THE LUNAR OBSERVER

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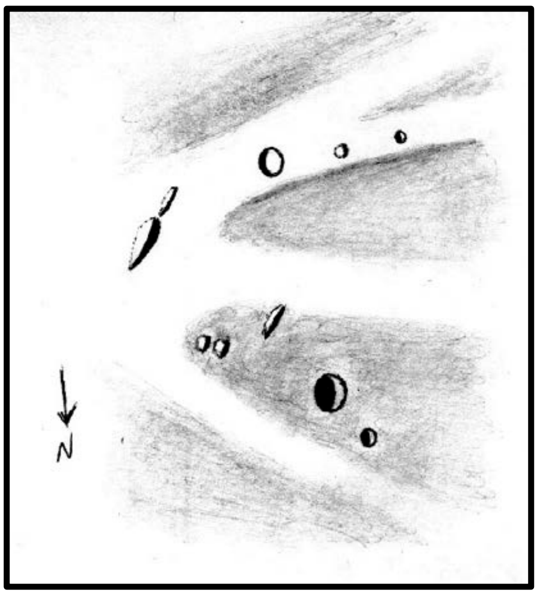
RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – AUGUST 2015

KEPLER C,D,E



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

April 1, 2015 03:41-04:05 UT, 15 cm refl, 170x, seeing 7-8/10

I drew these craters and vicinity on the night of March 31/ April 1, 2015 while watching the moon hide two stars. This area is west of Kepler, and blends with its ray system. Kepler C is the largest and most conspicuous crater in this sketch. The smaller, but otherwise similar pit Kepler CA is northwest of C Kepler pi is probably the largest of three peaks southeast of Kepler C, and Kepler kappa is the large elongated mountain farther to the southeast. The latter feature has a short ridge just to its south. The Lunar Quadrant map outlines an old ring containing these peaks. Kepler D is southwest of kappa, and is nearly as large as C, but is much shallower. Kepler E is southwest of D, and a small peak is between them. Kepler kappa is not far from Kepler itself, and is embedded in that crater's main halo. Rays radiate outward from it. A ray to the southwest takes in Kepler D and E and the small peak between them. This ray splits in two near Kepler E. It has a relatively dark north edge almost like shadowing, but its southern edge is quite vague. Another ray grazes the south edge of Kepler pi, and continues westward past Kepler C and CA. This ray is fairly well defined. The northernmost ray drawn passes north of Kepler C and CA, but peters out near those craters.

LUNAR CALENDAR

AUGUST-SEPTEMBER 2015 (UT)

Aug	02	10:11	Moon Perigee: 362100 km
	04	02:53	Moon Descending Node
	07	02:03	Last Quarter
	08	23:22	Moon-Aldebaran: 0.7° S
	10	11:11	Moon North Dec.: 18.3° N
	14	14:54	New Moon
	16	14:34	Moon-Mercury: 2.2° N
	17	23:05	Moon Ascending Node
	18	02:33	Moon Apogee: 405900 km
	22	17:21	Moon-Saturn: 2.8° S
	22	19:31	First Quarter
	25	03:44	Moon South Dec.: 18.2° S
	29	18:35	Full Moon
	30	15:24	Moon Perigee: 358300 km
	31	10:16	Moon Descending Node
Sep	05	05:09	Moon-Aldebaran: 0.6° S
	05	09:54	Last Quarter
	06	17:06	Moon North Dec.: 18.2° N
	10	05:53	Moon-Venus: 2.9° S
	13	06:41	New Moon
	13	06:55	Partial Solar Eclipse
	14	04:38	Moon Ascending Node
	14	11:28	Moon Apogee: 406500 km
	19	02:54	Moon-Saturn: 3.1° S
	21	08:59	First Quarter
	21	12:02	Moon South Dec.: 18.1° S
	27	21:04	Moon Descending Node
	28	01:46	Moon Perigee: 356900 km
	28	02:48	Total Lunar Eclipse
	28	02:50	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 Journal of the Association of Lunar and Planetary Observers-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: 0 to 10 (0-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: Dionysius

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 **September 2015** edition will be the **dark ray crater Dionysius.** 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 Dionysius article is August 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
Deslandres	November 2015	October 20, 2015

Full Colongitude Range Observations on the Proclus Crater

By Stephen Tzikas

In the Spring 2015 issue of the *Journal of the Association of Lunar and Planetary Observer*, Page 4, Tim Robertson wrote an article on the ALPO Lunar and Training program. I was his latest graduate and the article highlighted my development in the program. I was extremely pleased and grateful to have been able to participate in such a program. The crater I most frequently observed in this program was Proclus. Once I began gaining momentum in the training program, I realized I had the makings of an observing protocol on the crater, and that was an impetus for this article. I continued my observations of Proclus after graduation to complete the holistic observational approach I had in mind for this crater. I believe it is unique in that it presents a panorama of sketches for the entire co-longitude phases of Proclus crater, with observational notes.

My attraction to sketch Proclus crater was not immediate. I first noticed the large craters of Petavius and Arzachel that were rich in detail. They unfortunately had relatively short colongitude ranges of sketching opportunities. I added Tyco to the mix of sketches to offer sketching opportunities past the optimal phases for Petavius and Arzachel. Perhaps shortly after sketching Petavius for the first time, I noticed bright, but smaller Proclus. I sketched it a few times but did not see a long-term value in it as it too had its optimal phases. But unlike Petavius and Arzachel that essentially disappear from viewing past their optimal phases, Proclus persisted, albeit without linear detail. As my experience in the training program progressed, I realized that Proclus was rich in tonal variety that I was able to extract for the sketches. I soon had an amazing crater to sketch through nearly an entire Moon cycle. That's quite a boast for a crater.

Methodology, Data, and Discussion

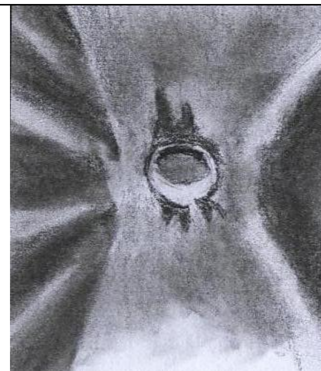
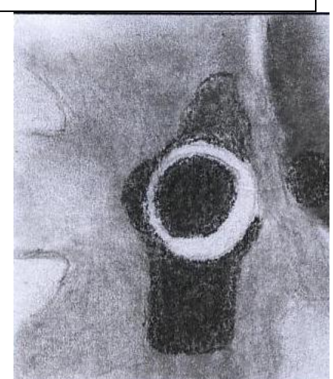
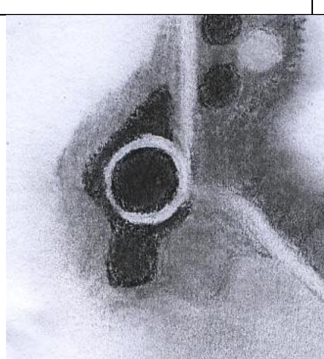
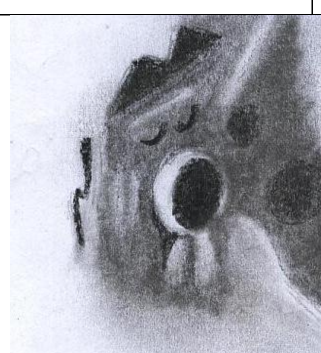
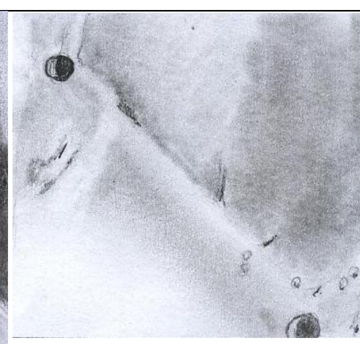
The skills and methodology promoted in observing features in the ALPO Training Program are essential in sketching. They are not something that is intuitively self-taught. In order to extract the detail that Tim Robertson requested, I found myself using my telescope to its limits, and realizing its undiscovered potential. The instrumentation I began using included a range of eyepieces with focal lengths as low as 2.3mm, as well as an assortment of filters. Besides all the new topographical information I began perceiving for the first time, I started consulting references on Proclus to determine if I was missing anything. This too brought information to light upon which I could focus. My observations were completed with an 8" Meade Starfinder. A 9 mm eyepiece was usually used for a magnification of 133x. Occasionally a 6 mm eyepiece was used to extract additional details. My observing location was Reston, VA.

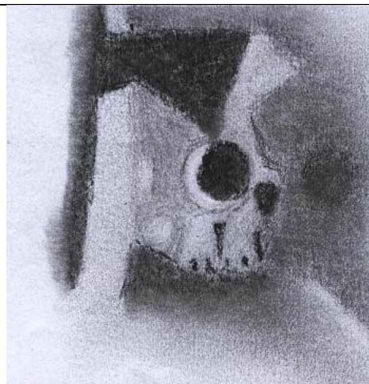
I decided to evaluate my colongitude observations and quantify trends. Colongitude is equal to the longitude at which the "morning terminator" (the theoretical line of sunrise on the Moon) crosses the Moon's equator measured west from the Moon's central meridian (the line of zero longitude) on a scale of 0 to 360°. The "evening terminator" (the line of sunset) crosses the equator 180° away from this. The colongitude is near 0 at First Quarter, near 90° at Full Moon, near 180° at Last Quarter and near 270°

at New Moon. Arranging the sketches and observation notes on Proclus crater in colongitude order helps reveal certain patterns. Most notably, there are periods were detail are dominant, and periods were tonal patterns are dominant. This is perhaps strikingly evident by just viewing the sketch in colongitude order.

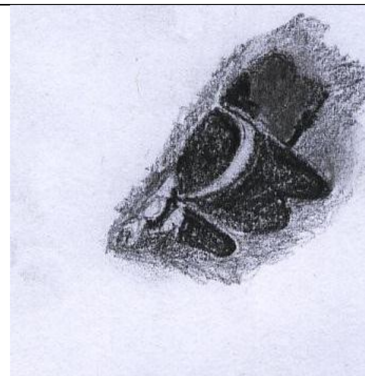
Figure 1: Images in Co-Longitude Order (Date and CoL)

Orientation: Mare Crisium on left (Western sky), Palus Somni on right (Eastern sky).

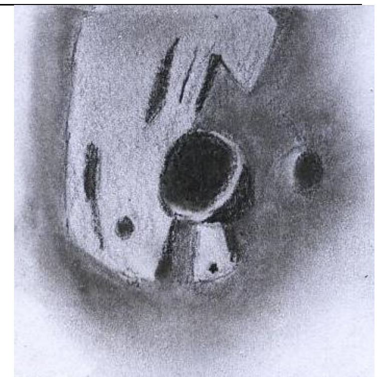
 July 5, 2014/ 1.4	 June 5, 2014/ 6.16	 July 6, 2014/ 13.96
 January 28, 2015/ 15.35	 November 30, 2014/ 17.61	 February 27, 2015/ 20.48
 February 1, 2015, 2015/ 53.1	 March 8, 2015/ 122.52	 March 8, 2015/ 122.52 (extended for rays) Top crater is Proclus, bottom is Romer.



February 7, 2015/ 129.16



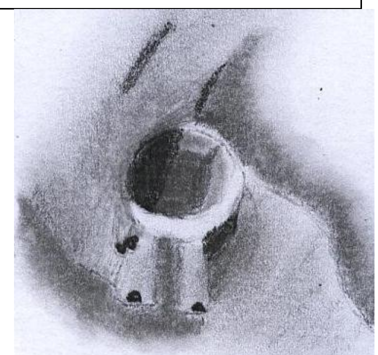
June 2, 2014/ 317.71



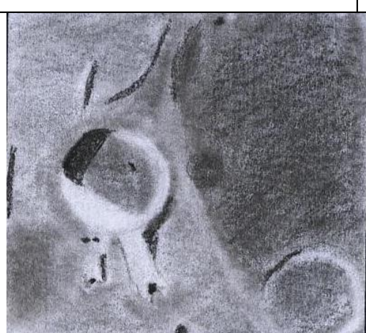
February 22, 2015/ 319.61

January 24, 2015/ 326.23

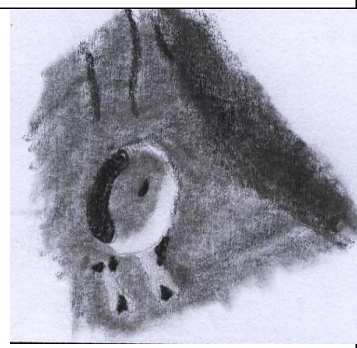
June 3, 2014/ 330.44



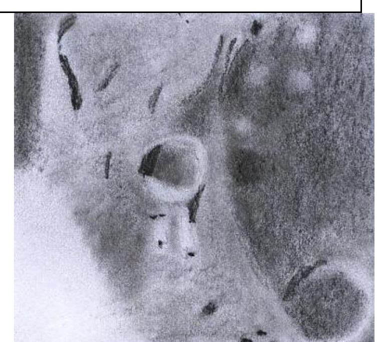
February 23, 2015/ 331.44



November 27, 2014/ 341.43



June 4, 2014/ 341.85



November 28, 2014/ 353.36

The observational notes to these sketches can be found in Tables 1 and 2. Each sketch was a revelation of some interesting fact that led to other inquisitive research. Satellite craters and lunar rays are two of the most noticeable characteristics found in the environs of Proclus Crater. A March 8, 2015 extended sketch is provided to show the extent of Proclus' rays. It is not sketched for detail accuracy.

Satellite Craters

Proclus boasts a comprehensive satellite crater system. Once I was aware of it, I began observing them all as part of complete Proclus experience. The 20 Satellites craters to Proclus include the craters A, C, D, E, F (Crile), G, J, K, L, M, P, R, S, T, U, V, W, X, Y, and Z. These craters are located either in the same eyepiece field of view as

Proclus, or are much farther away. Proclus is 28 km in diameter, whereas the satellite craters range in size from 33 km (G) to 6km (J, X and Z). An 8-inch aperture telescope will resolve the small satellite craters of 6 km. Some of the satellite craters (A, D, F, G, J) are banded craters just like Proclus. Some of the satellite craters are faint and not well defined. The USGS Digital Atlas of the Moon in the reference section provides a map of the satellite crater locations. By convention these features are identified on lunar maps by placing the letter on the side of the crater midpoint that is closest to Proclus. I would not have learned about the USGS digital atlas of the Moon without the search for satellite craters, as many of these satellite craters are not on standard Moon atlases.

Table 1: Observational Notes

Date (UT)	Col.	Approximate Phase	Observational Notes
5-Jul-14	1.4	1st Quarter	Details dominate over tones. Further out from Proclus one sees patterns around it, such as a large faint crater outline. My bigger discovery was to notice the impact of orientation due to other mechanisms apart from co-longitude. These include solar inclination, sun angle, and libration.
5-Jun-14	6.16	1st Quarter	Details dominate over tones. A ray system had developed around Proclus. These rays extend on to the mare. Two center rays pointing north were more intense than the 2 outer rays next to them. The intensity of the 2 rays south of Proclus were similar to the two center rays on the north side.
6-Jul-14	13.96	Gibbous Waxing	Details-to-tone transition. Noticed another faint outline of circular formation similar in size to that noticed yesterday to the south of Proclus. This formation was to the east of Proclus.
28-Jan-15	15.35	Gibbous Waxing	Tones dominate over details. Proclus is loosing detail due to its brightness. The wall of Proclus forms a bright ring around it, but it is not shiny bright like the bottom lip (in the north-east). Use of a polarizing filter (perhaps 25% transmission), succeeded in bringing out detail. The “lip” of the eastern ray is seen, whereas before it was bright and looked straight. On the opposite side of the crater, a shadow hugs Proclus. Another feature brought out with the filter is the extent of the inner crater brightness. What appeared to be 1/6 lit is now extended to twice its size (i.e., 1/3 lit). Perhaps the very bright wall of Proclus drowned out the lesser bright crater floor and made it appear dark. With the filter, the wall brightest is reduced to see the semi-bright crater floor.
30-Nov-14	17.61	Gibbous Waxing	Tones dominate. The usual features north and south of Proclus with sharp boundaries have now become tonal patches. The floor of Proclus crater has become a blend of 2 tones becoming darker as one moves from east (terminator side) to west (Moon limb side). For the first time a see a bright ray along the east side of Palus Somni. While the ray is fairly straight, Palus Somni is not, and has some small but noticeable “lip” on its boundary line. This bright wall rim of Proclus crater is not uniform. The north side is of a little greater thickness than the rest of the rim.
27-Feb-15	20.48	Gibbous Waxing	Tones dominate. Attempted to use 6mm eyepiece and various filters (red, orange, blue, polarizing, urban, H-beta, O-III) to see banding, but without success. Rays are prominent.
1-Feb-15	53.1	Gibbous Waxing	Tones dominate over details. Two main rays from Proclus exist along both sides Palus Somni They are not uniform in brightness but have central zones of greater brightness. There are no bright rays towards Mare Crisium as there were on January 28. Palus Somni south of Proclus has 5 equally shaped dark round crater tones stacked along its outline facing Proclus. Two, however, are only shown in the sketch. Proclus is surrounded by an envelop of a darker tone tonight, slightly expanded from the observation on January 28. Some of my earliest sketches on Proclus contained small dark features within/on the crater floor, but they do not seem to be visible on most co-longitudes.
8-Mar-15	122.52	Gibbous Waning	Morning sketch. Plateau or wall-like terrain to the edge of Mare Crisium. No shadow cast on Mare Crisium yet. Mare Crisium is half way on the terminator line. Proclus crater with shiny rays and bright spots. Generally speaking rays hug north and south along Palus Somni, extend east into Mare Crisium, project north to Fredholm crater, and extend northwest to Romer crater.
7-Feb-15	129.16	Gibbous Waning	Morning sketch. Terminator on Mare Crisum wall near Proclus. This is probably one of the last co-longitudes to view Proclus. Mare Crisium has high walls. Crater R was the most prominent I ever seen it, like an anchor crater, upon which detailed features could be drawn. Nearby the shadow of crater K floor’s is prominent. Palus Somni’s remnant ray is on the north side of Proclus. The area north of Proclus by its two “feet” is smooth, with a hint of another “foot” just west (towards Mare Crisium). This bright spot could be hilly terrain as there is no crater here. A spectacular long dark shadow cast by the Proclus environs onto and over the wall of Mare Crisium. I assume it is a combined shadow from the walls of Proclus, then crater S, and extended by crater P, the latter two hidden in the shadow.
2-Jun-14	317.71	Crescent Waxing	Nearest Co-longitude to 270 (New Moon). Is probably the earliest possible co-longitude to view Proclus. The most striking features of the area are the long shadows that are cast. Additionally the area is in a dark mare area with dark tones of terrain. On a March 23, 2015 evening visual-only observation of similar Co-

			longitude (Col. 312.52), Mare Crisium's wall was just before the terminator and the terrain appeared very rough between Crisium's wall and Proclus (which was hidden in darkness just past the terminator).
22-Feb-15	319.61	Crescent Waxing	I observed all remaining Proclus satellite craters that I did not observe before. Crater D crater is clearly defined. Crater E is smaller and less defined and nearby Lycille is dark. Craters U and V barely seen but were sharp. Crater M was poorly defined. Satellite craters A, C, F, and G also viewed. Palis Somni is similar in color tone to the mare just beyond it. This is the first time I have observed this. Usually it is a lighter tone. There are lots of textures, ridges, and craters walls around Proclus. It is hard to tell what is what at this co-longitude. This phase is fairly close to the terminator, about 4-5 Proclus diameter lengths to the terminator. The brightly lit part of the Proclus rim is thin, and tapers around the side rims with razor thinness. Interestingly, the main bright ray to the north-east of Proclus appears to be caused by a long ridge that drops in elevation into a valley further to the north-east. Perhaps this is an optical illusion but it generates the idea to study Proclus' multi-ray ray system further. The most startling part of this observation is the large surrounding "plateau," or what seems to be a brighter area of different terrain. This matches to a geological map I found on the Moon showing a similar contrasted area around Proclus: http://www.lpi.usra.edu/resources/mapcatalog/usgs/I799/. This is the first time I noticed this "plateau."
24-Jan-15	326.23	Crescent Waxing	Near terminator, details dominate over tones. Tonight's contrast is interesting. In the northeast direction are usually two protrusions out of Proclus, which I fondly think of as "feet," and they are roughly the same length as Proclus' diameter. For the first time I am seeing four "feet." Additionally, I notice a thin dark line on the "feet." I also see many new textures in the eastern direction from Proclus, in Palus Somni (Marsh of Sheep). In Proclus itself, a new feature appears. The regular very bright shine of Proclus' north wall is interrupted by a small dark shadow.
3-Jun-14	330.44	Crescent Waxing	Details dominate over tones. The prominent shadows observed yesterday are now gone, i.e., no deep dark shadows around it.
23-Feb-15	331.44	Crescent Waxing	Succeeded in observing faint internal wall structure, but no banding. Interestingly similar and different to June 3, 2014 co-longitude sketch. The "plateau" effect has gone away and the area has become the same usual tone as surroundings. The terminator is now about 20 Proclus diameters away. A small plateau by its right "foot" is visible. With a 6mm eyepiece and polarizing filter I examined Proclus' interior. The extreme bight glare from the rim of Proclus' wall is especially strong tonight. It seems to be twinkling past the wall giving an illusion that there is a darker feature imbedded within it. This glare is right around the rim line adjacent to one of Proclus' "feet" on the Mare Crisium side. The glare is strong even with a polarizing filter on dark near 40%. I am seeing hints of wall tones and needed to stare longer to declare it decisive. These hint of a wall structure, but no banding is evident.
27-Nov-14	341.43	Crescent Waxing	Details dominate over tones. Also see 28 Nov 2014 notes for comparisons.
4-Jun-14	341.85	Crescent Waxing	Details dominate over tones. Proclus is quite conspicuous compared to its surroundings.
28-Nov-14	353.36	Crescent Waxing	Details dominate over tones. There was a bright edge visible rim starting to extend around the dark (west) side of the crater but not yet around the whole crater. This did not exist yesterday. Apparently the dark edge around Proclus in the east is also a dark rim for crater K next to it, but I have never seen any shape to suggest a crater. Palus Somni has a faint crater R next to Proclus but it was noticeable in slightly darker tone only. Also noticed are several light patches (towards south) in Palus Somni that were not there yesterday. Further down east the Proclus crater area, laid a faint impression that I have seen before. On other side of Proclus (in the west) I traced the terrain to Mare Crisium. Noticed that the dark line features are actually faint crater rims (P and S craters). One side of the rim from crater P is connected to Prom. Olivium. This appears to be part of the Proclus extended ray system into Mare Crisium.

Table 2. Proclus Observations Using Filters

Filter	Supplement to Observation on January 24, 2015
80A blue - 30% VLT (visible light transmission)	East of Proclus in Palus Somni, the blue filter seemed to bring out the darker tones a bit more in these light tone mare. What seemed to be a tone "2" Palus Somni is now a patchwork of 1.75 and 2.25 tomes - wow ¼ tones are possible!
25A red - 14% VLT	I immediately noticed that the feature and texture contrast is poor with the red filter. However, tones over wide areas are pronounced. Mare Crisium has several tonal patches in it. There is no enhancement of Proclus and its immediate surrounding area.
Moon filter green - 18% VLT	With the Moon filter, there are no wide mare tones. There is some contrast of texture but it is not as good as without the filter. However, I noticed a difference in the bright areas on Proclus. Interesting and very subtle. Part of the lit area is not as bright. It is not a tonal "10," but not a 9 either. It is as if the "10" tone is dotted with tiny outcrops of terrain that are not reflective. Without the filter I could not readily notice the diminution of the bright area.
Bright orange filter.	Overall, seemed to offer a sharper contrast to everything, very similar to those yellow sunglasses that give better contrast, known as amber vision. However this did not necessarily translate to an improved sketch. What is better immediately when contrasted in orange, is still evident without a filter by just a little extra staring.
Yellow filter.	For area to the east of Proclus, the yellow filter helped with the contrast to see tiny spots of greater brightness but not broad brightest as of tones. That is, one can see better the spikes of brightness contrast rather than the averages.

Banded Craters

In an attempted to learn more of my adopted crater, I researched Proclus on the Internet. This is when I learned that Proclus and some of its satellite craters were banded craters, a new concept for me. These bands are streaks of contrasting hued ejecta from the formation of the crater or for small, smooth-walled craters, narrow landslides of rim material toward the floor. Bands tend to be indicators of somewhat youthful surfaces, either because the crater is young or the wall slopes are steep enough that material continues to slide downwards. Banded craters are not in the Astronomical League's Lunar II Observing Program, so it was a pleasant find. Unfortunately my telescope did not offer the resolution nor sharpness to view the banding in Proclus, but I'll have opportunities to use larger telescopes for this purpose. In the search for banding though, I was able to note other minor features on the floor and internal walls of Proclus that I may not have otherwise noticed. The ALPO has an extensive observing program for banded craters worth pursuing. Many relatively fresh craters have dark radial bands on their inner walls.

Height of Proclus

I decided to calculate the height of Proclus from my observational data. There are a couple ways to do this, and I decided to use an easier approximation method. My observation for June 2, 2014 found Proclus casting its longest shadow, approximately equal to its diameter. For situations near the Moon's terminator, a crater with a height, H, casts a shadow with a length L. The angle θ is the angle that the shadow makes with the lunar surface. The relationship between the height and the length then can be expressed as Tan θ= H/L. For situation near the terminator, Sin θ= d/R, where R is the radius of the Moon, and d is the approximate linear distance from the crater to the terminator. Here d is the distance to the terminator, which was approximately 3 Proclus diameters. For small angles (<10 degrees) one can approximate the values as: Tan θ= Sin θ = θ. Thus, the approximate the height of the crater is: H approximately equals L * d/R. Proclus Crater wall height (exterior) approximately equals L (28 km) x (3x28)/1734km x 3281ft /km = 4,450 feet. This is in an expected range but is difficult to verify since most professional data varies greatly and is usually presented for crater depths, not heights. Nonetheless, the geometry calculation was an interesting exercise.

Lunar Rays and Bright Spots

Proclus has an extensive ray system that varies greatly by colongitude. My March 8 extended rough sketch of the Proclus area attempted to show the extent of the Proclus ray system and related bright spots, which I have not yet studied in detail. It offers a worthy challenge and offers the observer some lessons in the effects of lunar geology/chemistry of the lunar surface, mechanics of impact deformation of unique craters like Proclus, as well as what is offered via the ALPO Bright Lunar Rays Project regarding distribution, structure, appearance, and interaction of rays. In anticipation of such a study I purchased a number 47 violet eyepiece filter to observe the rays. This filter makes the rays standout against a darker background.

Conclusion

I hope these observing notes help accomplish an observing prowess of fine detail and tones over a full observational range. Not only will a systematic approach to detailed and artistic sketching of a crater be rewarding in itself, but it offers to help the observers organize their observations into patterns, such as the detail vs. tonal patterns I found with Proclus. Proclus is not only an exercise in sketching, but a discovery in what in what craters and environs offer: satellites, plateaus, lighting, banding, calculations, and geology.

References and Links

Maps of Proclus satellite craters: ***USGS Digital Atlas of the Moon*** **,** LAC 43 and LAC 61

Approximation Method (Height of Lunar Craters): http://astro.physics.uiowa.edu/ITU/labs/observational-labs/studying-the-moon/measure-the-height-of-lunar/

Crater Depths: https://the-moon.wikispaces.com/Kurt+Fisher+Crater+Depths

Height of Lunar Mountains: http://stupendous.rit.edu/classes/phys236/moon_mount/moon_mount.html

Moon Ephmeris: http://www.lunar-occultations.com/rlo/ephemeris.htm

Proclus Ray System: Colin Ebdon illustration from “Observing the Moon” Vol 1, by Peter Wlasuk, figure 4.6

LUNAR TOPOGRAPHICAL STUDIES

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OBSERVATIONS RECEIVED

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

FRANCISCO ALSINACARDINALI-ORO VERDE, ARGENTINA. Digital image of Dionysius..

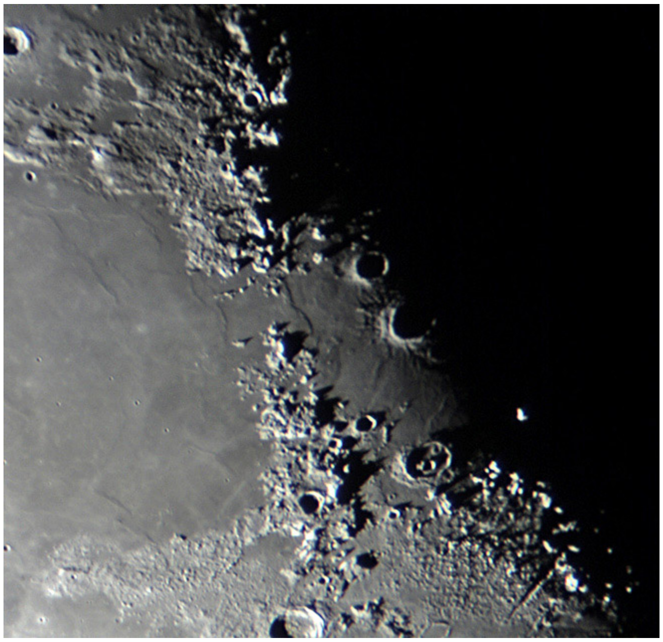
MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 3, 6(2), 7 & 9 day moon, Albetagnius, Alphonsus, Arago, Archimedes, Aristoteles(3), Censorinus, Clavius, Descartes, Earthshine(3), Eratosthenes, Langrenus, Manilius, Mare Nectaris(3), Mare Serenitatis(2), Montes Alpes, Montes Caucasus, Palus Somni, Plato, Stoffler, Theophilus & Triesnecker.

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawings of Kepler C,D,E & Marius A,C,D.

RICHARD HILL – TUCSON, ARIZONA, USA. Digital images of Atlas, Clavius & Vallis Rheita.

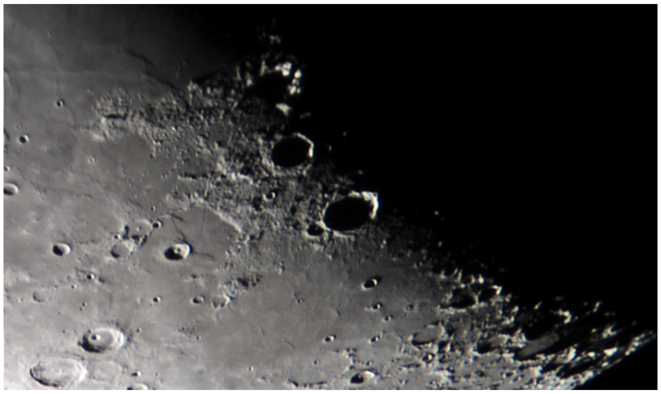
THIERRY SPETH-METZ-LORRAINE, FRANCE. Digital image of Dionysius.

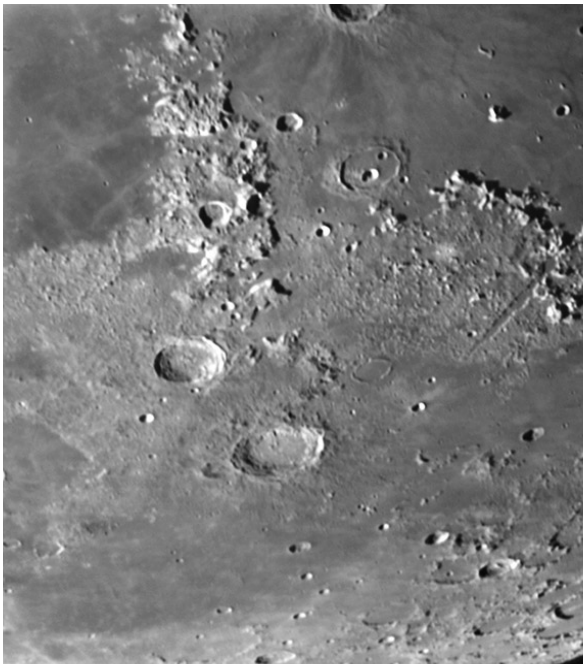
RECENT TOPOGRAPHICAL OBSERVATIONS



MONTES CAUCASUS - Maurice Collins, Palmerston North, New Zealand. June 24, 2015 07:44 UT. FLT-110, f/14.

ARISTOTELES - Maurice Collins, Palmerston North, New Zealand. June 23, 2015 06:57 UT. FLT-110, f/21.

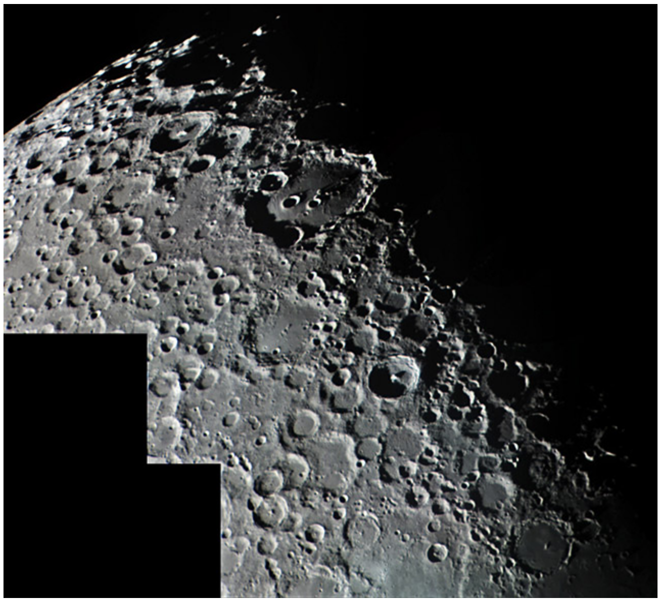




ARISTOTELES - Maurice Collins, Palmerston North, New Zealand. May 26, 2015 07:32 UT. FLT-110, f/21.

Ed. Note: Compare to the previous image taken with different lighting.

CENSORINUS - Maurice Collins, Palmerston North, New Zealand. May 28, 2015 07:23 UT. FLT-110, f/21.



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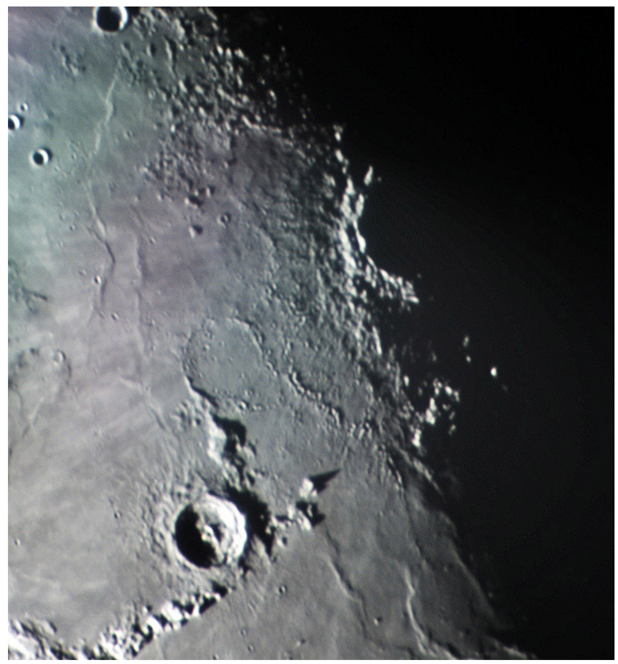
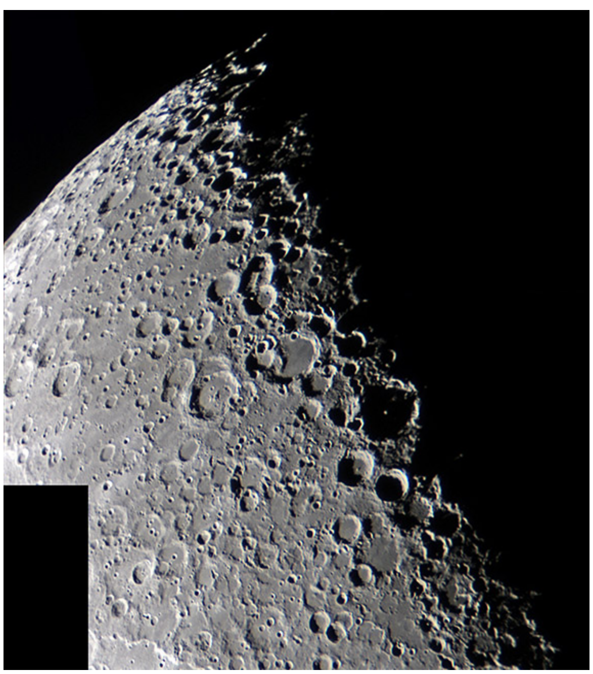
CLAVIUS - Maurice Collins, Palmerston North, New Zealand. July 25, 2015 07:32 UT. FLT-110, f/21.



ERATOSTHENES - Maurice Collins, Palmerston North, New Zealand. July 25, 2015 07:37 UT. FLT-110, f/21.



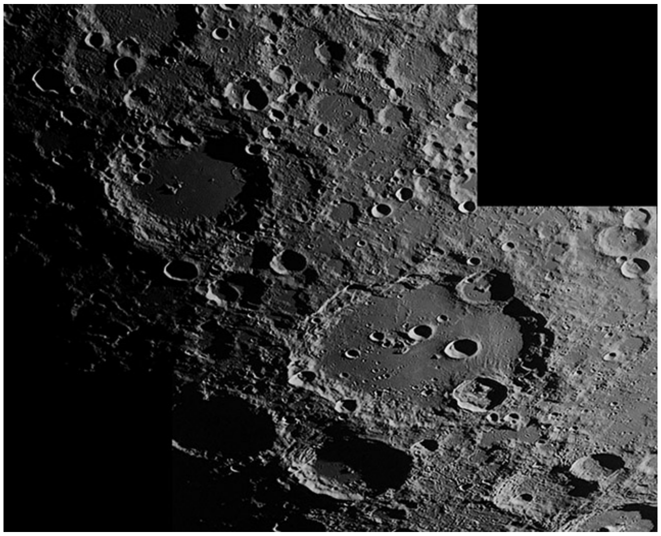
STÖFFLER - Maurice Collins, Palmerston North, New Zealand. June 24, 2015 07:51 UT. FLT-110, f/14.

ATLAS – Richard Hill – Tucson, Arizona, USA July 21, 2015 02:58 UT. Seeing 7-8/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

Several nights ago there was a beautiful sunrise on the 90 km diameter Atlas, the largest crater at the top of this image. The impact ejecta was well seen in the hummocky terrain close about the crater. The crater to the left of Atlas, just catching the first rays of sunlight on the far wall, is Hercules, slightly smaller at 71 km. Note the well shown terracing of that wall. Between and above these two, immediately adjacent to Atlas is the 68km ghost crater Atlas E. I always thought that this was distinct enough a feature to warrant its own name. Certainly there are more ghostly features on the moon that do have their own name like the 54 km ghost crater Chevallier to the right of Atlas with the young crater on its floor or the 43 km ghost crater below this also with a young crater on its flood floor. . The crater above Hercules, near the top edge of the image, is Keldysh at 34km diameter. This crater used to be known as Hercules A but was later named after a 20th century Mathematician/Engineer that died in 1978.

Over on the right side of the image are two more large craters. The larger one is the 58 km diameter Franklin and next to it is Cepheus. (Am I the only one that objects to names for long known astronomical features are reused? There are numerous examples, like the Jovian moon Io and the asteroid 85 Io or in this case the constellation and the crater.) Above are two more ghost craters parallel to Franklin and Cepheus. These are the Shuckburgh (41 km) and Hooke (37 km). The area right of Atlas and above Franklin is Lacus Temporis and since its age is listed as the same as all these ghost craters, I expect their flooding was the result of the formation of the Lacus.

Two relatively young craters below Franklin are the 19 km Maury (left) and the 21 km Maury A (right). Note the dramatic mountainous region they sit in, especially the area between Maury and Cepheus.

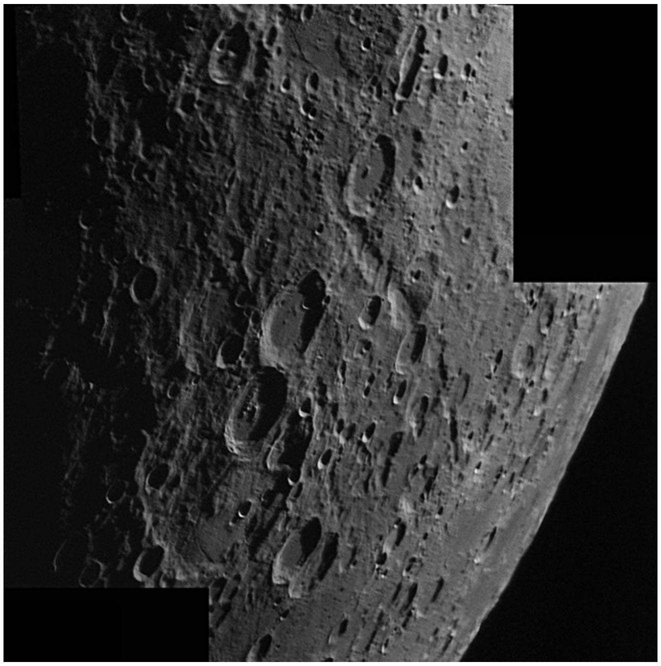


CLAVIUS & LONGOMONTANUS – Richard Hill – Tucson, Arizona, USA July 26, 2015 02:22 UT. Seeing 9/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

I had some 9/10 seeing last night during twilight (my best time of the day for stable seeing). Here is one scene that is the result of that. In the center of the image is the oh-so-familiar 231 km diameter Clavius. It was one of the first I learned to identify back in 1961 due to the notable chain of craters on its floor. In this image I was able to identify craterlets between 1.5-2 km diameter on the floor of this great crater. Note how well the ejecta on the north side of Calvius can be seen here as well as the ejecta across the floor from the impact that formed the 56 km crater Rutherfurd on the south wall of the huge crater. Compare the floor of Rutherfurd to that of the much older but similar sized 54 km crater on the north rim, Porter.

Immediately below Clavius is the 109 km Blancanus and completely shadow filled crater to the left of that is the slightly larger 114 km Scheiner. Over on the lower right edge of this image is the 97 km old crater Gruemberger over lain by the smaller 51 km Cysatus. On the upper right edge, just below the information box is the 49 km Deluc with two side craters that make it look like a sideways Mickey Mouse.

Above and left of Clavius is the the impressive 150 km Longomontanus with its smooth flooded floor and off center mountain range. Just above this is a ruined quasi-circular depression some 80 km diameter called Montanari. Because of the peppering of later imapacts it is a little hard to identify this feature at this lighting. A little further to the north, cut in half by the edge of the image is the 111 km Wilhelm. Between Wilhelm and Montanari and a little left, is Lagalla. This 3.9-4.6 billion year old formation is not a round crater being heavily modified by numerous later impacts.



VALLIS RHEITA – Richard Hill – Tucson, Arizona, USA July 21, 2015 02:38 UT. Seeing 7-8/10. TEC 8" f/20 Mak-Cass, SKYRIS 445M, 656.3 nm filter.

If you look at the inviting crescent moon only 4 days after new moon, you can't help but notice the large gash seen nearly vertical in the center of this image. This is the Vallis Rheita, formed 4 - 4.5 billion years ago. Think of it, this feature bore silent witness during the whole of the evolution of life on earth from the first sub-cellular entities to that pinnacle of creation, my own humble self! (ha!) This canyon stretches from the 71 km crater Rheita above center with the central peak, for 445 km towards the limb . This is four times longer than the better known Vallis Alpes! But the origin is very different than Vallis Alpes. In this case Vallis Rheita appears to be largely composed of overlapping impacts.

Above the crater Rheita is a very strangely elongate feature (probably the merging of at least three craters). This is about 10-12km wide at the two narrow necks and about 55 km long. You can see on the left side that it lays on the remnants of a much older 15 km crater whose ghostly walls are seen outside the Rheita E but are also seen on the floor of Rheita E. Further to the left is the 51km crater Neander with a small central peak still half in darkness.

Immediately below the valley in this photo are two craters. The upper one with a relatively smooth floor is the 90 km Metius. Below this is one with a weird set of mountains on the floor. This is an 80 km crater named Fabricius. The mountains are probably remnants of a previous feature (crater wall?) that was largely destroyed by the later impact. It would be fun to have rock samples from the walls of Fabricius and these mountains to compare. Fabricius sits in the northern half of a much larger circular feature, the 196 km diameter Janssen with the beautiful system of rimae on it's floor. The two craters to the lower right of Janssen are the 70 km Steinheil and 66 km Watt overlain by Steinheil. I was able to identify 2.5 km craterlets on the floor of Steinheil but try as I might, nothing smaller.

LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

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

Observations/Studies for June were received from: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Alphonsus, Aristarchus, Gassendi, Hyginus N, Kepler, Menelaus, Montes Tenerife, Plato, and Torricelli B. Kevin Berwick (Ireland, ALPO) observed: the area near Furnerius and Stevinus. Maurice Collins (New Zealand, ALPO) imaged: Albategnius, Arago, Aristarchus, Aristotles, Censorinus, Descartes, Earthshine, Eddington, Hevelius, Langrenus, Manilius, Mare Nectaris, Mare Serenitatis, Montes Appeninus, Montes Caucasus, Palus Somni, Stofler, Theophilus, Triesnecker, and also made some whole Moon image mosaics. Marie Cook (Mundesley, UK – BAA) observed: Censorinus, Gassendi, Menelaus, Proclus and Torricelli B. Pasquale D'Ambrosio (Italy, UAI) imaged Plato. Thierry Speth (France, BAA) imaged: Alphonsus, Aristarchus, Daniel, Gassendi, Mons Piton, Torricelli, and Tycho.

News: I have re-examined all weight 4 and 5 LTP reports to make sure these are appropriately classified. A small number of spectroscopic reports have been lowered in weight from 4-5 to 3, following an overlooked paper from 1984 by Potter. Potter suggested that the previously highly regarded spectroscopic evidence for LTP, where luminescence was invoked to explain the shallowing of reflected solar absorption lines, was actually caused by Brillouin Scattering, and that the effect is strongest as the lunar temperature reaches its maximum. I have not removed the absorption-line shallowing LTP reports completely, as they need further examination to make sure that they fit the proposed Brillouin Scattering theory correctly – also some reports of luminescence seem to occur at times other than Full Moon.

Jill Scambler has been in communication over her continued work of LTP statistics – I have updated the database of LTP and sent the relevant information she needed off to her.

LTP Reports: No LTP reports were received for June.

Spot the Difference: Unlike the first Spot the Difference temporal pair of images of the Apollo 14 landing site, which had loads of examples of sun-glint effects off of a spacecraft hardware, the 45° slope of NW Picard, on the crustally thin Mare Crisium, has proven devoid of any changes over the LROC images taken 2 years apart. This is despite three part-time arm chair astronomers: myself, Jay Albert, and Thierry Speth, examining every square metre of the region. This just goes to show that the lunar surface is a pretty inert and uneventful place. I did suspect though that the rays of one crater were slightly brighter in one image than in the other, but rays do brighten up, even with slight changes in colongitude.

This month we will switch our attention to a prime LTP site, the SW slopes of Aristarchus using images that were taken three years apart (See Fig 1) – again we will pick a slope in the hope of detecting fresh boulder trails or landslides, but this time the inclination is only 18°. Although the image pair differ in solar altitude by just 2°, there is a larger difference in the azimuth of illumination amounting to 38°, hence you may see some rotation of shadows, which are clearly not real physical changes. Again we have some strong stereo parallax effects, so when blinking between images, you may see some lateral jumps. Having taken a precursory look at the image pair, I have also noticed some large area differences – I think these are slope angle effects i.e. slopes facing the Sun are brighter than those facing away in the second image, so this 38° difference in illumination azimuth maybe playing tricks on us here.

A couple of suggestions I would like to offer. 1) if the jumping effect from stereo parallax is a problem, then break each image down into smaller tiles, re-register each tile with its temporal pair, then try blinking again. 2) If some areas of the image are low in contract or texture, then do a high pass filter, followed by a contrast enhancement – this will bring out more detail.

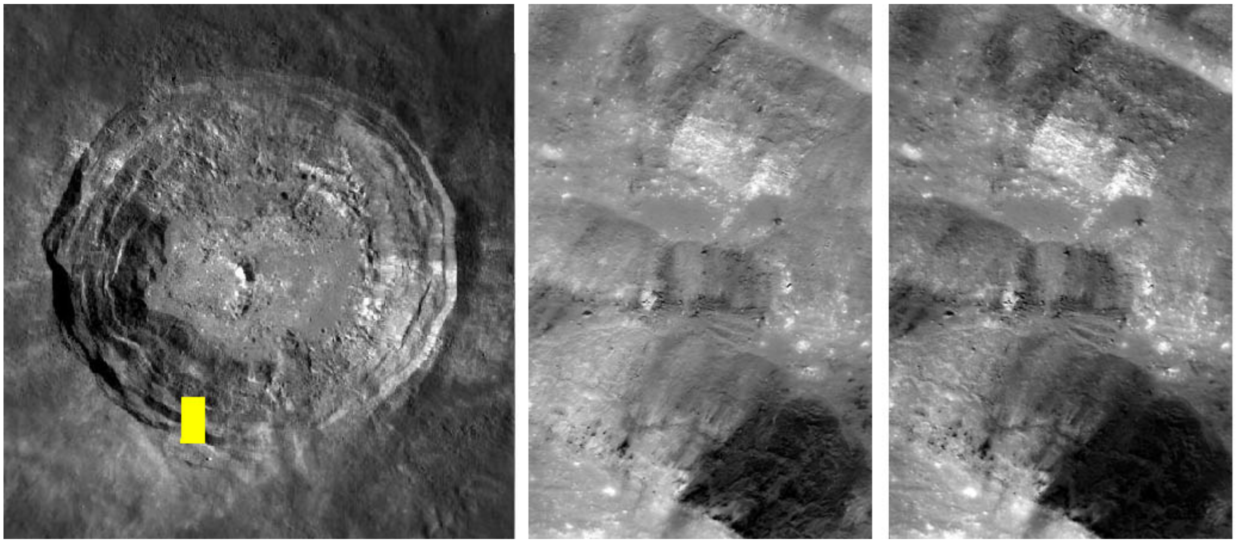


Figure 1. *Aristarchus crater from the LROC Quickmap web site with our region of interest for the "Spot the Difference" region marked in yellow. The images are orientated with north towards the top. The LROC images used for Spot the Difference are:* ***(Left)*** *M109548636RC taken on 2009 Oct 27 with: Solar Altitude=64.4°, Solar Azimuth=169.8°, and an image scale originally of 0.5 m/pixel.* ***(Right)*** *M1101516499LC taken on 2012 Sep 05 with: Solar Altitude=62.4°, Solar Azimuth=205.6°, and an image scale originally at 1.3 m/pixel – note this image was taken with a slanted view (not nadir) originally,so the resolution in the horizontal direction differs to the vertical direction.*

. **Routine Reports:** Below are a selection of reports received for June that can help us to re-assess unusual past lunar observations.

Proclus: On 2015 Jun 23 UT 20:55-21:00 Marie Cook (BAA) observed this crater under the same illumination conditions (to within ±0.5°) to a 1987 LTP reported by her:

> *On 1987 Nov 27 at 19:35-21:04 UT M.C. Cook (Frimley, UK, seeing IV-V) saw spurious color on the crater floor and also on the rim. Two bright spots were seen on the west rim (the brightest one was on the NW rim). Saw >>N-NW lip 21:00UT blink in red. This was apparently confirmed by A.C. Cook (according to Cameron) at 21:04UT. At 20:56UT Censorinus was quite dull and diffuse, spurious color but no blink. Sketches made. Cameron Extended LTP catalog ID=314 and weight=5. Apparently M. Mobberley was observing as well and took some video. Please note that it is unclear from the report in the Cameron catalog whether the description pertains to Censorinus or Proclus. The ALPO/BAA weight, in view of the poor observing conditions is 2.*

Looking through the digitized archives that we now have, it is clear that the description from the Cameron Extended catalog is a bit scrambled. Here are the series of observations for that night with times in UT:

17:30-17:37 Raster scan of the Moon by G. North – all appears normal.

17:38-17:45 Raster scan of the Moon by G. North – all appears normal.

17:54-17:58 Raster scan of the Moon by G. North – all appears normal – but seeing worsening.

18:00-18:04 Raster scan of the Moon by G. North – all appears normal – but seeing much worse.

18:05 G. North reports the seeing now hopeless

18:27 & 18:35 G. North does two further quick checks, but gives up due to very bad conditions.

20:43 M. Cook (seeing IV-V) sees spurious red color on the north crater floor and blue on the outside north rim. A pale brown color was seen clinging to the ridge/rays on the border with Palus Somni.

20:50 M. Cook found Proclus brighter in red and in yellow or blue filters. The Moon's altitude was 22°.

20:52 M. Cook found Proclus approximately 6x Brighter on its NW rim than Censorinus.

20:56 M. Cook found Censorinus extremely dull and diffuse compared to the white patch east of Atlas.

21:00-21:04 M. Cook found definite blink reaction between red and blue filters, when looking at Proclus. A. Cook agreed but thought it might have something to do with the really bad observing conditions. The Moon's altitude was now 14°.

21:08 M. Cook still finding a blink reaction between red and blue filters.

21:10 M. Cook reported in white light, red to the east of Censorinus, and the crater had now brightened and was equal to that of the white patch east of Atlas

21:12 M. Cook found Censorinus brightest in red, then yellow, then blue filters.

21:15 M. Cook finished observing because the sky conditions had become too foggy.

During the repeat illumination observing session in 2015 Marie had better seeing (III) and transparency was good. She used the same telescope and filters, but this time saw no color, spurious or filter blink reaction on Proclus, and Censorinus looked normal too.

I can find no observations from Martin Mobberley, until the night of the 28th, and so in view of the observing conditions back in 1987 will lower the weight to 1 for Proclus, but will keep the Censorinus weight at 2 as I do not think it should have been varying in brightness as it was reported. The LTP description will be updated accordingly in the database.

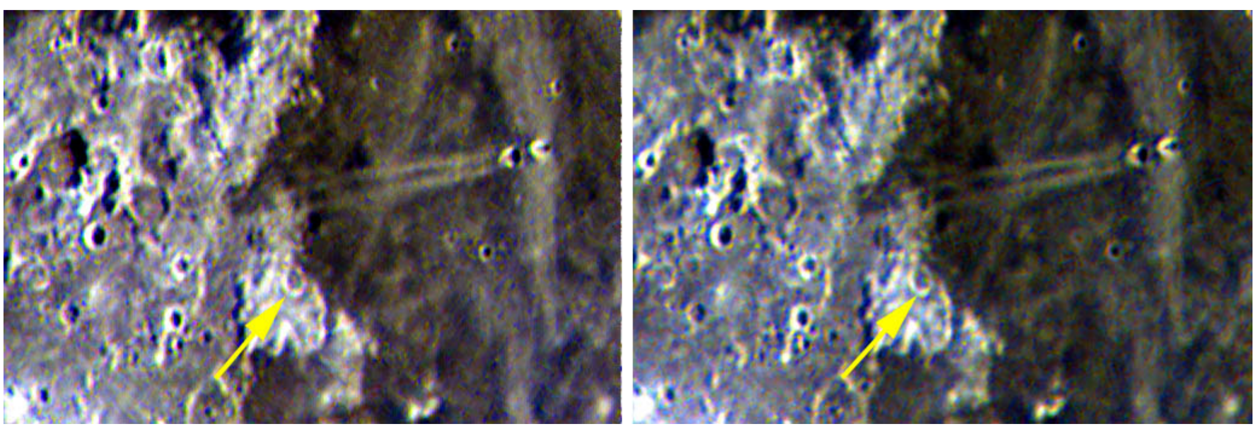


Figure 2. *2015 Jun 24 images by Maurice Collins (ALPO) of the region around Lubbock (with the crater arrowed), orientated with north towards the top. The images have had their atmospheric spectral dispersion removed, sharpened, color normalized, and then had their saturation increased by 60% to reveal faint colors.* ***(Left)*** *Image taken at 07:53 UT.* ***(Right)*** *Image taken at 07:58 UT.*

Lubbock On 2015 Jun 24 UT 07:53 and 07:58 Maurice Collins captured images of the area around Lubbock that matched the same illumination conditions (to within ±0.5°) to a 1972 LTP report by Hill:

Lubbock 1973 Nov 02 UT 22:10-23:59 Observed by Hill (Greensboro, N. Carolina, USA) "Color in crater changed fro. gray to brownish – strong enough change to be noted. Never saw anything like this 7 yrs. of observing". NASA catalog weight=3. NASA catalog ID #1379. ALPO/BAA weight=3.

The images that Maurice took (Fig 2) have been enhanced to show up faint color. However as you can see, there is no natural brown color present. Hence I will leave the weight at 3 because it is not possible to explain this transient brown color on this specific crater. If anybody knows who Hill from Greenboro, N. Carolina is, or have further details about this observation, then please do let me know.

Figure 3. Alphonsus by Jay Albert orientated with north towards the top, taken on 2015 Jun 25 UT 02:47.

Alphonsus: On 2015 Jun 25 UT 01:55-02:08 & 02:47 Jay Albert (ALPO) observed visually, and imaged Alphonsus under the same illumination conditions (to within ±0.5°) to a 2003 LTP report by Guy Jasmin of Quebec:

On 2003 Apr 10 at 00:40UT a GLR observer G. Jasmin (Quebec, Canada, using a 10" F-10 Schmidt Cassegrain) took a photograph of Alphonsus crater on Kodak 400ASA film with an exposure of 1/30th sec. There was a light visible (diameter 10 km) inside Alphonsus and the effect was present for 5 minutes. The observer commented that they have seen a light in this crater many times before, but never as long as 5 minutes. This report was submitted to the GLR group in Italy. The ALPO/BAA weight=2.

Back in 2006 I was notified about this LTP report by Piergiovanni Salimbeni of GLR, however although I appear to have been given images of Guy's telescope and observatory, I do not appear to have a copy of the image of Alphonsus itself. I have made efforts to contact Pier, and Guy, but at the time of writing have not heard back from either of them. Additional searching on the web for the image has not had much luck either.

Under the repeat illumination conditions, Jay noted that the terminator was over 100 km west of the crater, that there was black shadow along the bottom of the east wall whilst the interior west wall was well lit. The central peak was the brightest feature in the eyepiece field and cast a short black shadow. Rima Alphonsus was also seen and the interior west walls of the craterlets inside Alphonsus were bright. No other "light" was seen. Jay used a Celestron 15cm SCT telescope for his observations. He also captured the image, shown in Fig. 3, so if at some point in the future we can find a copy of Guy Jasmin's image then we can compare the two images, and even perhaps even subtract one from the other to see the full extent of the recorded glow.

Gassendi: On 2015 Jun 27 UT 19:57 Thierry Speth (BAA) imaged this crater under the same illumination conditions (to within ±0.5°) to a 1977 LTP report by Peter Foley:

> *On 1977 Jul 26 at 21:00-23:50 P.W. Foley (Maidstone, UK, 4" refractor, x50-x360, seeing II) saw red spot on southern slope of northern most central peak. Also 21:42-21:55UT A. Cook (of Frimley, UK) saw a possible red color on the west of the central peak of Gassendi and dark brick red color in the north west floor quadrant. The telescope used was a 12" reflector, x240 and the seeing was IV. P. Moore and D. Jewitt think the cause is atmospheric spectral dispersion. Cameron LTP Catalog Extension weight=2. The ALPO/BAA weight=3.*

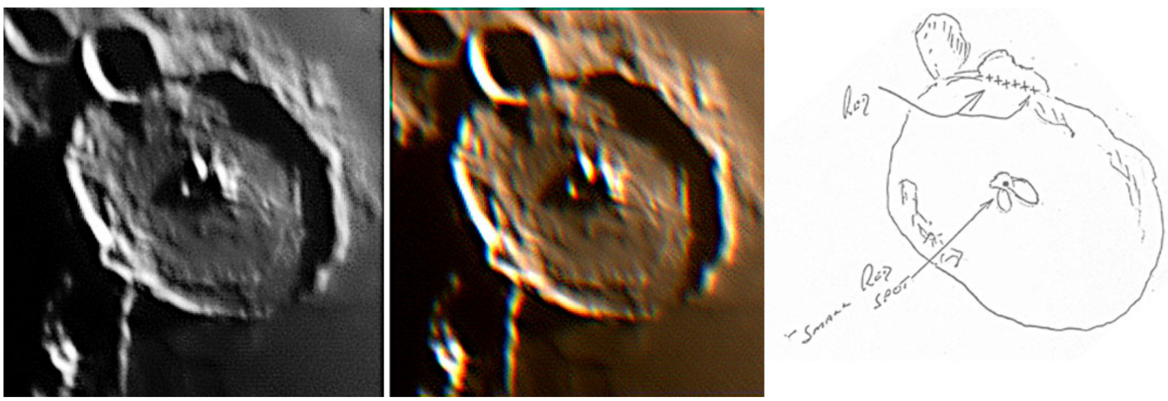


Figure 4. *Image of Gassendi by Thierry Speth, orientated with north towards the top taken at 19:57UT on 2015 Jun 27.* ***(Left)*** *Original monochrome image.* ***(Centre)*** *Image with artificial atmospheric spectral dispersion & absorption added.* ***(Right)*** *A sketch by Peter Foley from 1977 Jul 26 – annotation has been rotated so that it is readable in this orientation.*

Looking back through the archives, the observations from 1977 makes interesting reading. I think the reason why the report was given an ALPO/BAA weight of 3 was that two observers reported color, and when the weight was assigned, the full report from the third observer had not been scanned in from the archives or was difficult to find. With hindsight the low altitude of the Moon should have set alarm bells ringing. But anyway here are the three reports:

> UT 21:00 P. Foley (10cm refractor, x50 to x360, seeing II) sees a very obvious red spot on the southern slope of the northern central peak and a wisp of redness on the inner NE rim (See Fig 4 (Centre)). Although he looked elsewhere on the Moon he could not find any other signs of color. A check with filters suggested that the NE rim color darkened slightly in a blue filter. The central peak spot was "too small for any conclusion to be formed". The Moon was 19° above the horizon at this time.
>
> UT 21:15 (from) P. Foley telephoned D. Jewitt, P. Moore, and H. Ford to alert them.
>
> UT 21:42-21:55 A.C. Cook (Frimley, UK, 30cm reflector, x240, seeing IV, 2 years of observing experience) found a brick red color on the NW floor quadrant of Gassendi, and a possible(?) redness on the west shadow of the central peaks. No Moon Blink device was available to use at the time. It appears, from my log book, that no additional checks were made for color on other features. The Moon was at an altitude of 18° above the horizon.
>
> UT 21:53-22:25 D. Jewitt (30cm reflector, x130, x260, Wratten 25 and 44a filters, seeing III, observing experience: >8 years) examined Gassendi with Moon Blink filters but found no evidence for color. Visually though (without filters) Gassendi did have red along its east wall and a red spot on the south of the northern most central peak. He found similar effects of other features with shadows e.g. Kepler and Promontorium Heraclides. His local lunar altitude was 17°-15°.

UT 22:45 P. Moore telephoned to say that he had indeed seen color in Gassendi, but so too in other craters! At this time the Moon was 15° above his local horizon.

UT 22:45-23:50 P. Foley looked for color elsewhere, along the terminator region, but could not find any, other than in Gassendi crater. The Moon's altitude was now 14°-8° above his horizon – so it's mighty peculiar that he could not see any atmospheric spectral dispersion – though he did experience some cloud cover between 22:45 and 23:20, which might have dimmed the Moon a bit.

So reading between the lines here, despite checks by Peter Foley for color elsewhere, and not finding any, Moore and Jewitt, did find color elsewhere due to the Moon's low altitude. I saw color on Gassendi, but did not check for it elsewhere (I was a novice observer in those days!), however at these low altitudes it is quite likely that bushes in the garden in Frimley were partly obstructing the view of the Moon, so I am not surprised that I was seeing color then. The color I saw did not correspond to the locations that Peter Foley saw it in. The test by David Jewitt, with the Moon Blink device is a definitive test though – if there really is red or blue color on the Moon then the image will blink when switching between filters. If the color was atmospheric induced then there will be no blink effect (perhaps just a slight displacement in the image between red and blue filters). Clearly then, there is no longer any merit in keeping this LTP report in the database, and I will demote it to a weight of 0.

Plato: On 2015 Jun 30 UT 19:53-22:49 Pasquale D'Ambrosio (UAI) imaged Plato under the same illumination conditions (to within ±0.5°) to two LTP reports from the past:

Plato 1937 Jul 22 UT 06:20 Observed by Haas (Alliance, Ohio, USA, 12" reflector?) "Floor distinctly greenish, but was gray on June 23, 1937 at 0430 & col.84 (normal?)" NASA catalog weight=4. NASA catalog ID #421. ALPO/BAA weight=3.

Plato 1916 Oct 10 UT 21:00? Observed by M, Maggeni (Florence Obs., Italy) "Reddish shadow spread over part of crater. Looked like vapor (like nitrous vapor) and obscured underlying craters. The Cameron 1978 catalog weight=3 and ID = 365. The ALPO/BAA weight=3.

Although imaging in monochrome, we can at least see the appearance of the floor of Plato as visible to Walter Haas back in 1937 (Fig 5 Top Left). Also we can see what Plato should have looked like to fellow Italian observer, Maggini, back in 1916 (Fig 5 Top Right to Bottom Left) if the so called "obscuring cloud" had not appeared. There is some loss in image clarity in Pasquale's image sequence, as time progresses in Fig 5, but this is due to atmospheric conditions. Please note that the UT for Mentore Maggini's LTP, from Cameron's catalog, is estimated at 20:00. If anybody has access to a Scientific American journal from 1919, Vol 121, p181, then I would be interested to hear from you, likewise if you have access to observational records at Florence Observatory, then maybe we could find a more precise UT? I know for certain that despite conditions being near to Full Moon, there was no lunar eclipse on that date that could explain the red effect seen – so I am very curious to learn more precisely what this experienced Italian observer actually saw?

Furnerius and Stevinus: On 2015 Jun 30 UT 22:20-23:01 Kevin Berwick (ALPO) observed these two craters visually with a 10 cm refractor, under IV seeing conditions – this matched the illumination and topocentric librations (to within ±1°) to a 1961 LTP report by Winnie Cameron:

Furnerius and Stevinus 1961 May 29 UT 02:45-03:30 Observed by Cameron (Adelphi, MD, USA, 3.5" reflector, x160, Questar, Seeing=good) "Craters stood out like glittering points (small craters on rims?). Only anomalies among many features examined (specular refl. from flat surface?)." NASA catalog weight=4. NASA catalog ID #738. ALPO/BAA weight=1.

Kevin commented that he suffered from poor seeing throughout and that the Moon looked like it was "underwater at times" – this was partly due to it having been the hottest day of the summer so far in

Dublin. Also the elevation of the Moon was quite low and the sky was still quite bright. Magnification was kept low because of the seeing conditions. Alas he was unable to positively identify the craters as both features were illuminated far from the terminator, but he did look at the correct area. He found that under this illumination the terrain has many bright areas and dots. Throughout his observing session, he saw nothing unusual and certainly no “glittering” effects reported from 1961. I have always suspected that the glistening effect was just scintillation of small point-like ray craterlets, but we will have to wait for another opportunity to try this again. Nevertheless, despite the poor seeing that Kevin experienced, it was worth trying as the viewing and illumination angles were so similar to what they were during the 1961 LTP.

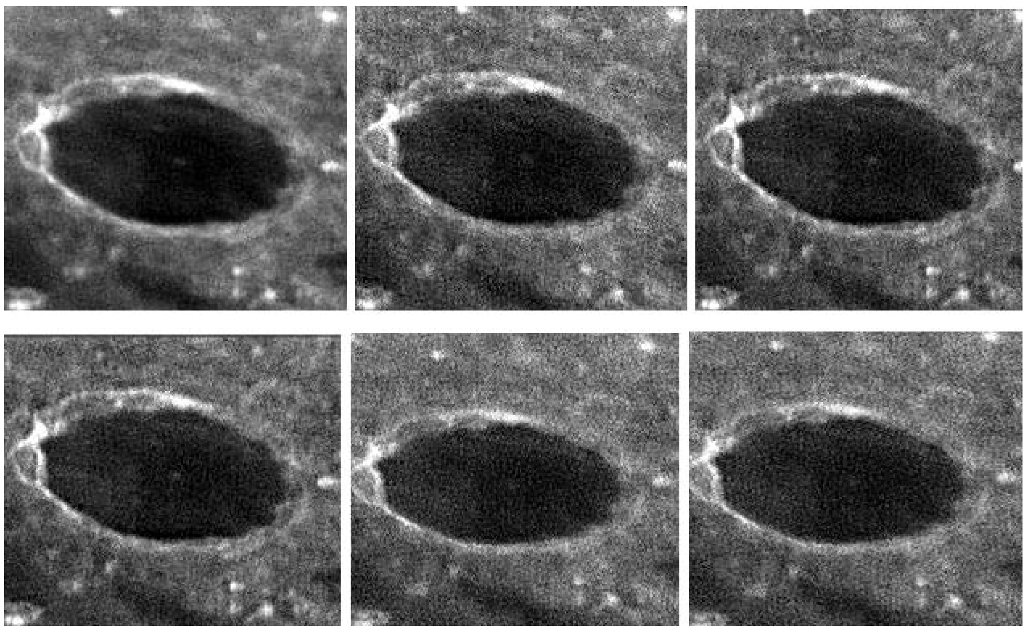


Figure 5. *Plato as imaged by Pasquale D’Ambrosio (UAI) on 2015 Jun 30, orientated with north towards the top.* ***(Top Left)*** *19:54 UT.* ***(Top Centre)*** *21:28 UT.* ***(Top Right)*** *21:31 UT.* ***(Bottom Left)*** *21:33 UT.* ***(Bottom Centre)*** *22:48 UT.* ***(Bottom Right)*** *22:49 UT.*

Suggested Features to observe in August: For repeat illumination (and a few repeat libration) observations for the coming month - these can be found on the following web site: http://users.aber.ac.uk/atc/lunar_schedule.htm . By re-observing and submitting your observations, only this way can we fully resolve past observational puzzles.

To keep yourself busy on cloudy nights, why not try “Spot the Difference” between spacecraft imagery taken on different dates? This can be found on: http://users.aber.ac.uk/atc/tlp/spot_the_difference.htm .

If in the unlikely event you do ever 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 https://twitter.com/lunarnaut .

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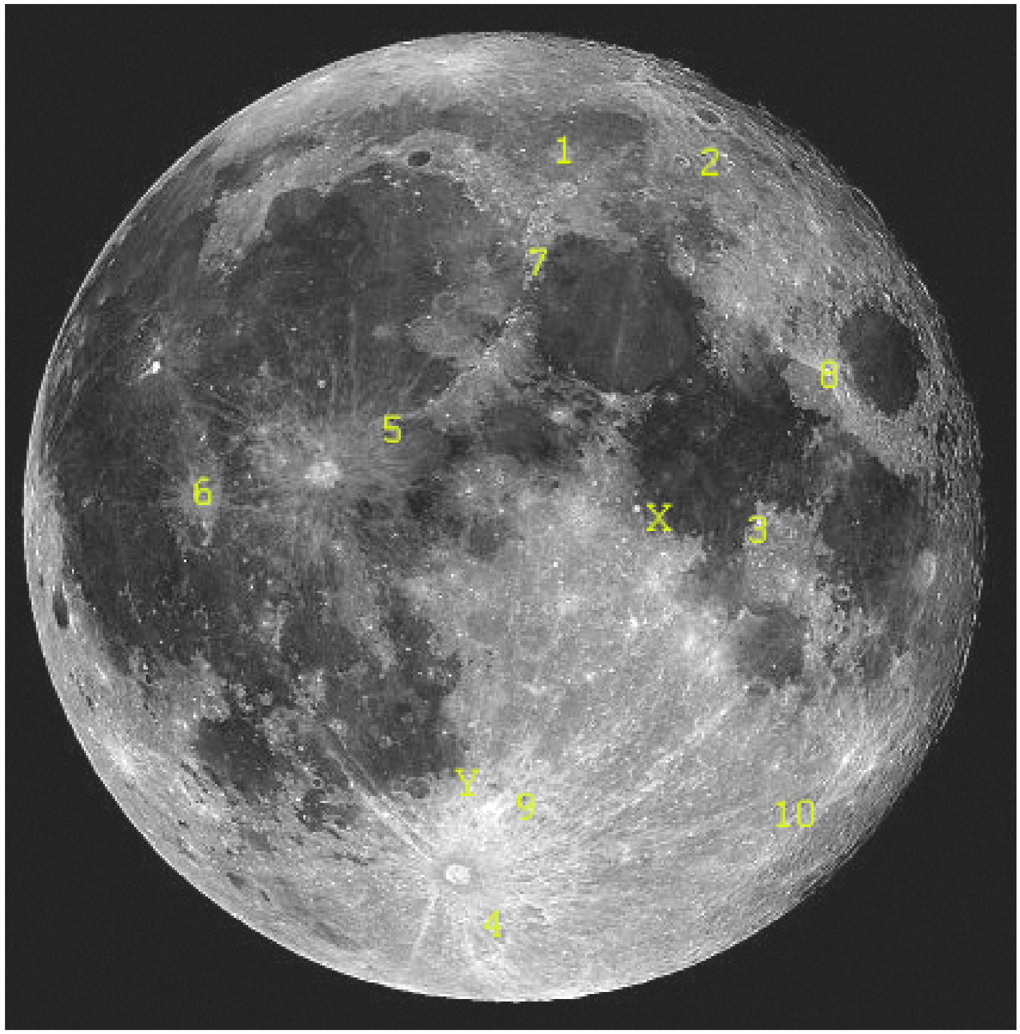
KEY TO IMAGES IN THIS ISSUE

1. **Aristoteles**
2. **Atlas**
3. **Censorinus**
4. **Clavius**
5. **Eratosthenes**
6. **Kepler**
7. **Montes Caucasus**
8. **Proclus**
9. **Stöffler**
10. **Vallis Rheita**



FOCUS ON targets

X = Dionysius
Y = Deslandres