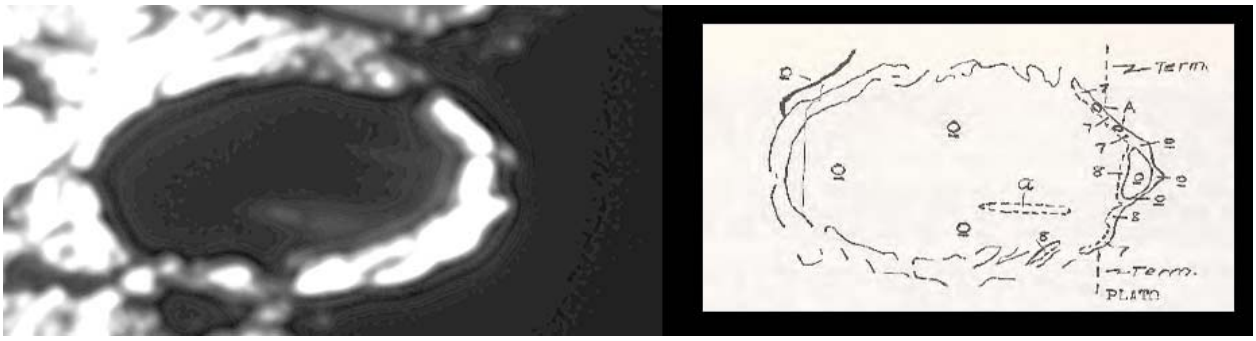


Figure 4. Plato with north oriented towards the bottom – to accommodate the usage of the writing. **(Left)** Image by Bob O'Connell that has been sharpened and contrast stretched to bring out floor shadow details – some artificial fringes can be seen around the inside floor of Plato due to this enhancement. **(Right)** The sketch made by Kelsey in 1967 April 18.

Concerning the other three LTP reports, Jay comments that for the Elger report that the shadows on the east wall peaks were sharp and well defined. The west wall was very bright and sharply defined, but its shadow was subsumed by the shadow beyond the terminator. The mountains outside the crater beyond the east and west walls were also bright and well defined. Jay wonders if there has been some mix up with IAU E-W definitions when the report was transcribed into the NASA catalog? Jay mentions that for the other two Plato LTP reports, that both of the original descriptions were rather vague as to specifically what to look for in

what part of the crater. He believes they may refer to the light and shadow bands across Plato's floor as described above.

Aristarchus: On 2012 Nov 25 UT 00:55-01:34 Paul Zeller imaged (see Figure 5) the crater under similar illumination to two past LTP reports:

On 1985 May 30 at UT 20:10-23:54 P.Moore (Selsey, UK, 15" reflector) and at the same time Doherty (Sussex, UK, 15" reflector) observed a strangely bright and pink/red north rim of Aristarchus crater during 20:20UT and 20:36UT. The effect reduced between ~20:39UT and 20:44UT. M.C. Cook (Frimley, UK) found the northern wall to have a red/purple color but the effect vanished after 50 minutes. Cook also saw a "V"- like notch in the NW crater shadow and this appeared to be bigger than normal. G. North (Sussex, UK) saw a tinge of pink color on the northern rim and a bit later a "ruby red" color on the worth-west wall - again this effect lasted 50 minutes. Moseley verified the color. Finally M. Hather (Yorkshire, UK) suspected the north wall of Aristarchus to be blue in color. Cameron suspects that this LTP is not spurious color because it is in the wrong place. The Cameron 2006 catalog ID=276 and the weight=5. The ALPO/BAA weight=4.

On 1991 Jan 26 at UT 23:38-23:50 D. Darling (Sun Praire, WI, USA, 12.5" reflector, x159 and 3" refractor x90, seeing 5/10, transparency 3/6) found that Aristarchus was brighter through a red filter than through a blue filter on its western wall. He checked Aristarchus in two telescopes and obtained the same result. The Cameron 2006 catalog ID=419 and the weight=4. The ALPO/BAA weight=3.

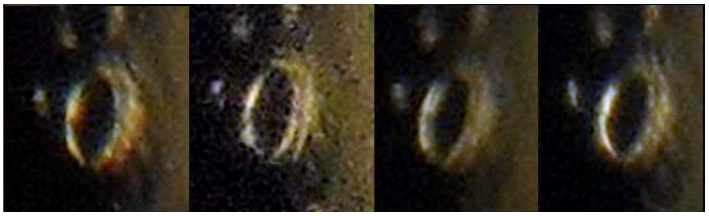


Figure 5. Aristarchus on 2012 Nov 25 imaged by Paul Zeller with north at the top. These were taken at the following times from left to right: 00:56, 00:57, 01:31, and 01:32 UT.

Paul's is just starting in lunar imaging (he would like it to be known) – his first image has a bit of spurious color in it as there is obvious color fringing on all contrasty edges, though this is not so on the other images. However there is no obvious sign of color on the north or the west wall in the other three images as the two past LTP reports implied. Therefore for now these two past LTP reports remain unexplained and will thus stay at the same weights; though atmospheric spectral dispersion, or chromatic aberration, might offer some explanation in cases where Moon Blink filters were not used.

Aristarchus: On 2012 Nov 25 Claudio Vantaggiato, and Franco Taccogna (Both UAI observers), imaged Aristarchus at 16:30 and 19:36 UT respectively (See figure 6). The illumination of these corresponded to the following past LTP reports:

(Italy time for repeat illumination: 2012-Nov-25 UT 15:48-16:27)

On 2003 May 13 at UT06:40-07:26 W. Haas (Las Cruces, NM, USA, 12.5" reflector, x321 and x202, S=2, T=3.5) suspected (06:40-06:55UT) that he saw an oval bright feature (intensity 5.5) near the centre of the floor of Herodotus crater indenting into the shadow - however the seeing was none too good, so it is more of a suspicion than a definite sighting. At 07:14-07:26UT he re-examined the region (x202 and x321, S=1-2 and T=3.5) and had better glimpses that conformed his initial suspicions of there being an oval indentation bright spot (now intensity 6) into the shadow in the centre of the floor. Of course Herodotus does not have a central peak! There was also a very bright spot on the NW sunlit rim of Herodotus crater. The ALPO/BAA weight=2.

(Italy time for repeat illumination: 2012-Nov-25 UT 18:31-19:41)

Aristarchus area 1967 Apr 21 UT 19:00-21:20 Observed by Darnella (Copenhagen, Denmark, 3.5" refractor, S=1-2), Farrant (Cambridge, England, 8" reflector, x160), Corralitos Observatory (Organ Pass, NM, USA, 24" reflector with Moonblink) "On exterior wall of Aris., 3 pts. in Cobra Head & banks of valley were star-like & glowing; & Herod. were red. Farrant could not bring hill N. of Herod. into focus. He says color was deep red-

orange & steady for 3 min. Started at 1915h (1916-1925h seeing was too bad) (indep. confirm.). Suspected next nite but bad seeing. Not confirmed by Corralitos MB." NASA catalog weight=5. NASA catalog ID #1030. ALPO/BAA weight=3.

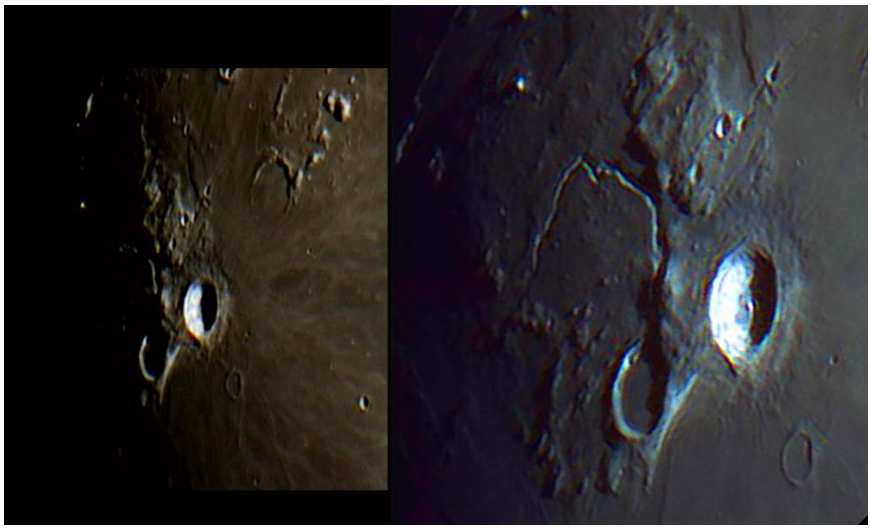


Figure 6. Aristarchus with north towards the top on 2012 Nov 25. Both images have had color saturation increased to make faint colors more visible. **(Left)** 16:30 by Claudio Vantaggiato (UAI). **(Right)** 19:36 UT by Franco Taccogna (UAI).

Claudio's image, Figure 6 (Left), corresponds to the Haas LTP report from 2003, although it is just outside the tail end of the observing window for similar illumination. The resolution and image quality is not quite enough to detect any hint of a central spot in Herodotus. The Haas LTP will remain at a weight of 2, but at least we know that the NW rim spot is normal to see. Franco's image, Figure 6 (Right) matches the start of the 1967 Darnella LTP report. It is unclear what Darnella meant by "star-like points" as there is no obvious sign of them in Claudio's image between the western exterior rim and the Cobra's Head, and no signs of red here. Darnella was also using a small 3,5" refractor, which might perhaps account for the colors seen? The comment by Farrant (using a 20 cm reflector) of the hill north of Herodotus appearing "out of focus", probably corresponds to the normal appearance as we can see in Franco's image, as it does lack some texture – however there is no sign of red on this. I do not propose to change the weight of this LTP report, because star-like points should definitely not have been seen on the western exterior rim, nor the redness of the hill north of Herodotus.

Montes Alpes: On 2012 Nov 21 UT 08:08-08:37 Maurice Collins captured a global mosaic of the Moon and on this we can see the Montes Alpes area which corresponded to what it should have looked like (See Figure 7), in terms of illumination, to the LTP report below:

South of Alps 1843 Jul 04 UT 21:15-22:00 Observed by Gerling (Germany?) "Bright pt. glowing like a star on the S. extension of the Alps. On the following eve. found a small mt. which he did not see before." NASA catalog weight=1 (low). NASA catalog ID=122. ALPO/BAA weight=1.

One wonders if Gerling got confused by Mons Piton? As you can see from Figure 7 it can appear quite bright, and if he had seen it early surrounded by shadow it might well have looked star-like. He then goes on to say that it appeared as a mountain on the next night, but that he had not seen this before. However he also says that it was on a south extension of the Alpes, whereas Mons Piton is offset quite far to the south west. Maybe something in the description was lost in translation? Unfortunately I do not have any additional information about this LTP other than what is in the NASA catalog. Therefore it shall remain at an already low weight of 1. Perhaps future observations, at a range of slightly different illumination angles, within the +/- 0.5° window, may throw some light on this puzzle?

Figure 7. Subsection of an image mosaic of the Moon, by Maurice Collins, showing the Montes Alpes region. Taken on 2012 Nov 21 UT 08:08-08:37 with north towards the top.

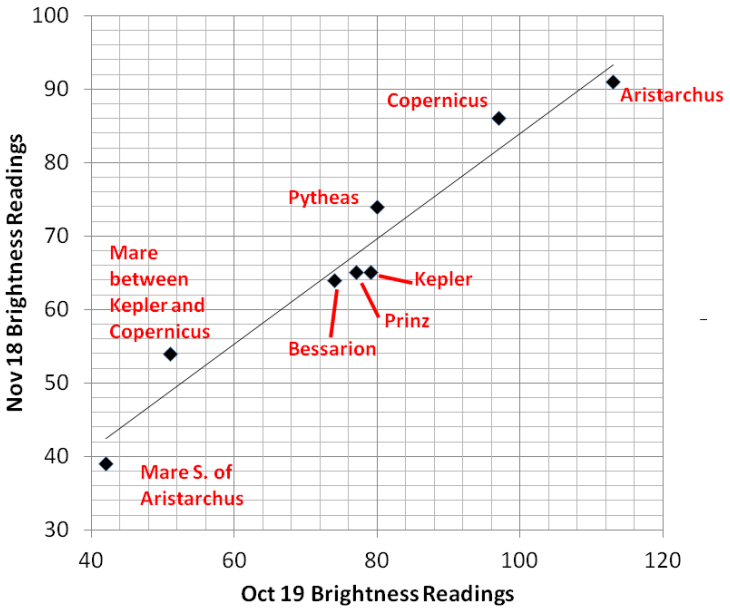


Figure 8. Brightness measurements, derived from Norman Izett's images,comparing 8 selected features/areas in Earthshine from two nights in 2012

Earthshine: On 2012 Nov 18 UT 07:59 to 09:13 Norman Izett imaged Earthshine. It is interesting to compare the brightness of the same features that he imaged on October 19 UT 07:55 with those in November 18 UT 08:29 – see the graph in Figure 8. This shows that there can be upto +/-10% errors of measurement of brightness of selected features/areas when comparing images of Earthshine taken on different dates, for the examples given. Hence any variation in reflectivity on the Moon exceeding 10% in Earthshine should be detectable using the camera that Norman uses, providing that images are compared under similar phase. Therefore we have a method of testing some of the claims that Aristarchus can vary significantly in brightness in Earthshine – though we might expect some wider scatter if haze was present on one of these nights, or if there were libration effects that were important.

Suggested Features to observe in January: 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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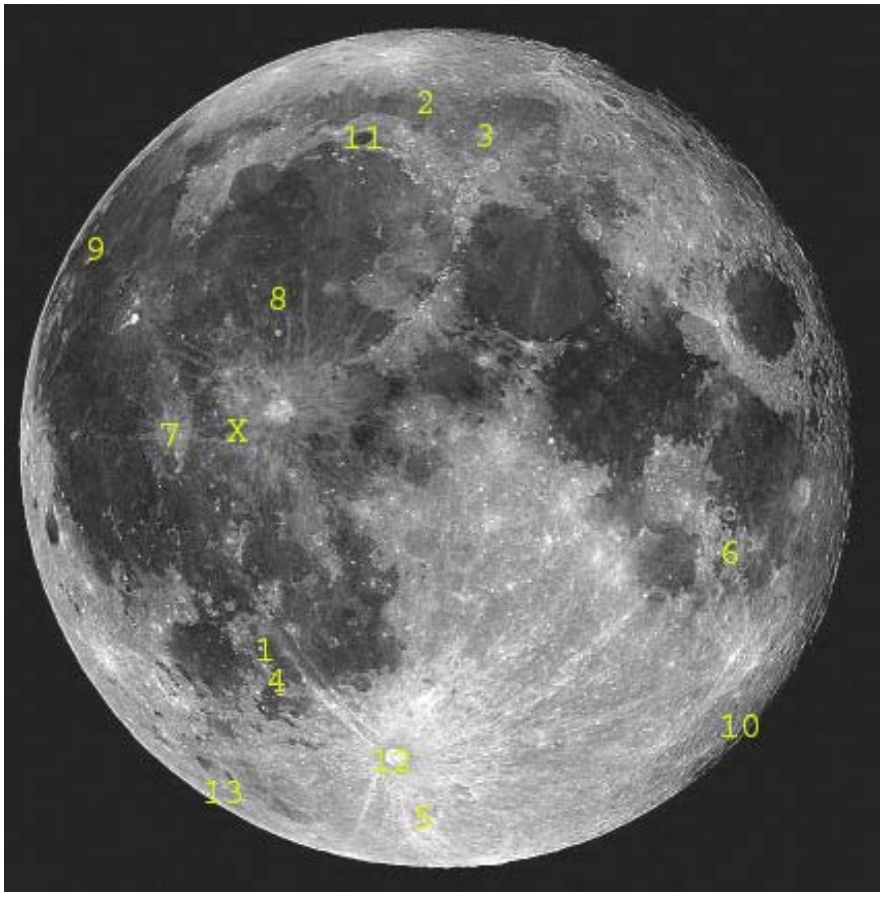
KEY TO IMAGES IN THIS ISSUE

1. **Agatharchides A**
2. **Archytas G**
3. **Aristoteles**
4. **Campanus**
5. **Clavius**
6. **Colombo**
7. **Kepler**
8. **Lambert**
9. **Lichtenberg**
10. **Mare Australe**
11. **Plato**
12. **Tycho**
13. **Wargentin**



FOCUS ON targets

Wrinkle Ridges & Rilles (March)
X = Mare Insularum (May)