



The Lunar Observer

A publication of the Lunar Section of ALPO

Edited by David Teske: david.teske@alpo-astronomy.org

2162 Enon Road, Louisville, Mississippi, USA

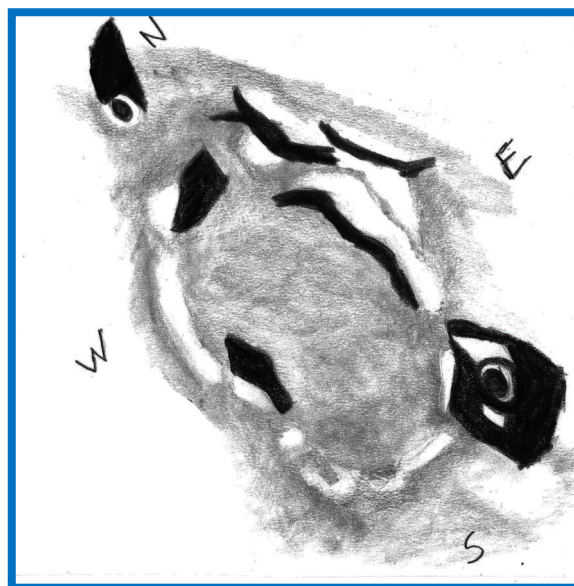
Recent back issues: http://moon.scopesandscapes.com/tlo_back.html



Feature of the Month—October 2019

An Expressionist Vision of Schumacher B

Albert Anuziato



Alberto Anunziato, Paraná, Argentina. 2019 August 18 0330-0400 UT. Meade EX 105 Magnification: 154X

At 120.7° colongitude, Schumacher B gains visibility for two reasons: its proximity to the terminator and the shadows that completely cover its most important neighbor, Schumacher. I realized that I was observing shadows that seemed very elongated but that came from walls that should not be very high. Schumacher B is an ancient crater, almost completely flooded by lava. I could only find two images of this little known secondary crater. One of these images belongs to the Lunar Orbiter mission and the second to the Lunar Reconnaissance Orbiter mission. With these images I could compare what I had drawn with the eye in the eyepiece, fascinated by the very marked shadows that seemed to come from an old 40's film noir, with the true appearance of Schumacher B. It is obvious that it appeared more oval in my eyes of what it really is. The west wall has two higher points that appeared brighter on its tops and are the ones that cast long shadows. Although the walls seem to be at the limit of my telescope's resolution, the shadows were clearly discernible, but not to the full extent of the west wall. The east wall is more complex and the shadows are flatter, probably because of the angle of incidence of sunlight. To the north there is a secondary crater in smooth terrain, its interior is dark and its walls shine like a luminous circle, because of the length of the shadow they cast they must be high. And to the southeast a small crater appears in the shadows, only visible from its east wall. In that area the shadows of that crater seem to mix with those that project the elevations that separate it from Schumacher and the southeast section of the wall of Schumacher B, interrupted to the north and south by the lava that has erased the interior features.

Lunar Calendar October 2019

2019	U.T.	EVENT
October 03	2000	Jupiter 1.9° south of Moon
05	1647	First Quarter Moon
05	2100	Saturn 0.3° north of Moon, Occultation Easter Island, Southern South America, South Georgia, southern Africa
06		Greatest southern declination -22.7°
06	0900	Pluto 0.1° north of Moon, occultation in Australia, Melanesia, southeastern Micronesia, western Polynesia
10	1800	Moon at apogee, 405,899 km
13	2108	Full Moon, smallest of 2019
19	1500	Moon 1.7° south of M35
20		Greatest northern declination $+22.9^\circ$
21	1239	Last Quarter Moon
22	0500	Moon 0.7° north of M44
26	1100	Moon at perigee, 361,311 km
28	0338	New Moon, Lunation 1198

The Lunar Observer welcomes all lunar related images, drawings, articles, reviews of equipment and reviews of books. You do not have to be a member of ALPO to submit material, though membership is highly encouraged. Please see below for membership and near the end of *The Lunar Observer* for submission guidelines.

Comments and suggestions? Please send to David Teske, contact information page 1. Need a hard copy, please contact David Teske.

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.

LUNAR TOPOGRAPHICAL STUDIES

Acting Coordinator – David Teske - david.teske@alpo-astronomy.org

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

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

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

Website: <http://moon.scopesandscapes.com/>

OBSERVATIONS RECEIVED

Albert, Jay– Lake Worth, Florida, USA. Digital image of Atlas and Hercules.

Alberto Anunziato - Oro Verde, Argentina. Feature of the month An Expressionist Vision of Schumacher B with article and drawing, article Rheita E and Rio Cuarto: Oblique Craters in Two Worlds and image of Río Cuarto crater field, Argentina.

Fransico Alsina Cardinali - Oro Verde, Argentina. Digital image of Rheita E.

Jairo Chavez - Popayán, Columbia. Digital images of Mare Crisium, Aristarchus, Gutenberg, Plato and Sinus Iridum.

Howard Eskildsen - Ocala, Florida, USA. Digital images of Aristoteles and Eudoxus, Meton 1 Dome, Lichtenberg to Seleucus, Herodotus Omega, Mons Rümker, the Aristarchus Plateau, the Wargentín region and the Marius Domes.

Richard Hill – Tucson Arizona, USA. Digital images and articles about An Excellent Lake, On the Marsh and Plateau Sunrise.

Jerry Hubbell - Wilderness, Virginia, USA. Digital images of the 17, 21, and 25 day old Moon.

David Teske—Louisville, Mississippi, USA. Digital images (2) and article Eratosthenes and Stadium and digital image of Copernicus.

Many thanks for all these observations, images, and drawings.

Favorable Lunar Librations

East limb most exposed on October 5, 2019, +7.9°.

West limb most exposed on October 22, 2019, -7.1°.

North limb most exposed on October 16, 2019, +6.6°.

South limb most exposed on October 2, 2019, -6.6° and October 29, 2019, -6.5°.

On the Marsh Rik Hill

South of Mare Humorum is an area that looks like no more than a western embayment off Mare Nubium. This is Palus Epidemiarum, the Marsh of Epidemics, a little over 300 km in diameter; it is surrounded by and contains some real treats. Near the upper right corner of the image are two similar sized craters, Mercator (49 km) on the right and Campanus (also 49 km) on the left. Above them in the extreme right corner of the image is the Dome Kies Pi with its prominent central pit. To the left of the two large craters can be seen the roughly parallel Rimae Hippalus and parallel to them further left is the mountain chain Rupes Kelvin and then the isolated Promontorium Kelvin sticking into Mare Humorum. These rimae end at a very interesting unnamed passage between the marsh and Humorum. On the right end of this passage is the crater Ramsden (26 km) with a beautiful system of Rimae Ramsden surrounding. Look to the upper right of Ramsden to the double walled little crater Marth (7 km). This is worthy of High magnification!

On the right side of the image is most of the crater Capuanus (61 km) with the wonderful mountains trailing off the left wall. Below this is the largely ancient highly modified crater Elger (22 km) that may be a merger of several craters. It may be as old as 4.5 billion years, as much as 18 rotations of our galaxy! Further left is a curious straight wall and a wedge-shaped shadow. This is a small mare-like area with a low short mountain range on the south side, a juxtaposition of mundane features that makes for shadow-play given the right sun angle. Lastly, I zoom over to the crater on the left side of the image with an illuminated central peak. This is Vitello (43 km) and it has one of the most interesting central peaks of any crater on the Moon. Unfortunately, that would not be best shown until about two or three hours after this image was taken.

Palus Epidemiarum,
Richard Hill, Tucson,
Arizona, USA. 17
March 2019 0353 UT,
colongitude 38.8°, 8''
f/20 Mak-Cass, Skyris
445 m camera, 610 nm
filter, seeing 8/10.



Richard "Rik" Hill ©2019
Loudon Obs. Tucson
RHILL@LPL.ARIZONA.EDU

Eratosthenes and Stadius

David Teske

In these images (on the next page) I captured Eratosthenes at sunrise and sunset. It is certainly one of the most beautiful craters on the Moon. Copernicus rivals it in size and youthful age, but Eratosthenes is deeper and perhaps even more dramatic at sunrise. At 58 km in diameter, Eratosthenes beauty can be attributed to the fact that it is little eroded. Its depth is 3.6 km below that of the rim. An astronaut standing on the rim of Eratosthenes would look down a steep though terraced slope of around 33°, to the crater floor. These well preserved interior walls show complex slumps and piles of debris and impact melt that fill much of its floor. The central peak rises 1.5 km above the floor and consists of three individual mountains. There is a ridge connecting the central peaks to the north wall. The outer slopes have radiating ridges similar to those on the flanks of Copernicus. Because of its ancient age, 3.2 billion years old, Eratosthenes no longer shows a ray system like Copernicus displays. Its rays have been darkened by billions of years of lunar erosion. The foothills of the Apennines reach all the way to the northeastern wall of Eratosthenes while to the southwest a nameless range of mountains stretch south as far as Stadius.

Stadius at 69 km in diameter is similar in size to Eratosthenes, but that is where the similarities between the two craters end. Stadius is one of the most famous submerged or ghost craters on the Moon. Stadius is a shallow depression with bits and pieces of walls 600 m high. The best preserved part of the rim of Stadius is on the northeast side connected to the above mentioned mountains between Stadius and Eratosthenes. The crater is covered by ejecta of Copernicus and is saturated with secondary craters and crater pits that are randomly distributed. Stretching northwest of Stadius is a string of craters all about 5 km in diameter. In order from Stadius are Stadius Q, R, E, S, F, T, J, and W. Further north of Stadius W is a prominent crater chain right on the terminator of this image named Rima Stadius I. This formation is made of secondary impacts from the Copernicus impact. At the southeastern edge of Stadius is a fine rille, 30 miles long but only 1,000 m wide.

Of course, Eratosthenes was named after the Greek mathematician, geographer, and astronomer who lived from around 275 to 195 BC. I still find it most brilliant that all those years ago, Eratosthenes correctly found the circumference of the Earth. Stadius was named after Jan Stadius, a Belgian mathematician and astronomer who lived from 1527 to 1597.

References

Chu, Alan, Paech, Wolfgang, Wigand, Mario & Dunlop, Storm. 2012. The Cambridge Photographic Moon Atlas. Cambridge University Press, New York.

Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.

Kitt, Michael T. 1992. The Moon: An Observing Guide for Backyard Telescopes. Kalmbach Books, Waukesha.

Legault, Thierry and Brunier, Serge. 2006. New Atlas of the Moon, Firefly Books.

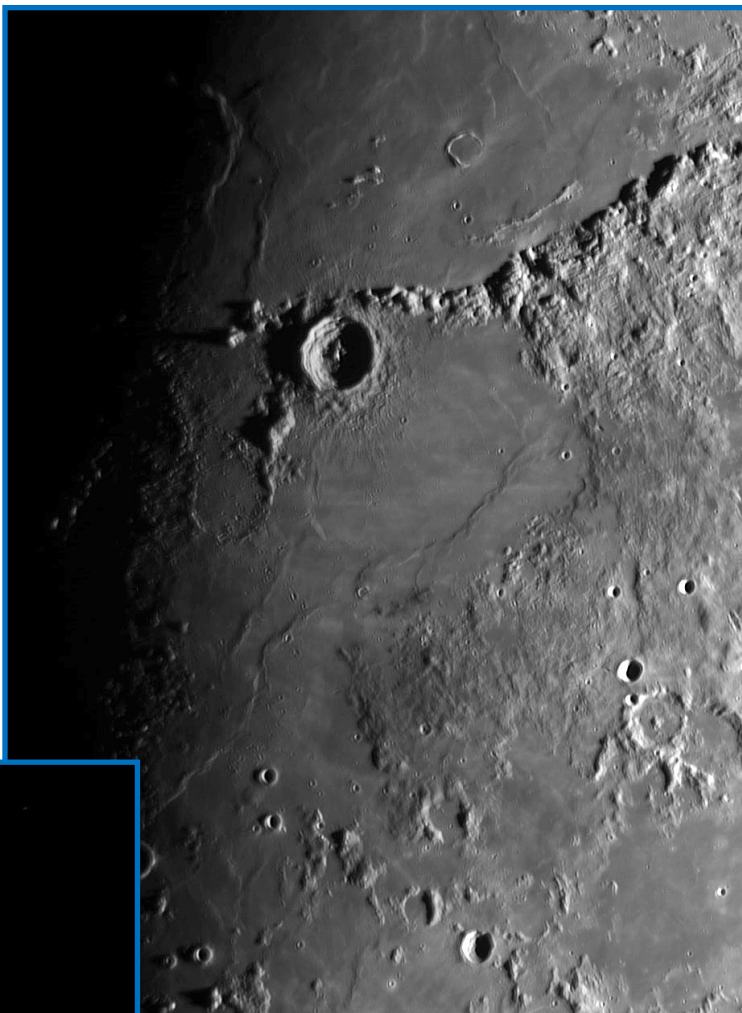
North, Gerald. 2000. Observing the Moon. Cambridge University Press, Cambridge.

Rükl, Antonin. 1990. Atlas of the Moon, Kalmbach Books, Waukesha.

Wilkinson, John. 2011. The Moon in Close-Up. Springer, Heidelberg.

Eratosthenes Sunrise,

David Teske, Louisville,
Mississippi, USA, 08 Sep-
tember 2019 at 0151 UT.
Colongitude 13.8°. Seeing
6/10. Mewlon 180,
ZWOASI120mms, 500
frames, Firecapture,
Registax, Photoshop.



Eratosthenes Sunset,

David Teske, Louisville,
Mississippi, USA, 22 Sep-
tember 2019 at 0925 UT.
Colongitude 188.1°. Seeing
8/10. Mewlon 180,
ZWOASI120mms, 500
frames, Firecapture,
Registax, Photoshop.



Aristarchus, Richard Hill, Tucson, Arizona, USA. 18 March 2019 0442 UT, colongitude 53.0°, 8" f/20 Mak-Cass, Skyris 445 m camera, 610 nm filter, seeing 8/10.

Plateau Sunrise Rik Hill

Sunrise on the Aristarchus Plateau is always a thrilling sight whether in your first 60mm telescope or a 400mm cannon! The eye-popping crater Aristarchus (41 km diameter) near the center of this image, is the eye-popping crater brightest crater on the moon and at 175 million years old, a Jurassic Crater, it's one of the younger ones. Some dinosaur had a front seat to a spectacular impact show! Notice the nice terracing on the interior wall of this crater. Most of the Plateau is in shadow here. Aristarchus itself is in the southeast corner. You can see the east side of the Plateau going north from Aristarchus. Above and to the right of Aristarchus is the arc of the partially flooded Prinz (49 km) and the beautiful Rimae Prinz just above. Immediately above the north rim of Prinz is the odd crater Vera. It is the south end of one of the rimae that you can see running north a little further to the left or west of Prinz. In among the Prinz Rimae is the small crater Ivan (5 km), a challenge for a 3" telescope. Then further north and running off the image are the Montes Harbinger, just the tips of what must have been a magnificent mountain chain before they buried by the Imbrium basalts.

Moving directly above Aristarchus as you head up the east side of the Plateau, is Väisälä (9 km) and some more very interesting (unnamed) rimae. Below and left of Aristarchus is the shadow filled Herodotus (36 km) and the very interesting sharp ridge that runs along its eastern wall up to the big crater. There is an isolated bright spot deep in the shadow to the left. When I saw this I went to other images of this region taken this night. It was persistent but there was nothing there in my Virtual Moon Atlas so I checked on LROC QuickMap. Within a couple minutes I had determined that this is the tip of Mons Herodotus some 120 km north of its namesake crater. Amazing how bright it is!

Rheita E and Rio Cuarto: Oblique Craters in Two Worlds

Francisco Alsina Cardinali and Alberto Anunziato

The usual explanation for the strange Rheita E crater (66 kilometers long by 32 kilometers wide) is that it is three superimposed craters that would have formed at the same time, since there are no traces of internal walls, although its formation truly remains an enigma. Could it be a tangential crater produced by an oblique impact? For planetary geology the characteristics of an elongated crater are: up range and downrange rims depressed, crater elliptical and ejecta concentrated in the cross range directions, and when the impact is at angles $< 5^\circ$ a significant portion of the impactor may ricochet off the surface and produce a second crater downrange and in the downrange direction the crater becomes highly elongated. These ricocheted fragments can be up to half the size of the initial impactor and skip the target surface with much of their pre-impact velocity, creating a characteristic pit formed by the decapitation of the impactor itself and not by ejecta.

Elongated craters produced by oblique grazing impacts have been identified not only on the Moon (as Rheita E in Image 1), but also on Mercury, Venus and Mars, but never on Earth, until 1989. In October of that year, the then Captain of the Argentine Air Force Rubén Lianza, flying a Pampa airplane in the Cordoba skies, observed a peculiarly depressed terrain, which stood out from the cultivated fields that surrounded it. The now Commodore had discovered a formation of several elliptical craters that indicated a tangential meteorite impact thousands of years ago. Rubén Lianza is an amateur astronomer, which led him to realize the importance of what he had discovered. Unlike the Moon, deprived of atmosphere, climate and tectonic plates, on our changing Earth there are very few impact craters that retain their shape. And none of the known craters have the elliptical shape that indicates the impact of a meteorite at a very closed angle, less than 15 degrees. The Argentine elite pilot had discovered the first tangential craters on the surface of our planet (image 2), and even subsequently picked up a meteorite fragment of the condritical type in situ. Two years later, a scientific expedition led by Peter Schultz of Brown University, one of the world's most important planetary geologists, confirmed the discovery of the first oblique craters on the Earth's surface. The announcement was made in "Nature" in a communication signed by Rubén Lianza and Peter Schultz in the January 16, 1992 issue, followed by publications in "Planetary Report" and "Sky and Telescope." The pleasure of observing Rheita E was an auspicious occasion to remember a similar crater in our country, discovered by a friend. In the image taken in an observing session of the Sociedad Lunar Argentina, we can also see the notorious Rheita Vallis, which has been traditionally interpreted as a secondary crater chain formed by ejecta during the formation of the Mare Nectaris basin.

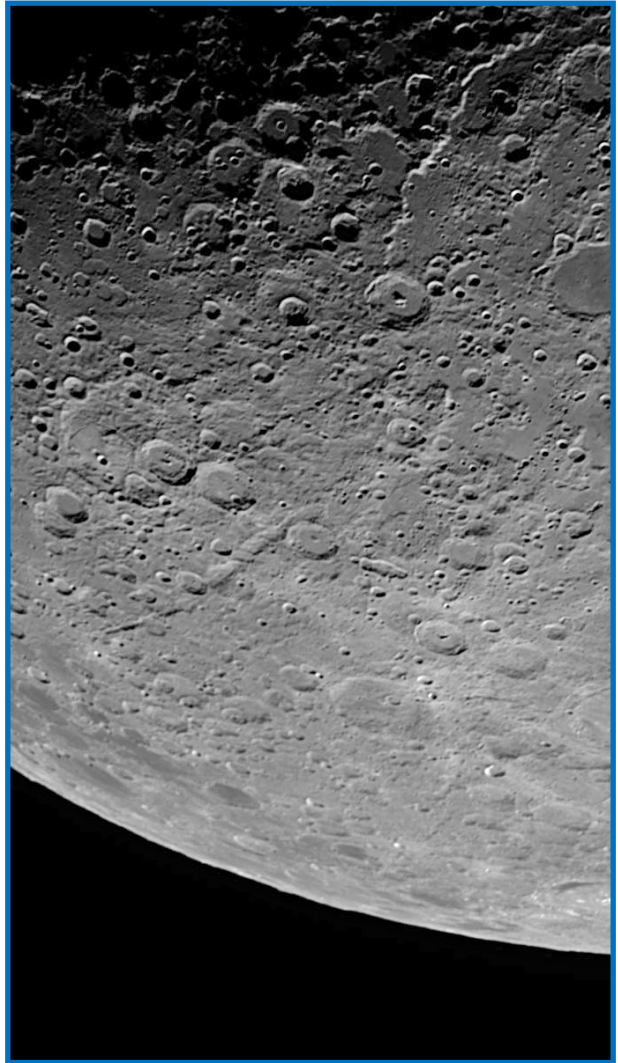
Bibliography:

Robert Herrick and Nancy Forsberg-Taylor: "The shape and appearance of craters formed by oblique impact on the Moon and Venus". Meteoritics and Planetary Science 38. Nr 11, 1551-1578.

Peter Schultz and J. Kelly Beatty: "Teardrops in the Pampas". Sky and Telescope, April 1992, 387-392.

Peter Schultz and Rubén Lianza: "Recent grazing impacts on the Earth recorded in the Río Cuarto crater field, Argentina". Nature, Vol. 355, No.6357, 01-16-1992, 234-237.

Right: **Rheita E**, Francisco Alsina Cardinali, Oro Verde, Argentina. 06 August 2019 2321 UT. 200 mm refractor, 742nm filter, QHY5-I camera.



Below: **Río Cuarto crater field**, Argentina.



An Excellent Lake!

Rik Hill

A lesser known feature on the Moon is Lacus Excellentiae just south of Mare Humorum, seen here just below center as an irregular mare expanse. On its south shore is the shadow filled crater Clausius (26 km) and further south is an irregularly shaped shadow filled crater very near the terminator, Drebbel (31 km). Other than this crater, the Lacus has no other named features in it outside of a handful of satellite craters. Even so, take some time here. There are many interesting mountains, promontories and dome-like structures on the floor of this lake.

At the top of this image we see southern Mare Humorum. The largest feature is the large partially buried crater on the shoreline just left of center. This is Doppelmayer (66 km) with a ghost ring crater Puiseux (26 km) to the upper right of it and Lee (43 km) below and left, also flooded by the Humorum basalts. To the upper left (northwest) are the wonderful Rimae Doppelmayer. The Sun is a little too high in this image to show them at their best. But these pale in contrast to the crater further to the right (east) with the sharp rim and odd central peak. This is Vitello (43 km) and it has a very complicated floor worthy of study on a good night. The central peak sits on a small circular plateau surrounded by a circular system of fractures. It was at one time thought to be a fairly recent caldera (“recent” on a lunar time scale), evidence of relatively recent volcanic activity. That is no longer the paradigm and it is considered a good example a floor-fractured crater (FFC).

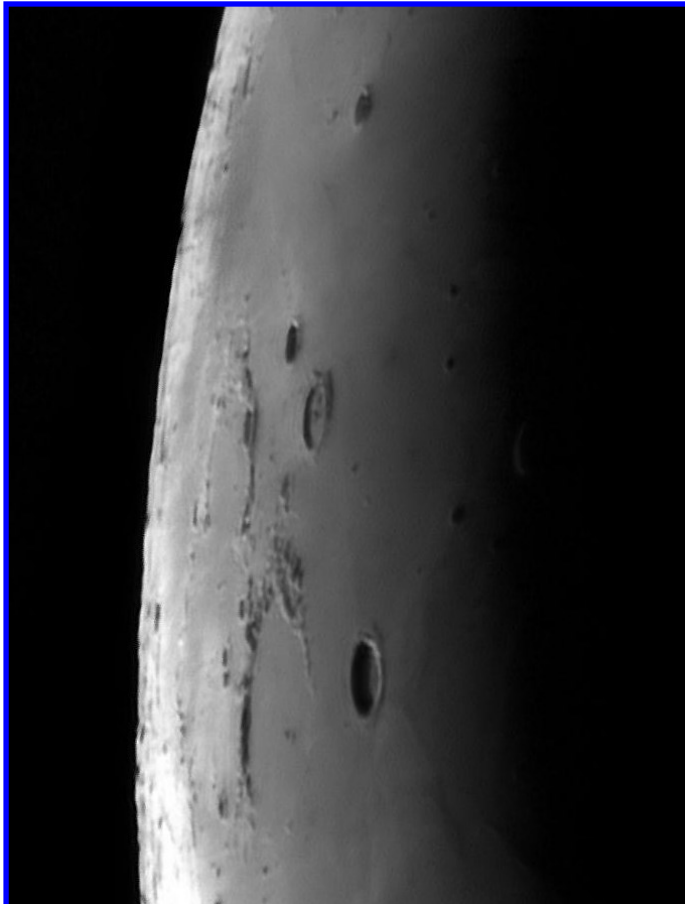
*Lacus Excellentiae,
Richard Hill, Tuc-
son, Arizona, USA.
18 March 2019 0415
UT, colongitude
53.0°, 8" f/20 Mak-
Cass, Skyris 445 m
camera, 610 nm fil-
ter, seeing 8/10.*



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Recent Topographical Observations

Sinus Iridum, Jairo Chavez, Popayán, Columbia.
11 September 2019, 0137 UT. 10" Dobsonian, MO-
TO ES PLAY.



Lichtenberg to Seleucus, Howard Eskildsen, Ocala,
Florida, USA. 26 September 2019, 1048 UT, colongi-
tude 240.0°. 6 inch f/8 refractor, Explore Scientific
lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS
camera. Seeing 5/10, transparency 4/6.

Recent Topographical Observations

17-day Moon

2019 September 16 0550 UT

Jerry Hubbell

Mark Slade Remote Observatory

Wilderness, VA W54

Explore Scientific 165 FPL-53 ED

16.5-cm APO Refractor

854 mm FL

f/5.16 FR

3-inch 0.7x FRFF

QHY 163C CCD TEC Camera

Seeing 7/10

Transparency 5/6

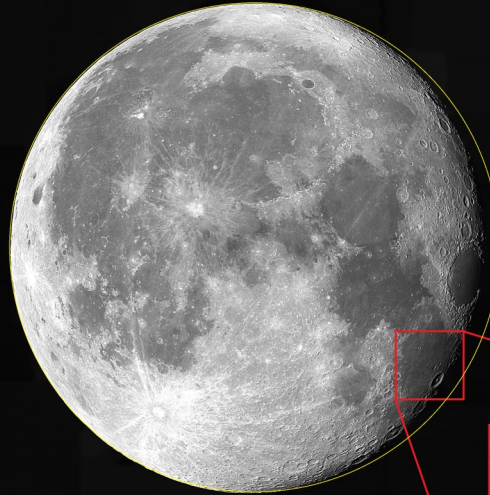
16 Mp Color Image Information

Full Resolution - 4656 x 3520 px

Plate Scale - 0.942 arc-sec/px

Field of View - 73.1 x 55.3 arc-min

Field of View - 1.22 x 0.92 degrees



Ephemeris: DE421

Observatory: +38°20' W77°46' Tz: -4h00m

Date: 2019-09-16 01:50:00

Date (TT): 2019-09-16 05:51:11

(J2000) Right Ascension: 01h04m44.02s

(J2000) Declination: +00°50'23.9"

(Date) Right Ascension: 01h05m44.86s

(Date) Declination: +00°56'44.1"

Distance: 399025Km

Apparent diameter: 29.95'

Colongitude: 115.9°

Phase: 337.4°

Lunation: 16.80 days

Illumination: 96.2%

Sub-solar latitude: 1.4°

Libration in Latitude: +07°08'

Libration in Longitude: -03°24'

Position angle: -22.5°

Azimuth +161°00'

Altitude +51°05'

Rise: 20h53m

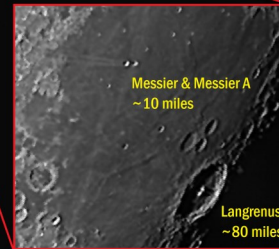
Transit: 2h38m

Set: 8h57m

Rise azimuth: +83°30'

Transit Altitude: +53°

Set azimuth: +27°35'



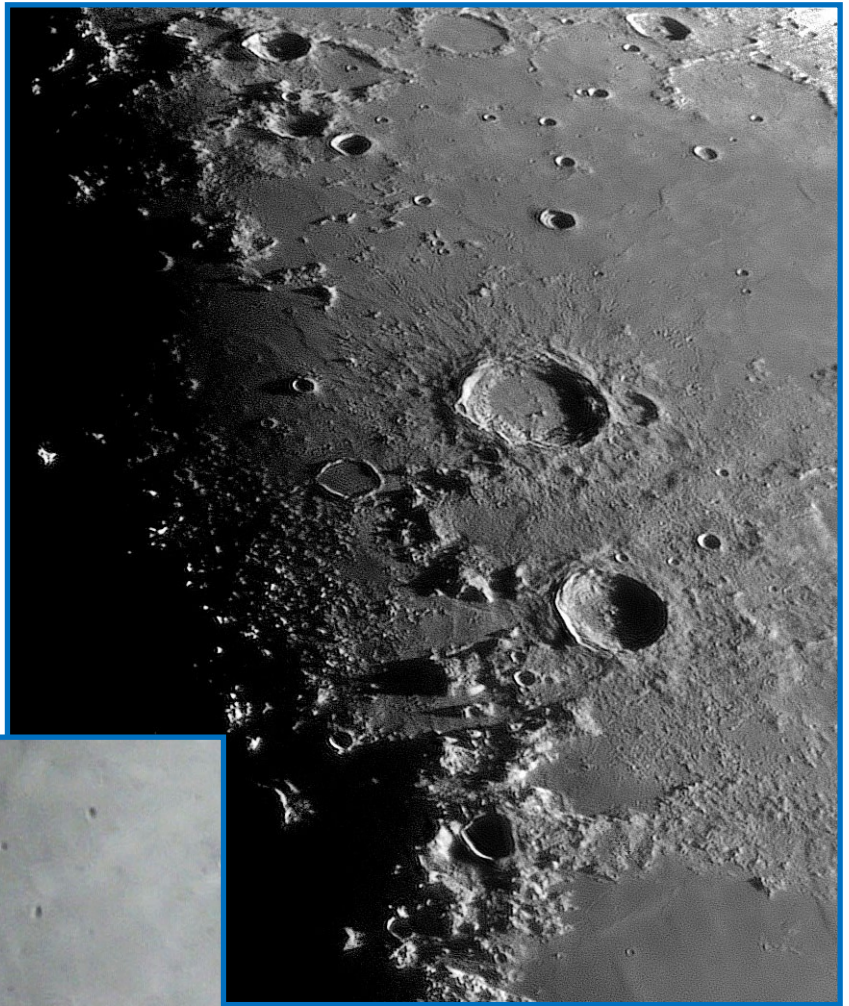
17 Day Old Moon, Jerry Hubbell, Wilderness, Virginia, USA. 16 September 2019 0550 UT. 16.5 cm Explore Scientific APO refractor, QHY163C TEC Color CMOS Camera. Seeing 7/10, transparency 5/6.

Plato, Jairo Chavez, Popayán, Columbia. 11 September 2019, 0136 UT. 10" Dobsonian, Sony DSC-WX50.



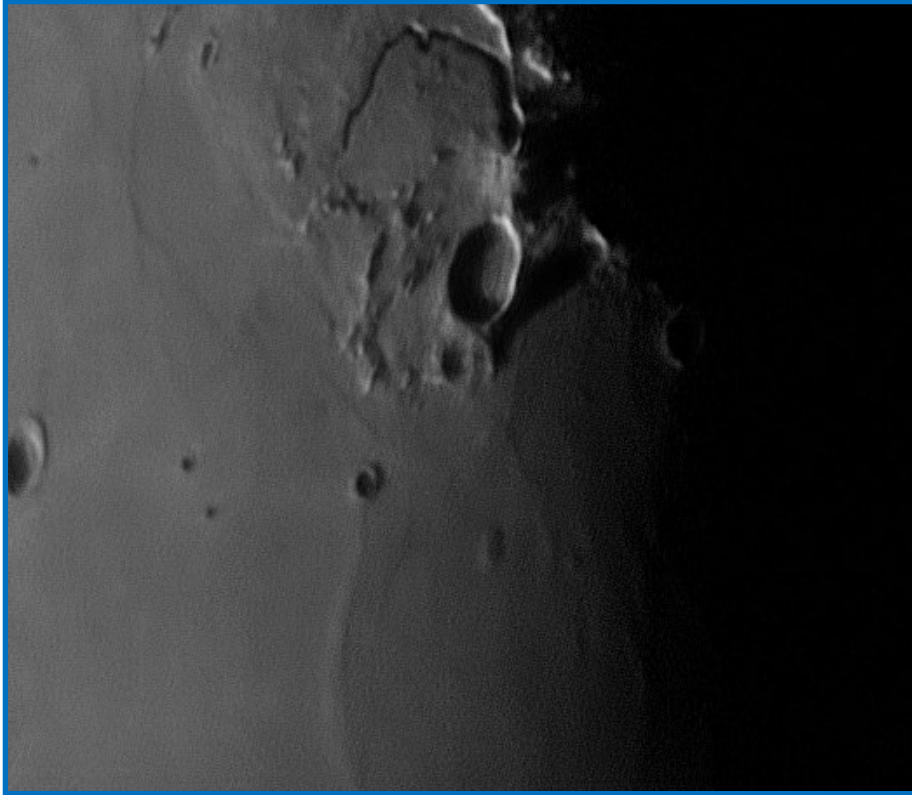
Recent Topographical Observations

Aristoteles to Eudoxus, Howard Eskildsen, Ocala, Florida, USA. 12 April 2019, 0032 UT. 6 inch f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 8/10, transparency 5/6.



Gutenberg, Jairo Chavez, Popayán, Columbia. 04 September 2019, 0005 UT. 10" Dobsonian, Sony DSC-WX50.

Recent Topographical Observations



Herodotus Omega, Howard Eskildsen, Ocala, Florida, USA. 25 September 2019 1006 UT. 6" f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Colongitude 227.4, seeing 7/10, transparency 6/6.

21 Day Moon, Jerry Hubbell, Wilderness, Virginia, USA. 20 September 2019 0846 UT. 16.5 cm Explore Scientific APO refractor QHY163C TEC Color CMOS Camera. Seeing 8/10, transparency 5/6.

21-Day Moon
 2019 September 20 0846 UT
 Jerry Hubbell
 Mark Slade Remote Observatory
 Wilderness, VA W54

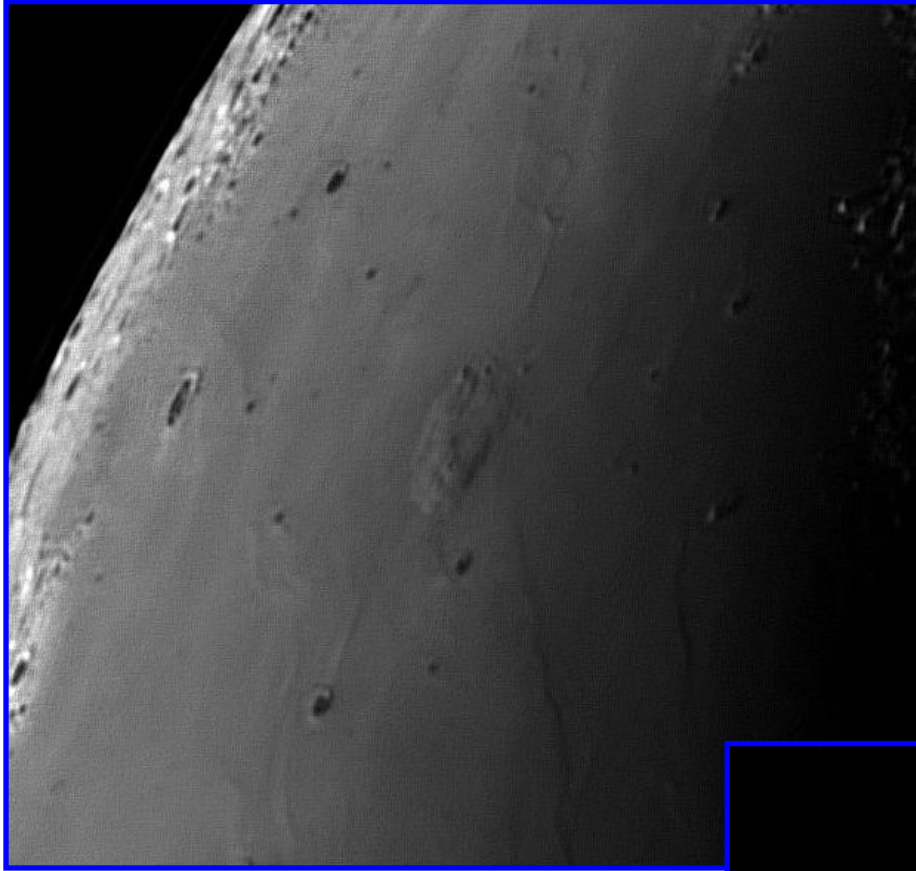
Explore Scientific 165 FPL-53 ED
 16.5-cm APO Refractor
 854 mm FL
 f/5.16 FR
 3-inch 0.7x FRFF
 QHY 163 CCD TEC Camera
 Seeing 8/10
 Transparency 5/6

16 Mp Color Image Information
 Full Resolution - 4656 x 3522 px
 Plate Scale - 0.942 arc-sec/px
 Field of View - 73.1 x 55.3 arc-min
 Field of View - 1.22 x 0.92 degrees

Ephemeris: DE421
 Observatory: +38°20' W77°46' Tz: -4h00m
 Date: 2019-09-20 04:46:00
 Date (TT): 2019-09-20 08:47:11
 (J2000) Right Ascension: 04h19m08.23s
 (J2000) Declination: +17°53'00.9"
 (Date) Right Ascension: 04h20m15.92s
 (Date) Declination: +17°55'46.5"
 Distance: 384811Km
 Apparent diameter: 31.05'
 Colongitude: 165.8°
 Phase: 291.1°
 Lunation: 20.92 days
 Illumination: 68.0%
 Sub-solar latitude: 1.5°
 Libration in Latitude: +04°25'
 Libration in Longitude: -06°50'
 Position angle: -8.5°
 Azimuth +148°40'
 Altitude +66°55'
 Rise: 23h05m
 Transit: 5h36m
 Set: 12h55m
 Rise azimuth: +63°49'
 Transit Altitude: +70°
 Set azimuth: +294°45'

1.22-degrees
0.92-degrees

Recent Topographical Observations



Mons Rümker, Howard Eskildsen, Ocala, Florida, USA. 25 September 2019 1008 UT. 6" f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 6/10, transparency 6/6.



Aristarchus, Jairo Chavez, Popayán, Columbia. 11 September 2019, 0134 UT. 10" Dobsonian, Sony DSC-WX50.

Recent Topographical Observations

25-Day Moon

2019 September 24 1028 UT

Jerry Hubbell

Mark Slade Remote Observatory
Wilderness, VA USA W54

16.5-cm APO Refractor

ES 165 FPL-53 ED CF

853mm FL f5.2

3-inch 0.7x FRFF

QHY163C TEC Camera

Seeing 5/10

Transparency 5/6

Aristarchus
Plateau

Gassendi G
~5 miles

Gassendi
Mare Humorum

Ephemeris: DE421

Observatory: +38°20' W77°46' Tz: -4h00m

Date: 2019-09-24 06:28:00

Date (TT): 2019-09-24 10:29:11

(J2000) Right Ascension: 08h13m57.11s

(J2000) Declination: +21°05'06.0"

(Date) Right Ascension: 08h15m04.34s

(Date) Declination: +21°01'31.2"

Distance: 363866Km

Apparent diameter: 32.84'

Colongitude: 215.8°

Phase: 240.4°

Lunation: 24.99 days

Illumination: 25.3%

Sub-solar latitude: 1.5°

Libration in Latitude: -01°38'

Libration in Longitude: -05°39'

Position angle: 14.2°

Azimuth +103°46'

Altitude +50°24'

Rise: 1h48m

Transit: 9h19m

Set: 16h44m

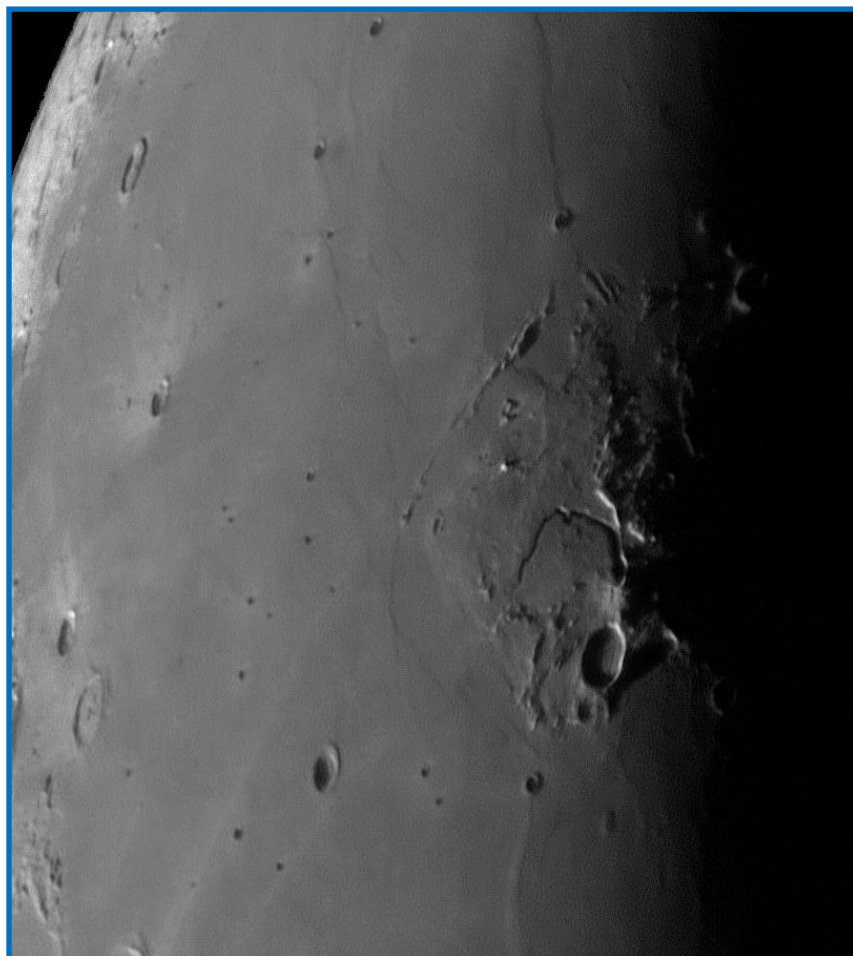
Rise azimuth: +61°56'

Transit Altitude: +73°

Set azimuth: +296°19'

25 Day Moon, Jerry Hubbell, Wilderness, Virginia, USA. 24 September 2019 1028 UT. 16.5 cm Explore Scientific APO refractor QHY163C TE Color CMOS Camera. Seeing 5/10, transparency 5/6.

Aristarchus Plateau, Howard Eskildsen, Ocala, Florida, USA. 25 September 2019, 1006 UT. Colongitude 227.4°. 6 inch f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 6/10, transparency 6/6.

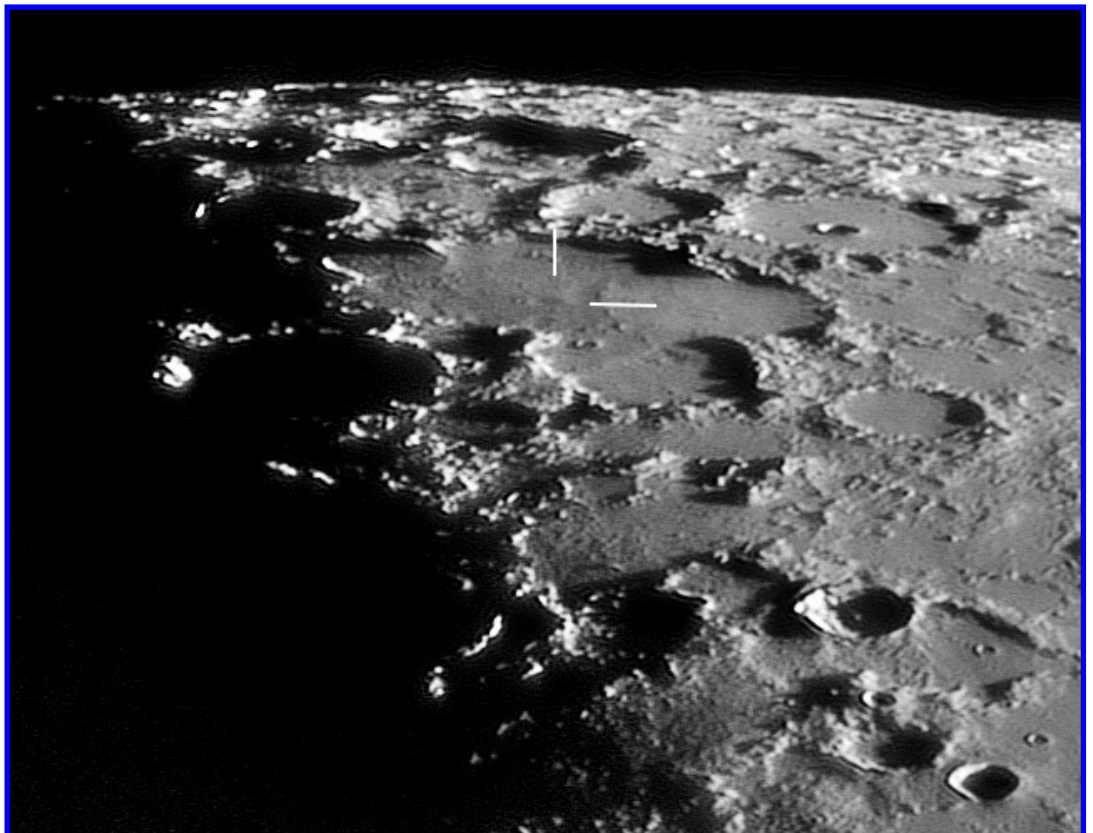


Recent Topographical Observations

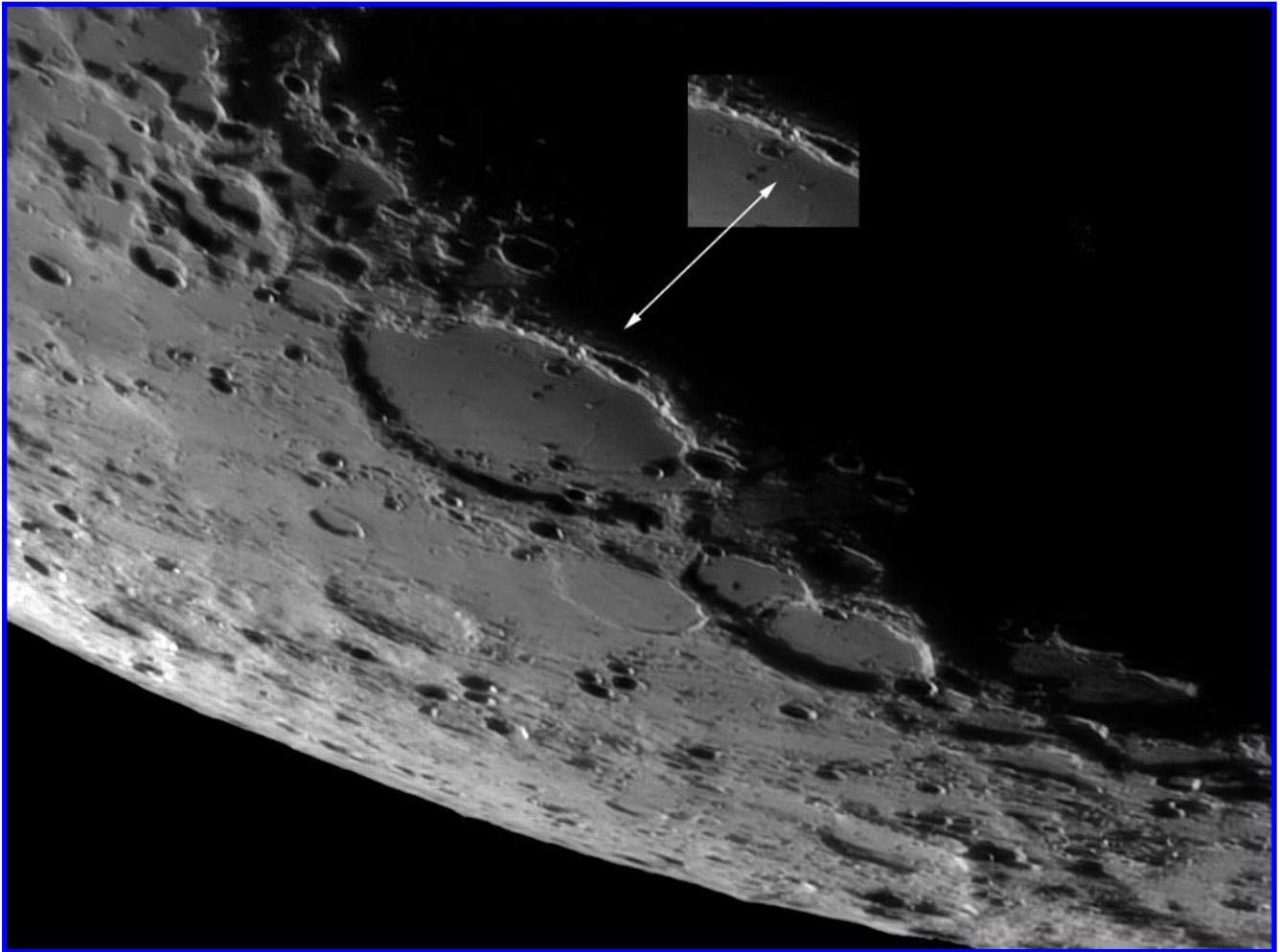


Marius Domes, Howard Eskildsen, Ocala, Florida, USA. 25 September 2019, 1005 UT. Colongitude 227.4°. 6 inch f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 6/10, transparency 6/6.

Meton 1 Dome, Howard Eskildsen, Ocala, Florida, USA. 12 April 2019, 0036 UT. 6 inch f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 8/10, transparency 5/6.

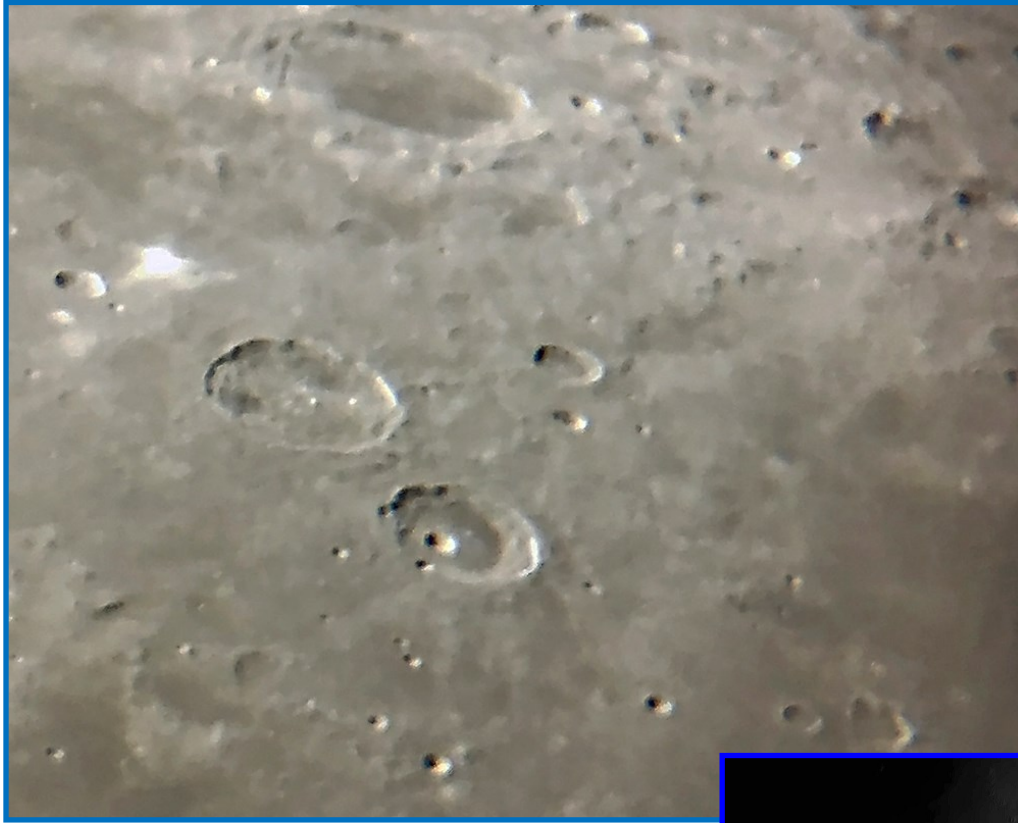


Recent Topographical Observations

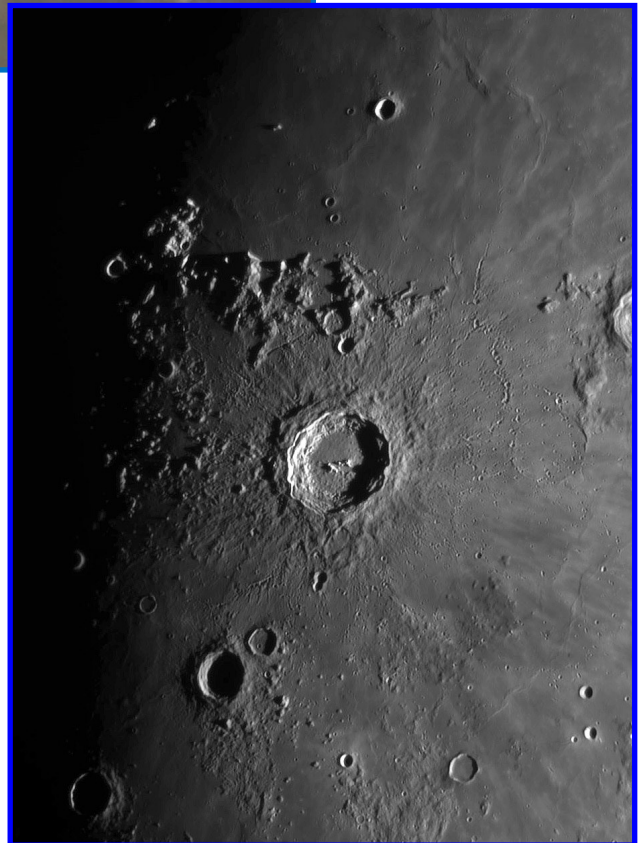


Schickard, Nasmyth, Phocylides and Wargentín, Howard Eskildsen, Ocala, Florida, USA. 25 September 2019 1002 UT, colongitude 227.4. 6 inch f/8 refractor, Explore Scientific lens, 2 x barlow, W-8 yellow filter, DMK 41AU02.AS camera. Seeing 6/10, transparency 6/6.

Recent Topographical Observations



Atlas and Hercules, Jay Albert, Lake Worth, Florida USA. 07 September 2019 0134 UT. Celestron 8" NexStar Evolution, iPhone camera, 7 mm orthoscopic eyepiece, Celestron NexYZ cellphone adaptor. Seeing 5-6/10, hazy skies.



Copernicus, David Teske, Louisville, Mississippi, USA. 14 May 2019 0323 UT, colongitude 25.2°. Seeing 7/10 180 mm Mewlon, ZWO ASI120mms camera, Firecapture, Registax, Photoshop.

Remember the Focus-On for next month includes images, drawings, and reports of Atlas and Copernicus. Please get your observations into Jerry Hubbell (jerry.hubbell@alpo.astronomy.org) and David Teske (david.teske@alpo-astronomy.org) by October 20, 2019.

LUNAR GEOLOGICAL CHANGE DETECTION PROGRAM

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

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

2019 October

Reports have been received from the following observers for Aug: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Aristarchus, Grimaldi, Plato and Vallis Schröteri. Alberto Anunziato (Argentina – SLA) observed Burg, Geminus, Rheita, and Theophilus. Maurice Collins (New Zealand – ALPO/BAA/RASNZ) observed several features, including Theophilus. Walter Elias (Argentina – AEA) imaged: Conon, Copernicus, Macrobius, Montes Apenninus, Plato, Proclus, Tycho and several features. Rik Hill (Tucson, AZ – ALPO/BAA) imaged several features. Thierry Speth (France) imaged Alphonsus, Aristarchus, Gassendi, Herschel, and Pythagoras. Bob Stuart (Rhayader, UK – BAA) imaged Anaximander, Aristarchus, Harpalus, Herschel, Prinz, Sharp, Sinus Iridum, and several Features. Franco Taccogna (Italy – UAI) imaged the crescent Moon, Ivor Walton (Codnor, UK – BAA) imaged several features.

News: Unfortunately, India's Vikram lander, sent to the Moon with the orbiter [Chandrayaan-2](#), appears to have deviated from its intended trajectory just a few hundred metres above the surface, and then contact was lost. It may have hard landed at a speed which was outside its specifications. It is reported that thermal images from Chandrayaan-2 seem to show the lander lying on its side, but the images confirming this have not been released and I would be surprised if thermal IR images had sufficient resolution to determine this? NASA's [LRO](#) orbiter has tried to image the area but it was mostly in shadow. Despite attempts by the Indian Space Agency to contact the lander, it has not responded. Space is a risky business!

LTP reports: No LTP were observed in Aug. But there were some reports from Sep. Having lived in London many, many years ago, there is a saying that "London busses all arrive at once" – in other words you wait some considerable length of time at a bus stop, then maybe 2 or 3 buses arrive in the space of a few minutes. Then you get another big gap in time, and so on. Well in September something similar happened with LTP/Impact flash candidates.

On 2019 Sep 02 UT 22:45:36 Marcello Zurita (Joao Pessoa, Paraiba, Brazil – APA/BRAMON/SAB) videoed a flash on the Moon's night side, through cloud, somewhere in the vicinity of Mare Nubium. Unfortunately, the precise position could not be determined due to lack of visibility of features in Earth-shine. They were using a Skywatcher 130mm f/5 scope with a 15CC22 camera and a Dazzle HD capture device. Alas nobody else was observing at the time, so it could be a cosmic ray air shower decay particle that by coincidence struck the camera whilst it was pointed at the Moon.

On 2019 Sep 06 UT 21:44 Trevor Smith (BAA) observing on vacation from near to Great Yarmouth, UK, saw a very bright spot on the SW rim of Adams D crater - at first sight it looked perhaps raised above the lunar background, but this was just simply due to its brightness. It was by far the brightest object on the NW quadrant of the Moon. In terms of brightness it was almost but not quite bright as Proclus, but only half the size of Proclus. No color was seen to the spot. The spot was not emitting any false color, there was no change in appearance, and there was no ray structure visible either. Observations ceased when the Moon got too low. Trevor was using a 90 mm Maksutov, x80, under Antoniadi IV seeing. This is probably a normal appearance, but I would like to check this out so have given it a provisional ALPO/BAA weight of 1.

Then finally a really interesting set of images were received from Kevin Kilburn (BAA) on 2019 Sep 13 UT 23:26. Kevin was patiently taking a sequence of eleven Canon 550 color DSLR images of the Moon through an ED80 refractor with a x2 Barlow, over a 2-minute session. On the 4th image, a bright blue-green spot can be seen on the west rim of the 15km diameter Galvani B (89.0W, 49.5N). You can see this clearly in Fig 1 and the brightness is 50%-40% above the normal brightness in green and blue channels respectively, but in the red it is within 10% of the background, i.e. in the noise limit.

I painstakingly took the images that Kevin sent me (Fig 2a-k) and affine transformed them (registered) them to some 8 landmarks that were present in a sharper image (Fig 2l) taken later that night by Bob Stuart (BAA). The time sequence in Fig 2 at first sight appears to show the flash and then in the subsequent image a “plume”-like effect, and possibly in a few subsequent images too. However, upon viewing these in a movie I generated, it looks like the first appearance of the plume coincides with some camera/wind shake as other plume-like features can be seen at other locations along the limb. The case for the plume is not so strong in other images and might just be either further shake or image noise.

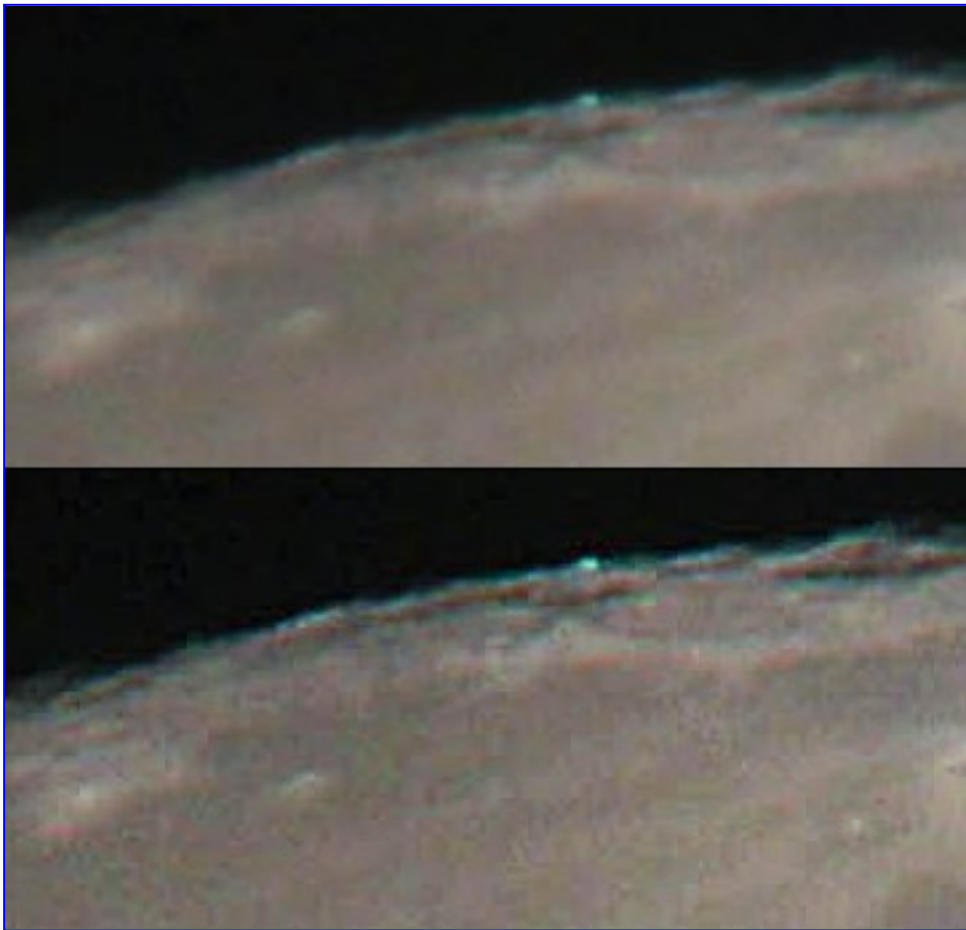


Figure 1. An image by Kevin Kilburn (BAA) showing a bright green-blue spot on the western rim of Galvani B crater. North is towards the top right. Taken on 2019 Sep 13 UT 21:26. **(Top)** The original color image. **(Bottom)** A sharpened view of the color image).

So, what should we make of this effect? There are four possible theories: (a) It is an impact flash – however the color is possibly too blue for this – if we assume blackbody spectral emission then we are probably (I haven't done any calibration) talking about a temperature of well in excess of 10,000K in order to achieve this blueness. Published impact flash measurements with ESA's [NEOLITA](#) telescope in Greece have a range of 1620-3000K – so this would have to be an unusually hot impact – which seems unlikely. (b) Some sort of LTP – perhaps a form of mechanoluminescence if a shallow quake/landslide resulted in the fracture of, or rubbing together of, rocks? Unfortunately, this is all rather speculative as the amount of energy released would have to outshine sunlight to be seen against the illuminated part of the Moon. Interestingly an impact crater situated on the inner western slopes of Galvani B, does actually show evidence of past landslides (Fig 3 – Bottom) – however how geologically recent these are is anybody's guess. (c) It is merely a cosmic ray air-shower event where some high energy particle struck the blue and green filter pixels of the [Bayer color filter matrix](#) more so than it struck red filters – this gives rise the blue-green cast. Cosmic ray events in cameras do not just affect single pixels, but can be spread out over several. It is quite a coincidence though that it hit the brightest part of Galvani B crater? (d) It is just an atmospheric scintillation effect where by in Fig 2d the seeing was sufficiently sharp to concentrate the light from the Galvani B interior bright craterlet, onto a small number of pixels – and possibly due to the Bayer Color filter matrix, the maximum amount of light then ended up on the blue and green filter pixels. Good seeing does not happen often hence why it does not appear so bright in any of Kevin's other images. In case you are wondering why it does not show up so bright in Bob's image, well Bob was imaging the area almost 4 hours later, under slightly different illumination, at much higher resolution and was working in monochrome light. N.B. Since I wrote this newsletter for the BAA Lunar Section Circular, I have discovered that Bob sent me some additional detailed images he took much closer to Kevin's time, taken at 21:14-21:20UT. These show the plume-like effect is just normal topography – however the bright spot is not visible 6 min prior to Kevin's image?

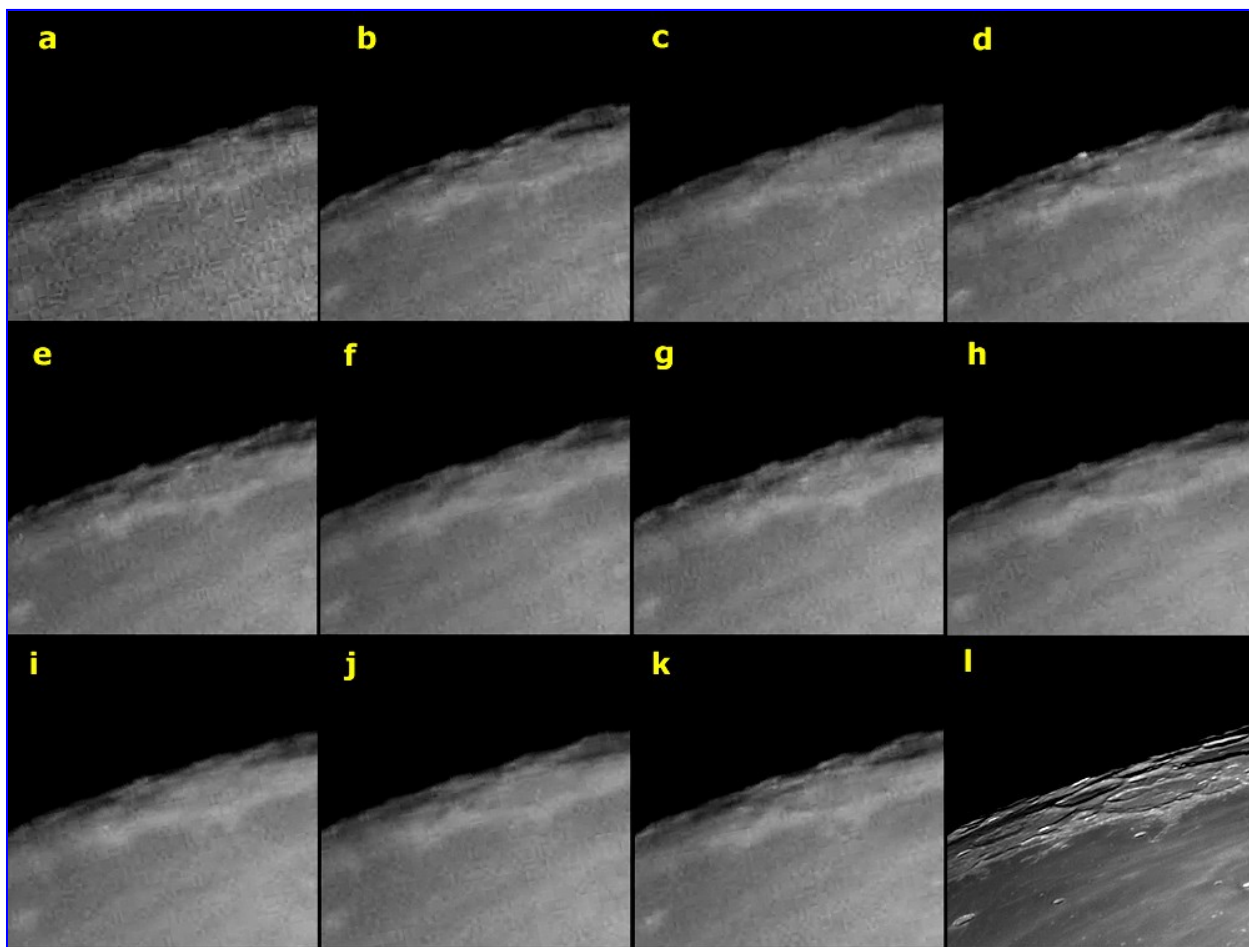


Figure 2. The Galvani B area of the Moon with north towards the top right – all images are effectively monochrome in this figure. **(a)-(k)** An image sequence, taken on 2019 Sep 13 UT 21:25-21:27, by Kevin Kilburn (BAA). In (d) a bright spot can be seen on the western rim of Galvani B. **(i)** An image of the area taken on 2019 Sep 14 UT 01:08 by Bob Stuart (BAA) at higher resolution.

Although I have not fully fathom what Kevin imaged, I suspect that in order of “least” likely to “most” likely the theories run from (b) à (a) à (c) à (d), but to be sure we will give this report an ALPO/BAA weight of 2 (since I came across Bob’s earlier images), and see if it reoccurs under similar illumination and topocentric libration. We need to try using similar equipment and resolution.

Routine Reports: Below are a selection of reports received for Aug that can help us to re-assess unusual past lunar observations – if not eliminate some, then at least establish the normal appearance of the surface features in question.

Earthshine: On 2019 Aug 02 UT 18:47, 18:48, 18:40 Franco Taccogna (UAI) attempted to image Earthshine to see if he could detect a brightness to the western limb of the Moon that is described in the [Lunar Schedule](#) web site:

BAA Request: Please try to image the Moon as a very thin crescent, trying to detect Earthshine. A good telephoto lens will do on a DSLR, or a camera on a small scope. We are attempting to monitor the brightness of the edge of the earthshine limb in order to follow up a project suggested by Dr Martin Hoffmann at the 2017 EPSC Conference in Riga, Latvia. This is quite a challenging project due to the sky brightness and the low altitude of the Moon. Please do not attempt if the Sun is still above the horizon. Do not bother observing if the sky conditions are hazy.



Figure 4. The Crescent Moon, over exposed to attempt to highlight earthshine. Taken by Franco Taccogna (UAI). A combination of two images taken on 2019 Aug 02 UT 1847 & 18:48. **(Left)** The combined image. **(Right)** a Gaussian blurred version to reduce image noise.

Attempting this lunar schedule request can be a bit problematic as it depends upon sky conditions – Franco has tried his best to capture some earthshine under the specified illumination conditions, but too much haze or too many particles in the atmosphere, greatly hinders the chances of detecting the limb effect that Prof Hoffmann is interested in. We shall keep on trying to observe this effect. Please check when to observe on the lunar schedule web site: http://users.aber.ac.uk/atc/lunar_schedule.htm

Conon: On 2019 Aug 10 UT 23:46 Walter Elias (AEA) imaged the area under similar illumination to:

Conon 1941 Feb 07 UT 03:00? Observed by Vaughn (Des Moines, Iowa, 3" reflector) "Faint bright spot on floor, no definite outline (??? reported 6th, but if local time 7th in UT)" NASA catalog weight=3. NASA catalog ID #484. ALPO/BAA weight=1.



Figure 5. Conon on 2019 Aug 10 UT 23:46 as imaged by Walter Elias (AEA) and orientated with north towards the top.

As you can see from Walter's image in Fig 5, there are a couple of faint white spots on the floor of Conon – they are just sunward facing slopes of hummocky terrain visible on the floor. Whether these relate to the described LTP is uncertain, but at least we know two faint light spots should be visible if the date in 1941 is correct. I'll leave the weight at 1 for now.

Aristarchus: On 2019 Aug 12 UT 03:40 Rik Hill (ALPO/BAA) imaged this region under similar illumination, to within $\pm 0.5^\circ$, to the following BAA report:

Aristarchus 1975 Dec 14/15 UT 17:05-00:30 Observed by Foley (Dartford, England, 12" reflector, S=II) and Moore (Sussex, UK, 15" reflector x250 S=IV) and Argent and Brumder (Sussex, UK). In early sunrise conditions, W. wall was less brilliant than usual -- matched only by Sharp, Bianchini, & Mairan. Extraordinary detail could be seen on this wall. Also noted intense & distinctly blue color entire length of W. wall. 3 others corroborated detail, but not color. Moore found things normal & saw Aris. brightest at 2030-2125h tho Argent & Brumder made it < Proclus" NASA catalog weight=4. NASA Catalog ID #1422. ALPO/BAA weight=1.

As you can see from the inset view of Aristarchus in the top left of Fig 6, there certainly is quite a lot of detail on the west wall of Aristarchus. Interestingly it is brighter than Mairan at the top right of Fig 6. Perhaps a change of another 0.5° in illumination (within our tolerance), might make some difference to the relative brightness of these two craters, making them more comparable? Note that Rik was using a red filter, and as Aristarchus has a blue cast it might have been even brighter in visible light. For now, I shall leave the weight at 1, but at least we have solved the "lots of detail" issue – it is normal to see this on the illuminated rim of Aristarchus.

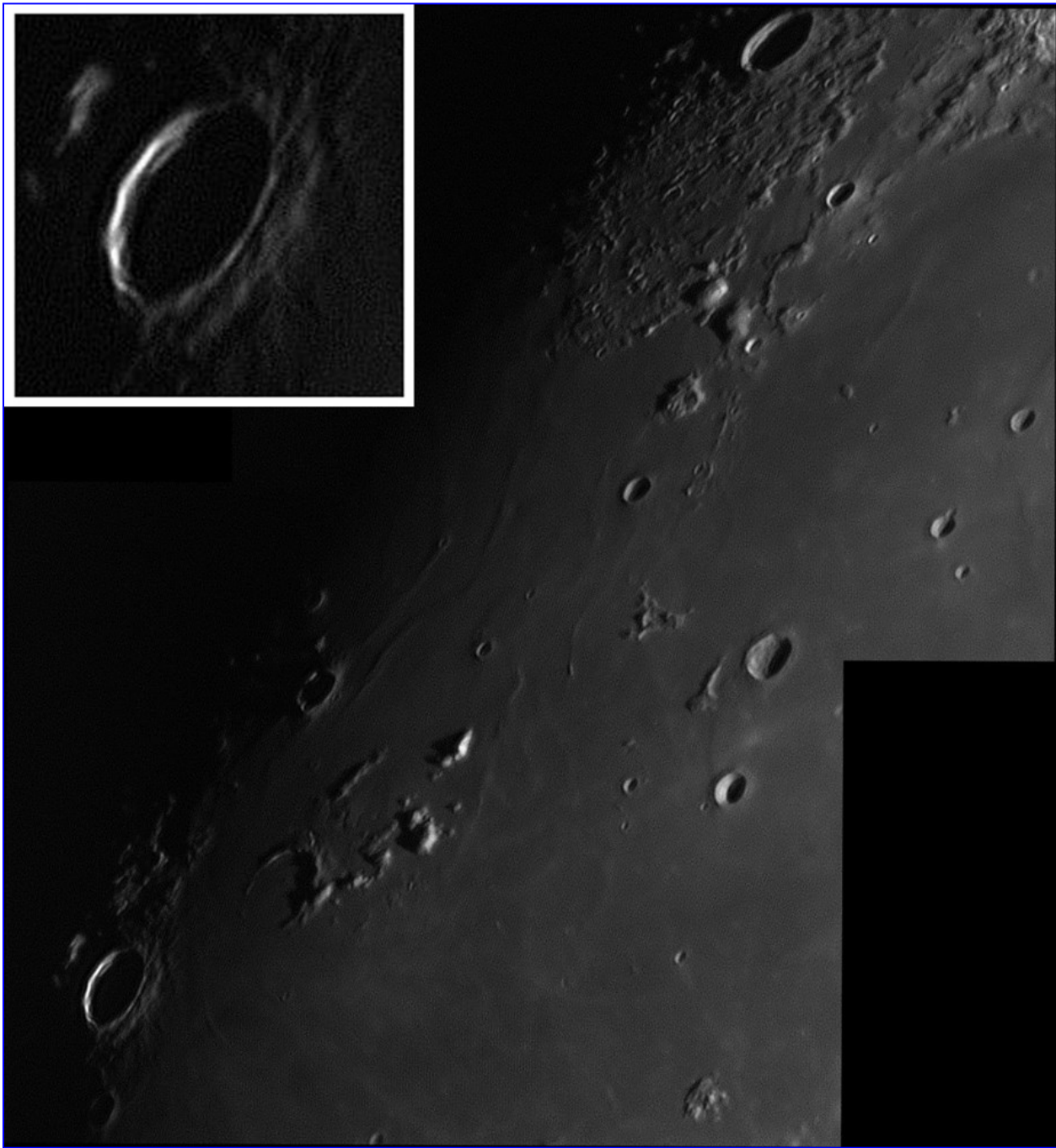


Figure 6. Aristarchus to Mairan region of the Moon, orientated with north towards the top. Imaged by Rik Hill (ALPO/BAA) on 2019 Aug 12 UT 03:40 using a filter centred on 510nm in red light. In the top left corner in an enlargement of Aristarchus.

Geminus: On 2019 Aug 18 UT 02:20-02:40 Alberto Anunziato (SLA) observed visually and sketched this crater as both the illumination and topocentric libration (viewing angle) matched to within $\pm 1^\circ$, to the following report:

On 2011 Jan 21 at 22:30UT N. Longshaw (UK, 4" Achromatic refractor, x128 & x160, Seeing III, transparency average) suspected on the eastern edge of Geminus, on the border of the crater filled shadow and the eastern illuminated rim, a brownish, almost sepia hue. This extended for a short distance from the floor shadow into the illuminated rim width and spanned from the north to the south of the crater. For a comparison, Cleomedes was checked but nothing unusual was noticed in its shadow. The observer notes that Elger also saw a warm brown or sepia tone. ALPO/BAA weight=1.

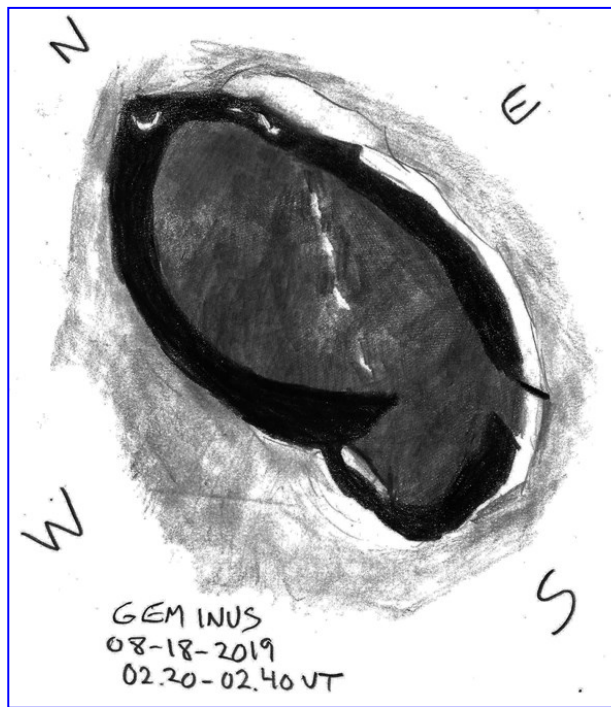


Figure 7. Geminus as observed by Alberto Anunziato on 2019 Aug 18 UT 02:20-02:40 and orientated with north towards the top left.

Alberto, was using a Meade EX 105 telescope at x154 and concentrated on drawing (Fig 7) the shadows and bright parts of the crater, he could not observe color in the area indicated by Longshaw. The only unusual feature was the dark shading of the crater floor, darker than Schumacher B. We shall leave the Longshaw report at a weight of 1, as color has not been re-observed.

Alphonsus: On 2019 Aug 21 UT 21:47-21:46 Thierry Speth (BAA) imaged Alphonsus in color under similar illumination, to within $\pm 0.5^\circ$, to the following report:

Alphonsus 1964 Oct 27 UT 05:18-06:10 Observed by Hall, Johnson, Weresulk (Pt. Tobacco, MD, USA, 16" reflector x400, S=5-7). "Red spot. Pink glow detected with Trident MB & seen visually too." NASA catalog weight=5. NASA catalog ID #863. ALPO/BAA weight=5.

As you can see in Thierry's image there is no obvious sign of a red spot, despite color normalisation and an increase in saturation. As the device that Hall *et al*, used had filters and a monochrome camera system it should be very reliable at detecting colors and immune from atmospheric spectral dispersion and chromatic aberration. Fig 8 shows that it is not normal to see a red spot here, so therefore whatever was seen in 1964 remains unexplained and will keep an ALPO/BAA weight of 5.



Figure 8. Alphonsus as imaged on 2019 Aug 21 UT 21:47-21:46 by Thierry Speth (BAA) and orientated with north towards the top. Image processing: 1) image color normalised sharpened, 2) color saturation increased to 65% and 3) then image noise reduced by Gaussian smoothing.

Plato: On 2019 Aug 22 UT 06:30-06:45 Jay Albert (ALPO) observed visually this crater under similar illumination and topocentric libration (viewing angle), to within $\pm 1^\circ$ to the following LTP report from the Cameron 2006 catalog:

On 1982 Aug 11 at UT03:30-04:15 Mobberley (Suffolk, UK) obtained a photograph and made a sketch that revealed a needle-like shadow from the west wall to nearby the central craterlet - the latter was quite clearly visible. What were not visible were the other four craterlets. The Cameron 2006 catalog ID=183 and weight=4. The ALPO/BAA weight=2.

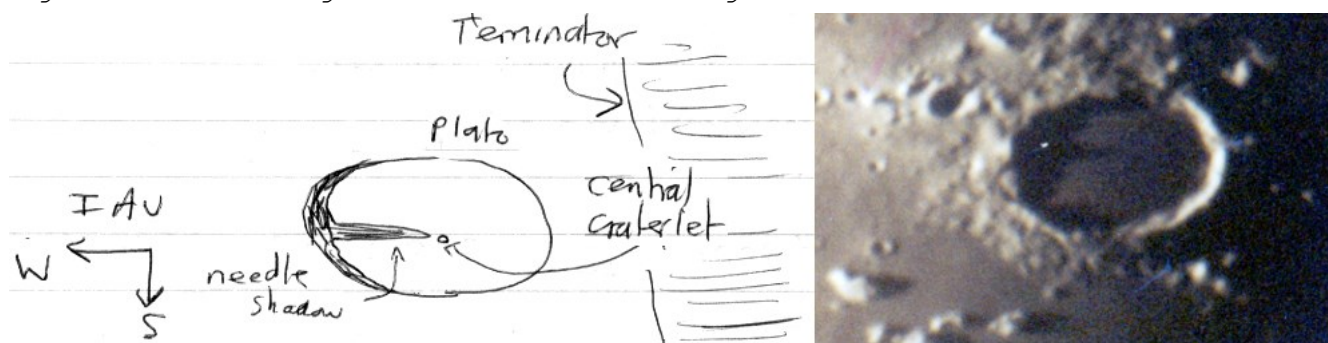


Figure 9. Plato as observed by Martin Mobberley (BAA) on 1982 Sep 11 and orientated with north towards the top. **(Left)** A sketch made at 03:30UT – the labels have been reoriented. **(Right)** A color photograph taken at 03:35UT. This has been color normalized, had its color saturation increased to 25% and then non-linearly contrast stretched so that some shadow detail can be seen on the crater floor. The white dot in the shadow on the floor is a photographic artefact.

Jay noted that in fact there was no “needle-like shadow” from the West wall. Only a short, somewhat rounded shadow was visible from the West wall pointed to the central craterlet, but was clearly nowhere “close to it”. The central craterlet, along with the North pair and the South craterlet were seen, although the North pair was a bit difficult. There was only a little shadow left hugging the interior West wall and the West landslip was sharply outlined in black. Jay’s report struck a note of caution in my mind – how could the Mobberley report and Jay’s observation be so different? I checked the Cameron catalog to make sure I had copied the date correctly and it said 1982 Aug 11. So, I then checked the ALPO/BAA archive, but could find no such observation on Aug 11. Instead I found the exact same description in a report from Martin Mobberley from 1982 Sep 11 – so this was a bug in the Cameron catalog which I shall now fix. Just out of curiosity in Fig 9 are a sketch and photograph of Plato by Martin Mobberley from 1982 Sep 11. Martin had been observing with his 14” Cassegrain under Antoniadi II seeing (good) with occasional I (very good), and so was clearly surprised at the non-visibility of the other craterlets. His transparency was good-very good. Contrast this with Jay’s observation made under transparency conditions which only allowed the visibility of magnitude 2 stars and seeing 8/10 – where several craterlets were actually visible – although we have discovered now that the illumination was different. Jay was using an 8” SCT scope. We clearly need repeat illumination/viewing angle observations to settle Martin Mobberley’s report once and for all, as to whether it was unusual.

Promontorium Laplace: On 2019 Aug 25 UT 05:22 Bob Stuart imaged the whole Moon, and although he was 1h 10m past a repeat illumination event window, we can still learn something from his image:

On 1989 Jun 28 at UT 08:39--9:00 D. Darling (Sunpraire, WI, USA, 3" refractor, x36) noted that Promontorium LaPlace was very bright. LaHire brightness was 7.0 and LaPlace was 7.5. Darling suspects that this was not a LTP because "as did not have mother-of-pearl appearance as seen on Piton at times. The Cameron catalog ID=369 and the weight=0. The ALPO/BAA weight=1.



Figure 10. Part of a whole Moon image taken by Bob Stuart (BAA) on 2019 Aug 25 UT 05:22 and orientated with north towards the top. The image has been non-linearly contrast stretched to bring out detail towards the terminator. **(Left)** Monochrome image. **(Right)** Same image but thresholded so that the brightest features ($> \text{DN}=110$) show up in red. A small red dot is just visible on Promontorium Laplace.

Fig 10 tells us that indeed Promontorium Laplace is bright (in an absolute sense), but so too are Aristarchus and several other features, especially the western limb. In a relative sense, with respect to the surroundings, Promontorium Laplace does appear quite bright. In terms of absolute brightness Promontorium Laplace has a digital number value (DN) of 191, Mons La Hire has a DN=75, Aristarchus has a DN=169. The western limb has a range of bright values due to the far side highlands; an example is 233. I think the issue here is when saying that something looks to be the brightest feature on the Moon, visually, one is referring the object to its background, and in the case of Promontorium Laplace, the background to the east is the night side of the Moon, hence to the eye it will look exceedingly bright. I will therefore lower the weight of the 1989 report from 1 to 0, effectively removing it from the ALPO/BAA LTP catalog and agreeing with the original interpretation by David Darling before it ended up in the Cameron catalog.

General Information: 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> .

Dr Anthony Cook, Department of Physics, Aberystwyth University, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc@aber.ac.uk

SUBMISSION THROUGH THE ALPO IMAGE ARCHIVE

ALPO's archives go back many years and preserve the many observations and reports made by amateur astronomers. ALPO's galleries allow you to see on-line the thumbnail images of the submitted pictures/observations, as well as full size versions. It now is as simple as sending an email to include your images in the archives. Simply attach the image to an email addressed to

lunar@alpo-astronomy.org (lunar images).

It is helpful if the filenames follow the naming convention :

FEATURE-NAME_YYYY-MM-DD-HHMM.ext

YYYY {0..9} Year

MM {0..9} Month

DD {0..9} Day

HH {0..9} Hour (UT)

MM {0..9} Minute (UT)

.ext (file type extension)

(NO spaces or special characters other than “_” or “-”. Spaces within a feature name should be replaced by “-”.)

As an example the following file name would be a valid filename:

Sinus-Iridum_2018-04-25-0916.jpg

(Feature Sinus Iridum, Year 2018, Month April, Day 25, UT Time 09 hr16 min)

Additional information requested for lunar images (next page) should, if possible, be included on the image. Alternatively, include the information in the submittal e-mail, and/or in the file name (in which case, the coordinator will superimpose it on the image before archiving). As always, additional commentary is always welcome and should be included in the submittal email, or attached as a separate file.

If the filename does not conform to the standard, the staff member who uploads the image into the data base will make the changes prior to uploading the image(s). However, use of the recommended format, reduces the effort to post the images significantly. Observers who submit digital versions of drawings should scan their images at a resolution of 72 dpi and save the file as a 8 1/2"x 11" or A4 sized picture.

Finally a word to the type and size of the submitted images. It is recommended that the image type of the file submitted be jpg. Other file types (such as png, bmp or tif) may be submitted, but may be converted to jpg at the discretion of the coordinator. Use the minimum file size that retains image detail (use jpg quality settings. Most single frame images are adequately represented at 200-300 kB). However, images intended for photometric analysis should be submitted as tif or bmp files to avoid lossy compression.

Images may still be submitted directly to the coordinators (as described on the next page). However, since all images submitted through the on-line gallery will be automatically forwarded to the coordinators, it has the advantage of not changing if coordinators change.

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 (use month name or specify mm-dd-yyyy-hhmm or yyyy-mm-dd-hhmm)

Filter (if used)

Size and type of telescope used Magnification (for sketches)

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

Resolution appropriate to the image detail is preferred-it is not necessary to 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:

David Teske – david.teske@alpo-astronomy.org

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

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

Hard copy submissions should be mailed to David Teske at the address on page one.

CALL FOR OBSERVATIONS: FOCUS ON: Atlas & Copernicus

Focus on is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **November 2019** edition will be the Atlas & Copernicus regions. 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 these features to your observing list and send your favorites to (both):

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

David Teske – david.teske@alpo-astronomy.org

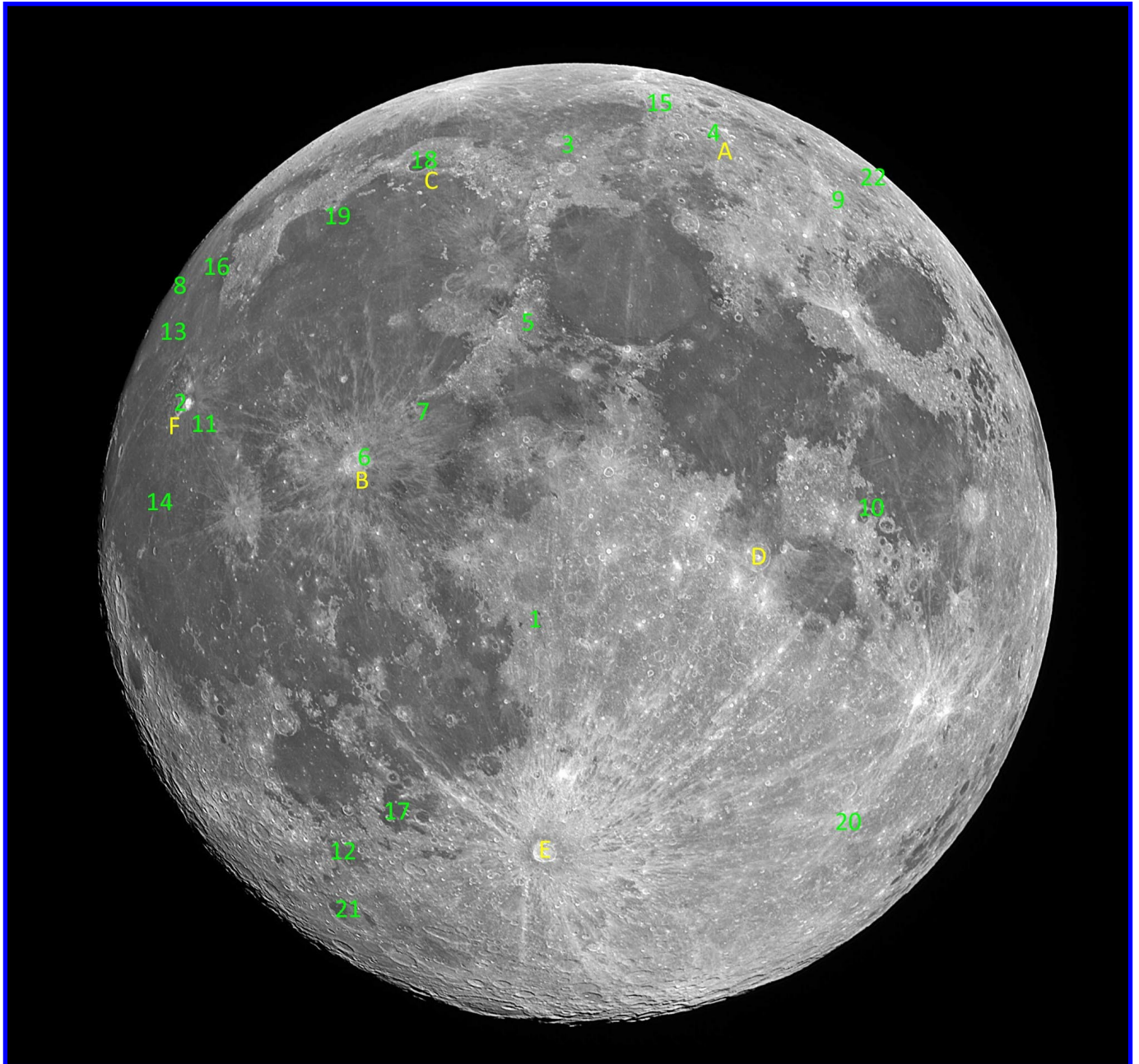
Deadline for inclusion in the Atlas and Copernicus region article is October. 20, 2019

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for contributors the following future targets have been selected: The next series of three will concentrate on subjects of the Selected Areas Program.

<u>Subject</u>	<u>TLO Issue</u>	<u>Deadline</u>
Atlas & Copernicus	November 2019	October 20, 2019
Plato & Theophilus	January 2020	December 20, 2019
Tycho & Herodotus	March 2020	February 20, 2020

Key to Images In This Issue



- | | |
|---------------------------|--------------------------|
| 1. Alphonsus | 12. Lacus Excellentiae |
| 2. Aristarchus | 13. Lichtenberg |
| 3. Aristoteles to Eudoxus | 14. Marius Domes |
| 4. Atlas | 15. Meton |
| 5. Conon | 16. Mons Rumker |
| 6. Copernicus | 17. Palus Epidemiarum |
| 7. Eratosthenes | 18. Plato |
| 8. Galvani | 19. Promontorium Laplace |
| 9. Geminus | 20. Rheita E |
| 10. Gutenberg | 21. Schickard |
| 11. Herodotus Omega | 22. Schumacher B |

Upcoming Focus-On targets:

- A. Atlas
- B. Copernicus
- C. Plato
- D. Theophilus
- E. Tycho
- F. Herodotus