BAA
British Astronomical Association
Lunar Section

Director: Dr.Anthony Cook.
Editor: Barry Fitz-Gerald.

LUNAR SECTION CIRCULAR
Vol. 62 No.9 September 2025

THE MOON

VOL. 4. No I.

SEPTEMBER 1955.

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1951 MARCH 18 22 HRS.

18" Reflector × 360

F. H. Thornton.

LUNAR SECTION CIRCULAR
Vol. 62 No.9 September 2025.

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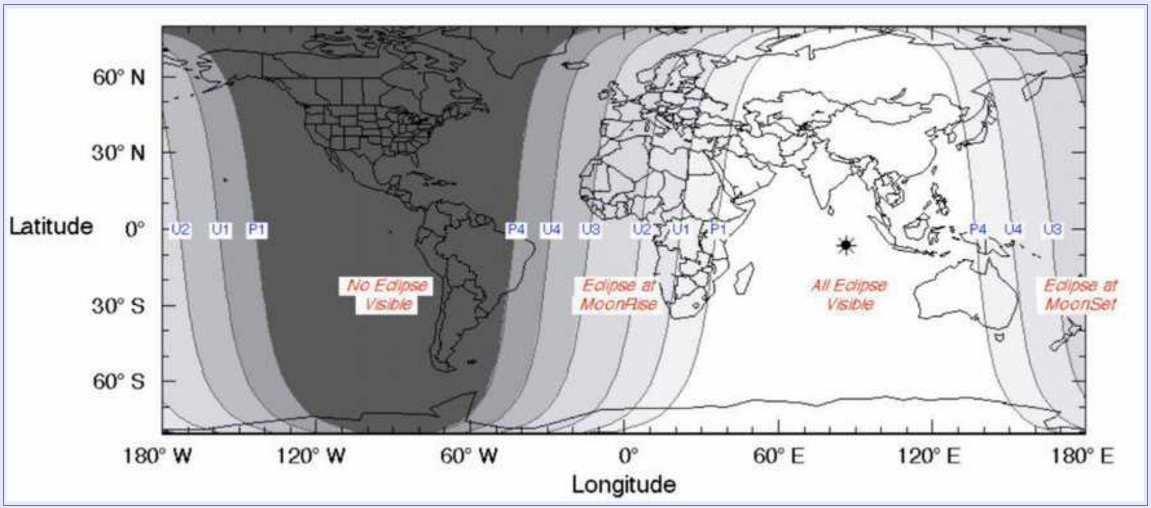
*Cover image from The Moon, Vol.4 No.1 September 1955.

FROM THE DIRECTOR by Tony Cook.



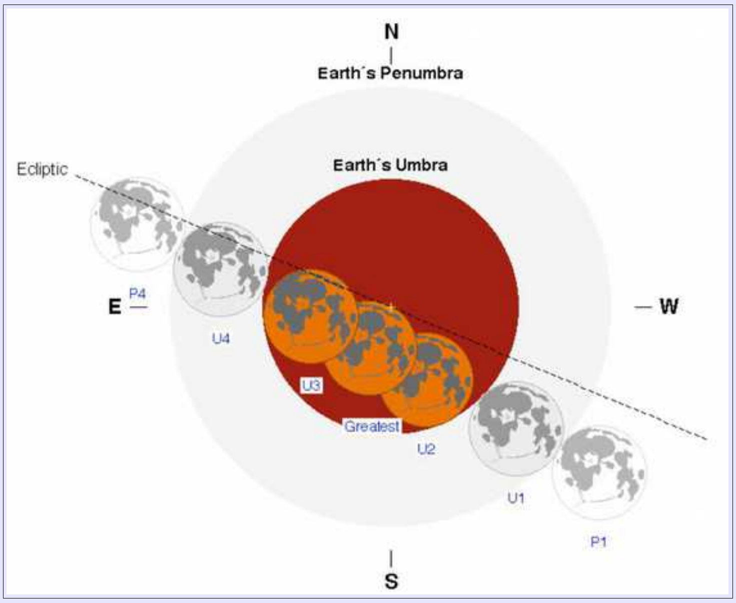


Figure 1. The geographical extent of the visibility of different stages of the lunar eclipse and the passage of the Moon through the Earth's shadow. From: https://eclipse.gsfc.nasa.gov/LEplot/LEplot2001/LE2025Sep07T.pdf

There is good news and bad news about the 2025 Sep 7 total lunar eclipse, at least from British Isles. The good news is that Sep 7 is a Sunday and it occurs during very sociable hours, so no need to stay up until the early hours of the morning observing and go into work the next day tired out. The bad news though is that from the British Isles, the Moon rises just a few minutes before the end of totality, and so will be rather difficult to spot against the twilight sky. You do get to see about an hour's worth of partial eclipse though but even by the end of this the Moon will still be low at about 10 deg above the horizon. Being low on the horizon means a longer path length through the atmosphere for Moon light to travel, so more scattering and absorption of light, making the Moon, redder than it normally would be and furthermore a greater chance for clouds to obscure our view. Those far to the east of the UK will fare better, especially in longitudes between East Africa and Mid-Western Australia, who will get to see the whole eclipse (See Fig 1).

If we are to make the most of this all too infrequent opportunity, then you need to plan ahead of time. I have included a diagram (Fig 2) showing the altitude of the Moon as seen from Birmingham, UK to give you some idea where to look at the different stages of the eclipse. Ignore this if you live in a different country. Azimuths and altitudes may vary by a few degrees, depending upon where you live in the UK. The further east and south you are the better. Anyway, using the plot in Fig 2, and a compass, check out your horizon to make sure that you can get a good view of the Moon low down. If you find this view is blocked then plan ahead and find a hill, an open window view from the top floor of your house, or somewhere where the eastern horizon is less obstructed. If you find that you cannot get the Moon from your main telescope, then consider either using a small portable telescope, or a compact or SLR camera with a telephoto lens on a sturdy tripod. Self-timer, options on cameras are preferable to just pressing the exposure button as the latter will lead to camera shake but the former gives time for vibrations to dampen down. I always use a range of exposures, and take as many photos as possible. Longer exposures let us see into the umbral shadow but over expose the dayside. Shorter exposures are better for the non-shadowed areas and the penumbral stage, so long as the exposure does not over expose. As to observing programmes, you can do time lapse colour imaging to monitor the density of the shadow, or attempt to video the umbral area to look for impact flashes or occultations. Visual observers can estimate how dark the eclipse is using the Dajon (https://en.wikipedia.org/wiki/Danjon_scale) scale, though with the Moon at such a low altitude and twilight interfering here in the UK this will be problematic.

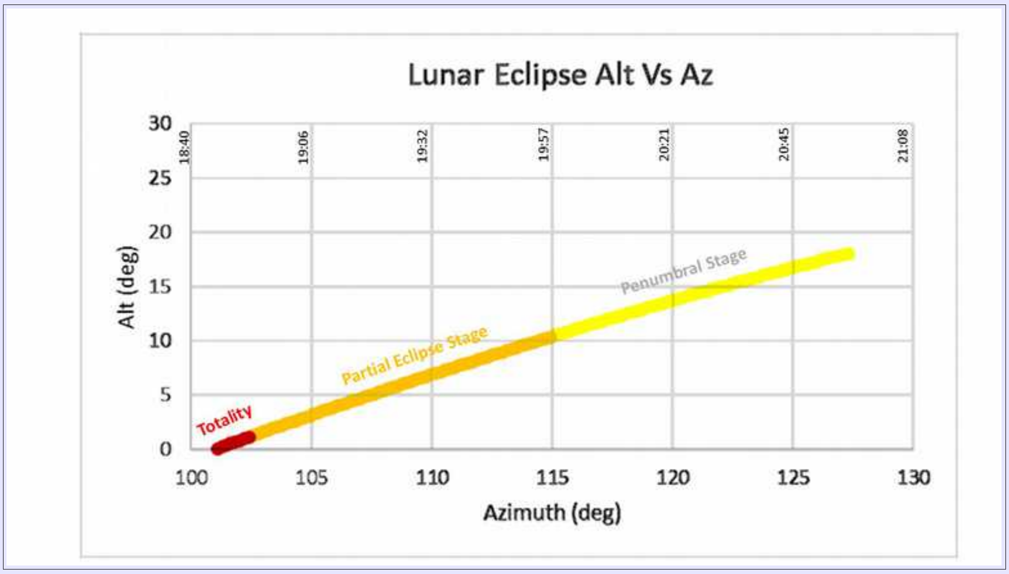


Figure 2. The location of the eclipsed Moon in the sky as seen from Birmingham, UK. Azimuth and altitude will vary elsewhere in the UK by a few deg at most. Slightly lower altitudes happen the further north you go and rise times will vary by a few min, earlier the further east and later the further west.

The Penumbral phase, P1 to P4 runs from 15:18-20:55UT – this is the least interesting phase as it’s difficult to tell whether there is a faint yellow tint of a shadow. However, it can be useful to cache observations early or late of this stage of the eclipse, in case the main umbral phase is clouded out. First contact of the darker umbral shadow or U1 starts at 16:27UT. The umbral eclipse starts (U2) at 17:31 with the middle of totality at 18:12UT and totality ends (U3) at 18:53UT and the last part of the umbra leaves (U4) at 19:56UT. Please send in any observations that you make and we will do a write up.

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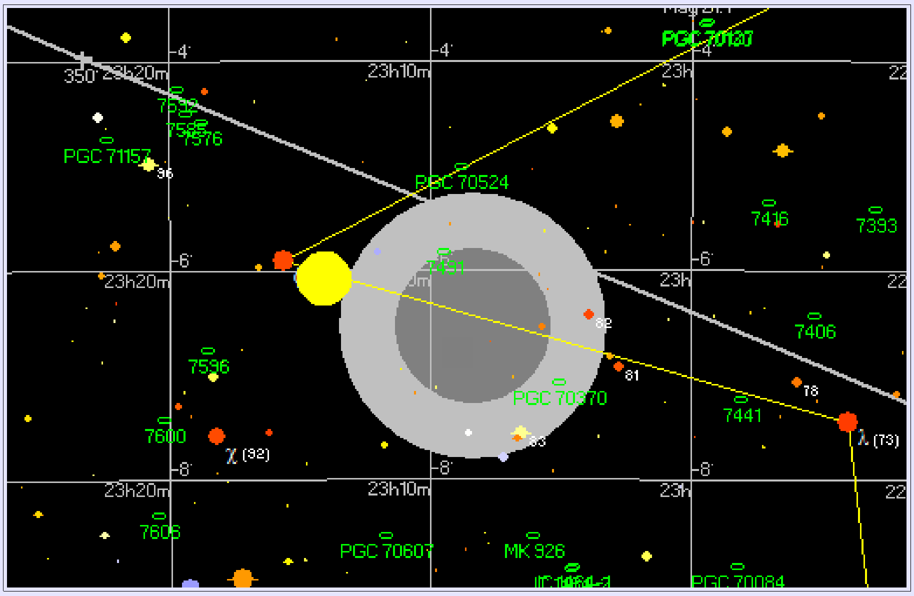
Lunar Occultations September 2025 by Tim Haymes.

Lunar Occultations

An occultation of phi Aquarii occurs at the lunar bright limb soon after the end of penumbral phase. With a spectral type of M2 it should be easier to view or video the occultation in a red visual filter, or long-pass IR filter such as those used generally for lunar imaging.

Here are the general circumstances from SkyMapPro on Sept 7th drawn at about 2100 UT



Pleiades passage on evening of September 12th

There are a series of dark limb reappearances at the 67% illuminated Moon, starting at 21:02 UT about one hour after Moon-rise. The first event is 17 Tauri (RD) at low sky elevation. The following events become more accessible with Alcyone (eta Tau) RD at 21:55UT. At magnitude 2.9, this is the brightest star in the cluster. There are some fainter events later at magnitude seven or so.

This is a good opportunity to test observing skills on brighter stars reappearing. I hope the weather cooperates. Most of the stars in the cluster are double or multiple so look out for step events in visual and video recordings. Please send report to the under signed by email.

Venus is occulted on morning of September 19th

A crescent Moon will occult Venus in daylight hours. Regulus (alpha Leo) is 0.5 deg to the South. With the SUN nearby, great care should be taken to avoid sun-light entering the optics. The usual “trick” is to observe in the shadow of a high building (house etc). Binoculars could then be used. I predict that Venus can be picked up, but the Moon will be washed-out unless a telescope is used.

The Alt/Az of Venus is: DB: 46 /213 RD: 38 / 237

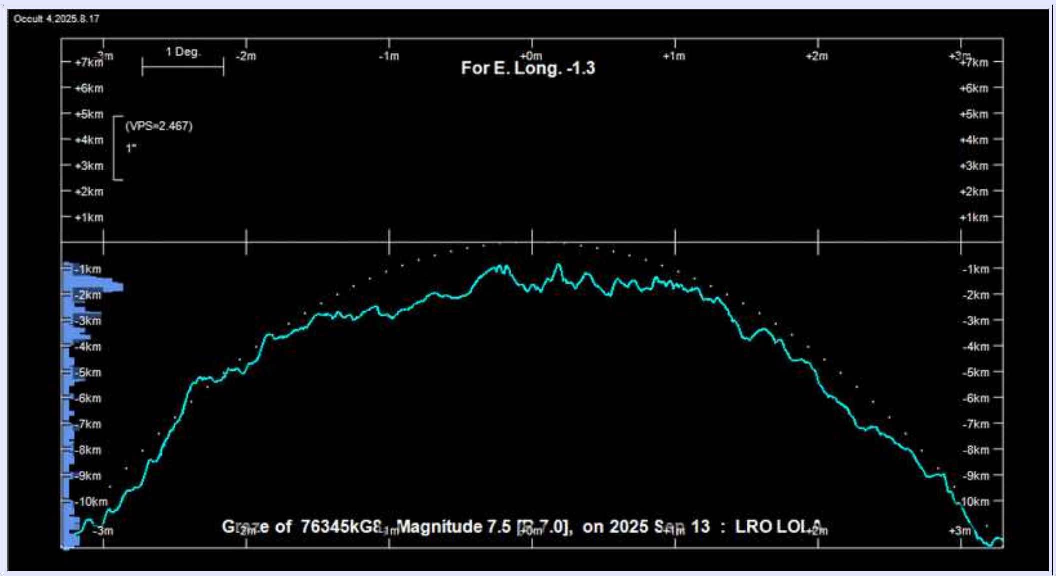
Venus Local circumstances: Planet disk duration 15s +/-1

City	DB (UT)	RD (UT)	Cusp Angle (RD)
Aberystwyth	11:49:15	13:07:35	88N
Belfast	11:43:18	13:01:40	88N
Birmingham	11:51:20	13:09:42	85N

Cambridge	11:53:37	13:11:47	82N
Cardiff	11:52:04	13:10:21	88N
Carlisle	11:45:32	13:03:52	84N
Dublin	11:45:26	13:03:39	89N
Edinburgh	11:43:14	13:01:25	83N
Exeter	11:53:24	13:11:34	89N
Herstmonceux	11:56:32	13:14:43	84N
Oxford	11:52:49	13:11:09	85N
Leeds	11:48:45	13:07:04	83N
London	11:54:46	13:13:07	83N
Manchester	11:49:00	13:07:21	84N
Reading	11:54:09	13:12:30	85N
Southampton	11:54:42	13:12:59	86N

Requests for Graze Predictions.
These are available from Tim Haymes, or via Tony Cook (Director)
Files are computed by Occutl4 software using for the nearest town to the observer. Typical travel range is set to 30 miles (say 50km). The following files are generated which contain information for planning;

Text file (Long/Lat/Time)
Limb profile (jpg)
Google Earth kmz file. This plots the lunar mean limb.



Occult4 for the graze of SAO 76345.

When planning, remember that the lunar limb is raised or depressed from the mean limb shown by the Kmz file. Consult the Limb profile to find the optimum offset. This could be several kms. The distances on the limb profile are the distances to be used on the Earth's surface.

SAO 76345 on Sep 13 (BAAH #8)
Details for this graze have been sent to Mr. C. Willits near Newcastle upon Tyne. The region is very rugged and the histogram on the left indicates large number of possible contact (10+) between 1.5 and 2 Km South of the mean limb. The tick marks on the mean line are at one minute intervals.

Occultation predictions for 2025 September (UK) (Times at other locations will +/- a few minutes)

Oxford: E. Longitude -001 18 47, Latitude 51 55 40
Stars brighter than r8.0 and illumination generally less than 98%

day yy	mmm	Time d	h	m	s	Ph		Star No	Sp D*	Mag v	Mag r	% ill	Elon	Sun Alt	Moon Alt	Moon Az	CA o	Notes
25	Sep	7	2	57	34.8	D		3310	A8	6.4	6.2	99+	171		14	232	66N	
25	Sep	7	22	12	37.2	R		3412	M2	4.2	3.4	100-	178		27	146	40S	phi Aquarii
25	Sep	10	1	19	9.7	R		143	F0	7.1	6.9	93-	149		47	168	89N	
25	Sep	12	0	59	5.0	R		425	K0	7.1	6.5	76-	122		47	121	64S	
25	Sep	12	3	51	43.4	R		440	A2	4.7		75-	120		60	185	82N	epsilon Ari
25	Sep	12	3	51	44.4	R	X	54005	A2	5.6	5.5	75-	120		60	185	82N	
25	Sep	12	21	2	25.2	R		537	B6	3.7	3.8	67-	110		7	60	69N	17 Tau
25	Sep	12	21	6	7	Miss		541	B8	3.9	3.9	67-	110		8	60	4N	20 Tau
25	Sep	12	21	24	31.1	R		545	B6	4.1	4.2	67-	110		10	64	53S	23 Tau
25	Sep	12	21	53	13.1	R		549	A0	6.3	6.3	67-	110		14	69	72S	24 Tau
25	Sep	12	21	55	3.2	R		552	B7	2.9	2.9	67-	110		14	69	67S	eta Tau
25	Sep	12	22	0	32.7	R		553	A0	6.8	6.8	67-	110		15	70	76N	
25	Sep	12	22	11	15.5	R		560	B8	3.6	3.7	67-	110		16	72	13S	27 Tau
25	Sep	12	22	23	48.4	R		557	A1	7.0	6.9	67-	109		19	74	81N	
25	Sep	12	22	25	26.4	R		561	B7	5.1	5.1	67-	109		18	74	43S	28 Tau
25	Sep	12	22	39	11.7	R		76237	A0	8.0	7.9	67-	109		21	77	63S	
25	Sep	12	22	42	1.8	R		76234	A0	7.5	7.5	67-	109		21	77	84N	
25	Sep	12	22	43	38.2	R		562	B9	6.6	6.6	66-	109		21	77	89N	
25	Sep	12	22	54	48.4	R		76249	A0	7.5	7.5	66-	109		23	79	75S	
25	Sep	12	23	10	49.2	R		76259	A2	7.4	7.4	66-	109		25	82	85N	
25	Sep	13	2	6	33.1	R		76345	G8	7.5	7.0	65-	108		51	119	38N	
25	Sep	13	3	14	46.4	R		76369	K2	8.3	7.5	65-	107		59	142	84S	
25	Sep	13	22	44	34.4	R		732	K3	7.5	6.8	55-	96		15	65	10S	
25	Sep	14	0	9	46.5	R		76841	K1	7.3	6.7	54-	95		27	80	87S	
25	Sep	14	1	54	4.4	R		746	B7	7.0	6.9	54-	94		43	99	62S	
25	Sep	14	4	15	25.2	R		756	F0	6.6	6.5	53-	93		61	139	90N	
25	Sep	14	22	4	27.7	R		890	A0	4.6	4.6	44-	83		3	47	49S	136 Tau
25	Sep	14	22	55	13.6	R		77724	B1	7.0	7.0	44-	83		9	56	63S	
25	Sep	15	0	25	32.4	R		77818	K5	6.7	5.8	43-	82		21	71	44N	
25	Sep	15	1	48	25	m		917	K2	8.1	7.4	42-	81		33	85	7N	
25	Sep	15	23	52	0.5	R		78957	G8	7.5	7.0	32-	69		8	56	75N	
25	Sep	16	1	12	13.6	R		79022	K0	8.0	7.6	32-	69		18	70	80N	
25	Sep	16	3	33	37.0	R		79122	K2	7.6	7.0	31-	68		39	95	38S	
25	Sep	16	4	22	17.7	R		1088	A4	5.8	5.7	31-	67		46	105	56N	47 Gem
25	Sep	16	5	4	17.3	R		79164	G8	7.4	6.9	30-	67	-7	52	116	64S	
25	Sep	17	0	49	20.2	R		79868	K0	7.4		22-	56		5	57	63S	
25	Sep	17	3	7	23.1	R		1225	K0	8.1	7.5	21-	55		24	82	35N	
25	Sep	18	4	56	43.9	R		1352	F5	7.9	7.7	13-	42	-8	29	96	82N	
25	Sep	19	11	52	48.5	D		Venus		-3.9	-3.9	5-	27	39	46	214	-66S	Venus
25	Sep	19	13	11	8.8	R		Venus		-3.9	-3.9	5-	27	37	38	237	85N	

End of predictions for September

Summary Report from ESOP XLIV held in Poznan on September 23-24
https://esop44.iota-es.de/

The annual symposium for occultation observers in Europe (ESOP 44) was hosted by the Astronomical Observation Institute, Poland. https://www.astro.amu.edu.pl/en/ .
Meeting attendees included UK observers: Tim Haymes, Brian Mills (by Zoom), Mr&Mrs Michael O’Connell, Alex Pratt, William Stewart and Mr&Mrs Derrick Ward. There were about 50 delegates in person.

The first Session was devoted to Lunar work (see Programme). Reports were heard on the state of Lunar Observation timings (O-C) which show an as-yet unexplained time offset. Limb profile, lunar ephemeris and libration were proposed as possible reasons. Continued observations and timings are encouraged.

The April-01 graze of Maia (Pleiades) was described and the multiple nature of Maia discussed. The writer offered his own data from the UK for comparison. This will be sent via a cloud-server. The observation and video from Oxfordshire is on this page:
http://www.stargazer.me.uk/grazes/GrazeObs.htm#nrCharlbury_track

Alex Pratt described the double star observations made by M O’Connell and B Mills. These were processed in Tangra,LiMovie and Occult4 and compared to the known orbit.

The French OLED project for Lunar Double Star observations was presented. The BAA LS will encourage observation of some double stars from the OLED web pages. (Thanks to Alex Pratt who initiated first contact for UK observers)

Tim Haymes prepared a poster on the use of Occult4 and Tangra to measure double star light-curves obtained as a by-product of asteroidal occultations (A known method)

It is expected that presentations will be uploaded to the ESOP44 web pages in the coming weeks. Please check these out.

Tim Haymes tvh.observatory@btinternet.com

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Members letters and notes.

Lunar imaging – does I need a field flattener? by James Dawson (Nottingham Astronomical Society)

The image projected out the back of most telescopes is curved due to the optics of the telescope. The exception are telescopes which intrinsically produce a flat field such as Petzval refractors like Takahashi's FSQ106, or where compensating optics are incorporated into the telescope design near the focal plane such as the Edge HD series of Schmidt-Cassegrain Telescopes (SCT) made by Celestron.

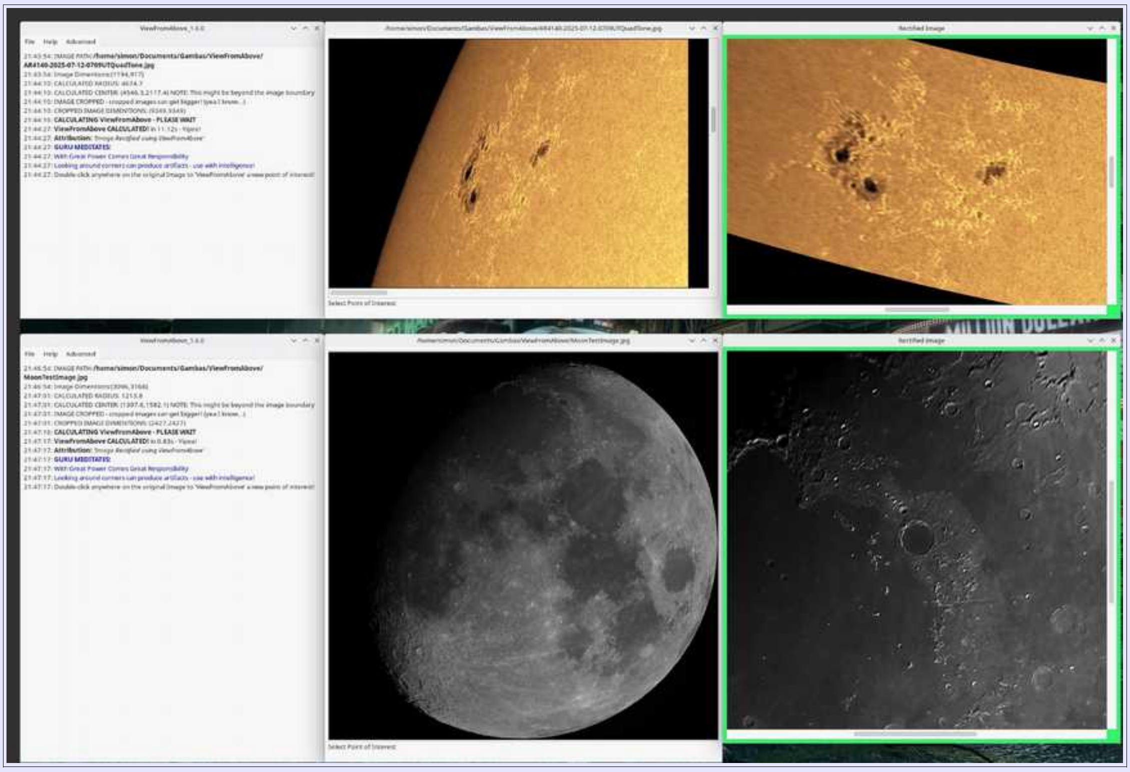
For visual observing a curved image probably is beneficial as it is projected on the curved retina of the eye. When using a camera at prime focus instead of an eyepiece, the curved image from the telescope is projected onto the flat sensor of the camera. Whilst focus can be achieved at the centre of the sensor, the image at the edge of the sensor is likely not to be in critical focus. This is less of a problem when a small proportion of the sensor is used, such as with planetary imaging, but for deep sky observers where the whole sensor is often employed, this is one of the main aberrations users will want to correct. The commonest way to correct this is with an optical element placed in front of the camera which 'flattens' the field, converting the curved image field into a flatter one. The spacing between the field flattener and the camera's sensor is important to get right else curvature again is introduced. Field flattening optics are often designed so they also act as a focal reducer; so called reducer-flatteners.

But what about my lunar imaging? I invariably use the whole sensor of the camera on a telescope without an intrinsically flat field (a standard SCT). Should I be using a field flattener? Or when taking high frame rate video of the Moon do the fluctuations in the seeing conditions result in bits of the image drifting into and out of focus negate the need for a flat field?

I'd be interested to hear what others do and think.

Limb rectification Software release by Simon Dawes.

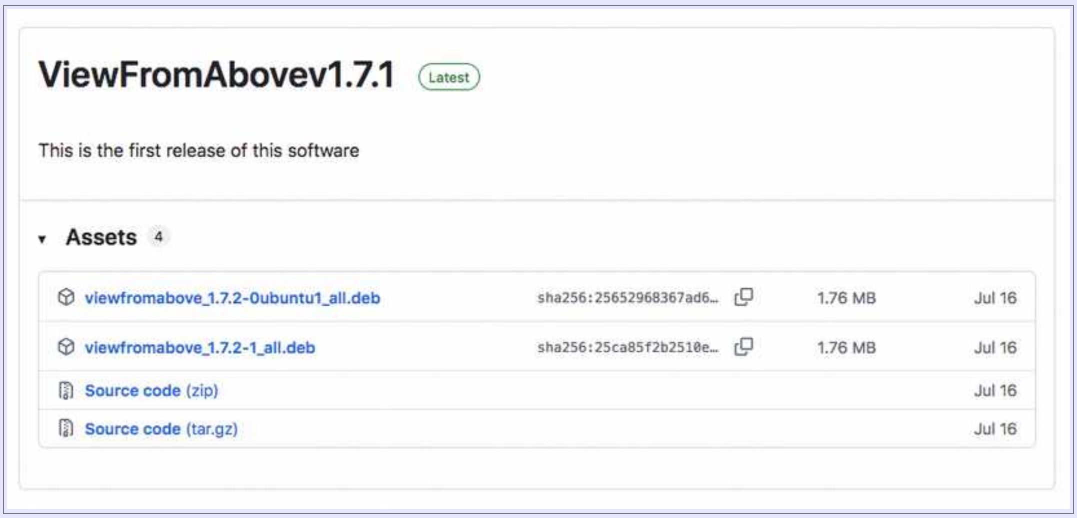
I've written some Linux software (see screen shot of it working on a Lunar and a Solar Image below). The software will simply rectify any foreshortening of features at the edge of the Moon, so long as there is part of the limb showing.



The link to the source code and to installation packages are available here -

https://github.com/SimonTelescopium/ViewFromAbove/releases<https://github.com/SimonTelescopium/ViewFromAbove/releases>

Note: this is Linux only software - it has been tested on my laptop but not on other distributions of Linux so I'm relying on the installation package manager to work for other distros.



Recycled Mice and the second bite of the cherry by Peter Anderson.

We live in the bush on the outskirts of suburbia in Brisbane, Australia. Many years ago before it became socially unacceptable our cat would go out at night and at times we would be awoken in the early morning hours by an incessant muffled miaow under our bedroom window – muffled because the cat held something in its mouth while it was trying to get our attention and show us what he had caught.

Dragging myself out of bed, I would go downstairs to be greeted at the kitchen door by the cat that presented me with his catch, almost invariably a large mouse or rat. After telling him what a cleve cat he was and giving him a saucer of milk I would carefully grab the unfortunate deceased catch by the tail and toss it into the bush.

Peter's Cat.

If I had not tossed it far enough, the cat would then find it again and recycle it – perhaps an hour or so later, with more muffled miaowing under the bedroom window. I then had to repeat the operation and make sure that I threw it further the next time. My wife referred to this as a 'recycled mouse'.Usually you get one opportunity at anything and a second bite of the cherry (or mouse) is frowned upon.

Fast forward to June this year when I submitted an image of the occultation of Antares by the Moon to the BAA Lunar Section circular. This image (see below) with the narrative and images of the instruments employed was duly published on pages 4 to 6 of the July 2025 circular and as far as I was concerned the matter was at an end. Imagine my surprise when I was perusing the Lunar Geological Change Detection Programme section in the August 2025 BAA Lunar Section circular and I came across text at the base of page 52 describing an image taken at the time of the occultation of Antares on 10th June 2025. It stated that it corresponded with the lunar illumination around the time of a reported transient event on 24th December 1977.

I 'pricked my ears' as it were. My first thought was that someone else had forwarded another such image but on the next page, attributed to me, was a cropped and sharpened section of my image displaying the relevant lunar region with the colour saturation increased. It looked very impressive. This came as a very pleasant surprise to me and though this recycling was not of my instigation, I immediately thought of the story of the recycled mice. Miaow Miaow!

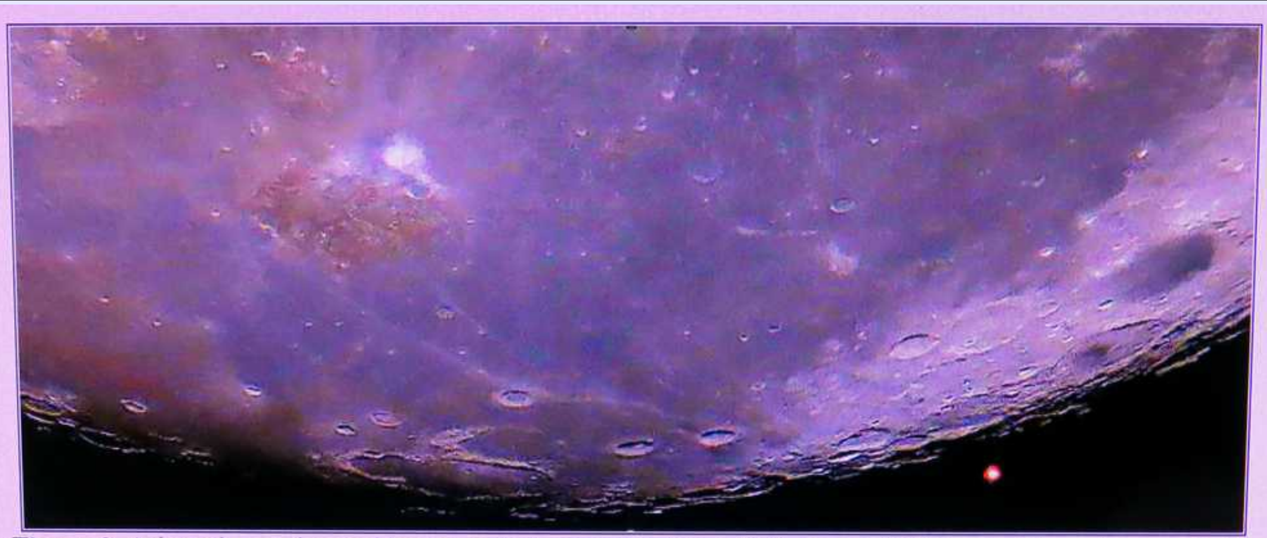


Figure 9. Aristarchus as imaged by Peter Anderson (BAA) on 2025 Jun 10 UT 09:16 with north towards the right. The image has been sharpened and had its colour saturation increased to bring out colours on the Moon. The bright orange blob, just off the SW limb is the star Antares.

Ed Comments:

On the subject of the territorial marking of astronomical equipment set up outside by cats, Peter suggested that as this marking usually took the form of a *spray* as opposed to a *stream,* the visiting feline would be unlikely to suffer an electric shock *if* this made contact with wiring to a power supply like a 12v battery – though apparently there is no empirical data on this. In reply Tony Cook said:

Concerning cats - I have to put sprinkle pepper around my portable telescopes, when I go out observing, to keep curious cats belonging to neighbours away. I remember the first time I ever used an equatorial tracking platform, I went inside the house to get the 8" Dobsonian, came out and had found that a cat had sprayed the *platform. Also because I sometimes have a 12V DC battery to Mains converter, for some of my equipment, I really would not want a cat (or other animal) to spray this and get an electric shock. Usually a circular ring of pepper around the operating area keeps animals away."*

I have never encountered this problem, but I did on one occasion leave an open eyepiece case complete with contents on the floor of an open conservatory one night, and a visiting hedgehog with digestive tract issues paid close attention to it before I got to it the following morning. Cleaning dew off eyepieces is one thing, this presented an altogether different challenge.

If you have any instructive comments or advice on astronomical equipment and wildlife that could benefit the readers – and their telescopes, please send them in.

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Lunar Impact Flash Observing Programme by Tony Cook.

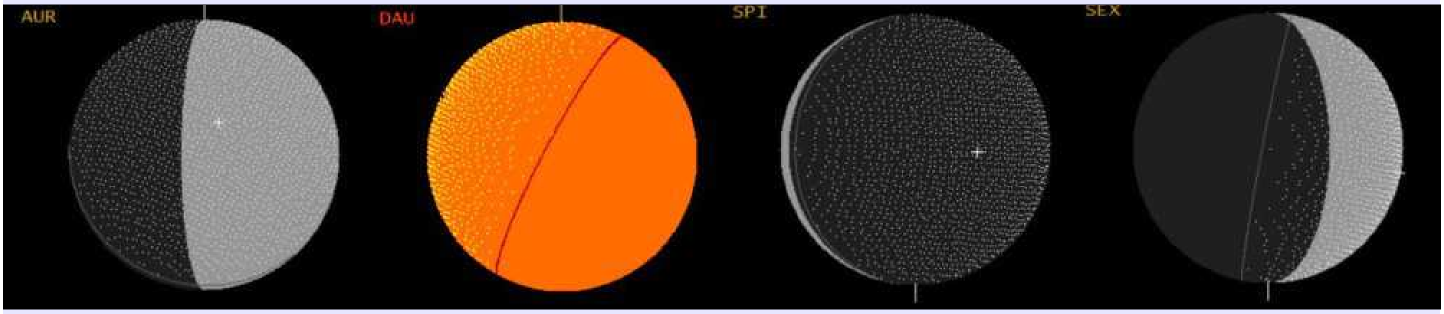

Figure 1. Locations of impact flashes from different showers with north at the top, as generated with the Lunarscan program. **(Far Left)** The Aurigids on Sep 1st. **(Left)** Delta Aurigids during the total lunar eclipse on Sep 7. **(Right)** South Piscids on Sep 20. **(Far Right)** Sextantids on Sep 27.

September is not a great month for observing impact flashes from the UK for two reasons: firstly, the few showers that are on are all have low ZHR rates, and secondly from the UK latitudes the Moon is too low in the evenings, though of course it is higher in the sky in the lunar crescent phase in the mornings. From the UK, Earthshine is favourable in the early mornings from Sep 13-19. During the Sep 7 total lunar eclipse, keep an eye out on the SW-W-NW-N part of the Moon (See Fig 1 Left), because although the ZHR rate is very low, Delta Aurigids are more likely to hit this part of the dark umbra. If you live in the southern hemisphere, for example New Zealand then you have the Kappa Leonid Radio meteor shower on Sep 24 & 25 – though this does not feature in the Lunarscan plots, only the Lunar Schedule website predictions. Then on Sep 26 and 27 you have the Sextantid shower, which have a low ZHR of 5 meteors per hour. Then finally from Sep 28-30 the sporadics are well seen, but again the ZHR is low.

Video Observation of Earthshine in August:

Date	UT Start	UT End	Duration(hours)	Filter	Observer	Location
2025-08-17	00:43:32	01:39:47	0.938	H	AC_Cook	Newtown_UK
2025-08-17	01:41:24	01:53:08	0.196	H	AC_Cook	Newtown_UK
2025-08-27	16:56:21	16:58:47	0.041	H	AC_Cook	Newtown_UK
2025-08-27	17:01:01	17:38:13	0.620	H	AC_Cook	Newtown_UK

Total Contact time with earthshine in August 2025 = 1.8 hours with no overlap of observations – so it's not possible to confirm any flashes, should any eventually be detected in the video. Video has still to be analysed for impact flashes.

I have received two communications from observers, both of whom are using the ALFI program to detect lunar impact flashes. I reminded them though that people should try their earthshine videos out on all three software: Lunarscan, ALFI and FDS as they all work in different ways and have different sensitivities under different conditions. However, as author of ALFI it's good to know that it is still being used. I have a new PhD student starting at the end of September and they may be upgrading ALFI to make it more robust and simpler to use.

On November 5-7 there will be a 2.5-day conference in Paris: "Toward an International Earth-Moon Network for Joint Seismic and Impact Flash Monitoring System of the Moon". Although I have not decided yet, I may contribute a presentation, and attend the conference virtually. If so then I will keep you posted in the December newsletter.

To learn how to observe impact flashes I have put together an instructional web site – this will be added to over time: https://users.aber.ac.uk/atc/lumio.htm . It's a lot simpler than you might think!

Two other useful lunar impact web sites are: https://www.pvamu.edu/pvso/cosmic-corner/lunar-meteor-watch/ and https://www.asg.ed.tum.de/en/lpe/research/lunar-impact-flashes/ .
You can find out when to look for impact flashes by checking on this web site, however visual observers are recommended to stick to meteor shower times to improve their chances of detection:
https://users.aber.ac.uk/atc/lunar_schedule.htm

Don't forget to join the impact flash mailing list on: lunar-impacts@groups.io

If you would like further details on how to observe impact flashes, please drop me an email. To learn more about the LUMIO mission, watch : https://www.youtube.com/@associationoflunarandplanetary/streams and select ALPO 2024 Conference Day 2 and wind on to about 4h8m into the video.

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Images sent in and from the BAA Gallery.

Petavius and surroundings.

Image by James Dawson taken on April 30th 2025 at 17:58 using a C14, ASI 585MC and ProPlanet 742nm IR-pass filter.

Bohnenberger.

Image by Bill Leatherbarrow taken on 2nd April 2025 at 19:08hrs.

Copernicus sunrise.

Image by Chris Longthorn taken on 6th May 2025 at 21:00 taken with a 200mm StellaLyra Classical RC Cassegrain with a ZWO ASI224MC colour camera.

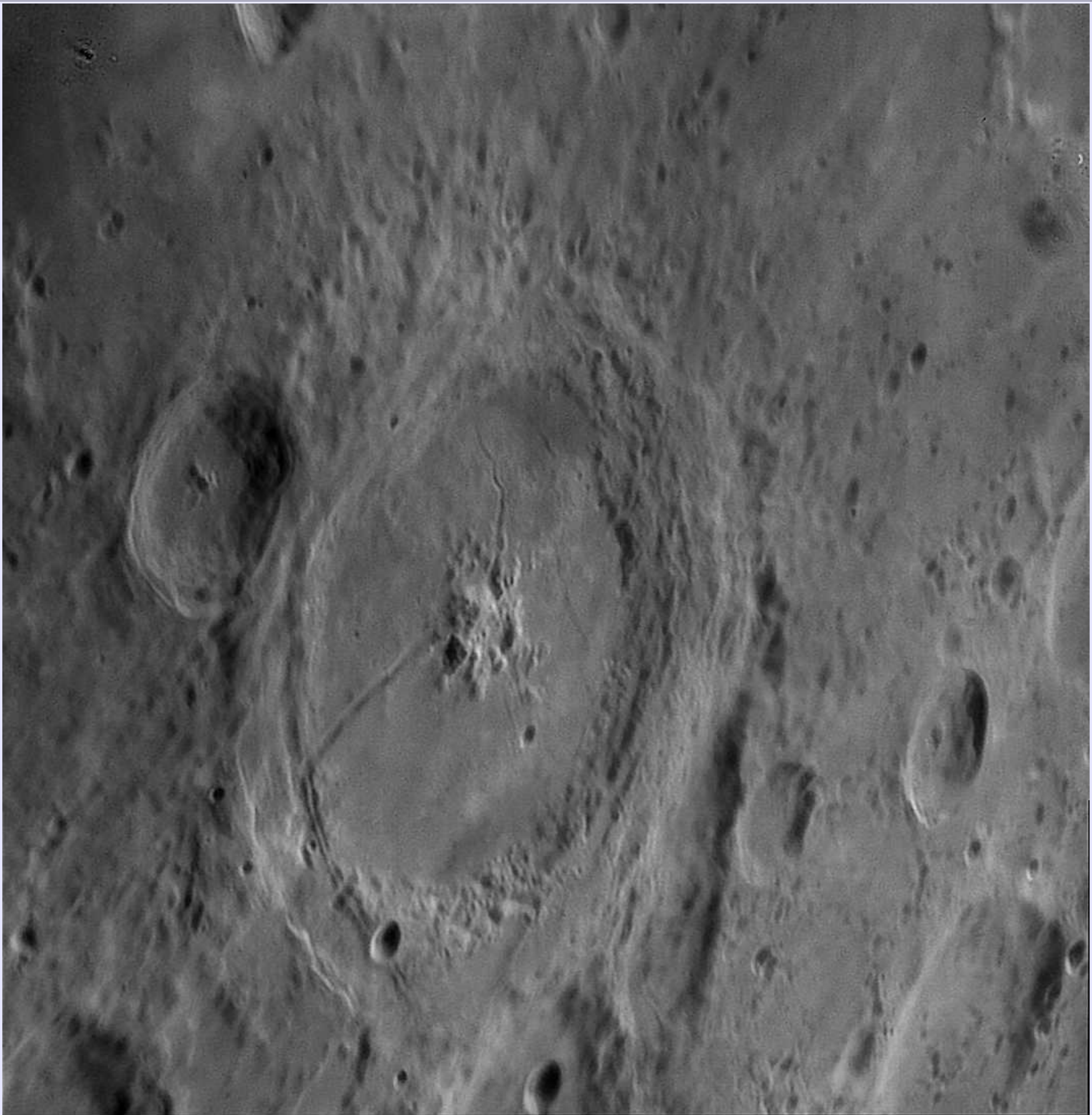
Bullialdus.

Image by Alexander Vandenbohede with details as shown.

Waxing Gibbous Moon.

Image by Ben Thomas and taken on May 08th 2025 at UT 20:46

Petavius.



Petavius, Wrottesley, Vallis Palitzsch 2025.05.02 20:24-25 UT, S Col. 331.1°,
seeing 5/10, transparency fair. Libration: latitude -05°33', longitude +07°10'
305mm Meade LX200 ACF, f 25, ZWO ASI 120MMS camera, Baader IR pass filter: 685nm.
A composite of two images processed in Registax 6 and Paintshop Pro 8.
Dave Finnigan, Halesowen

Image by Dave Finnigan with details as shown.

Walther.

Image by Leo Aerts taken on 6 April 2025 at 19:19 UT using a Celestron 14 SCT.

Ptolemaeus Crater Chain.

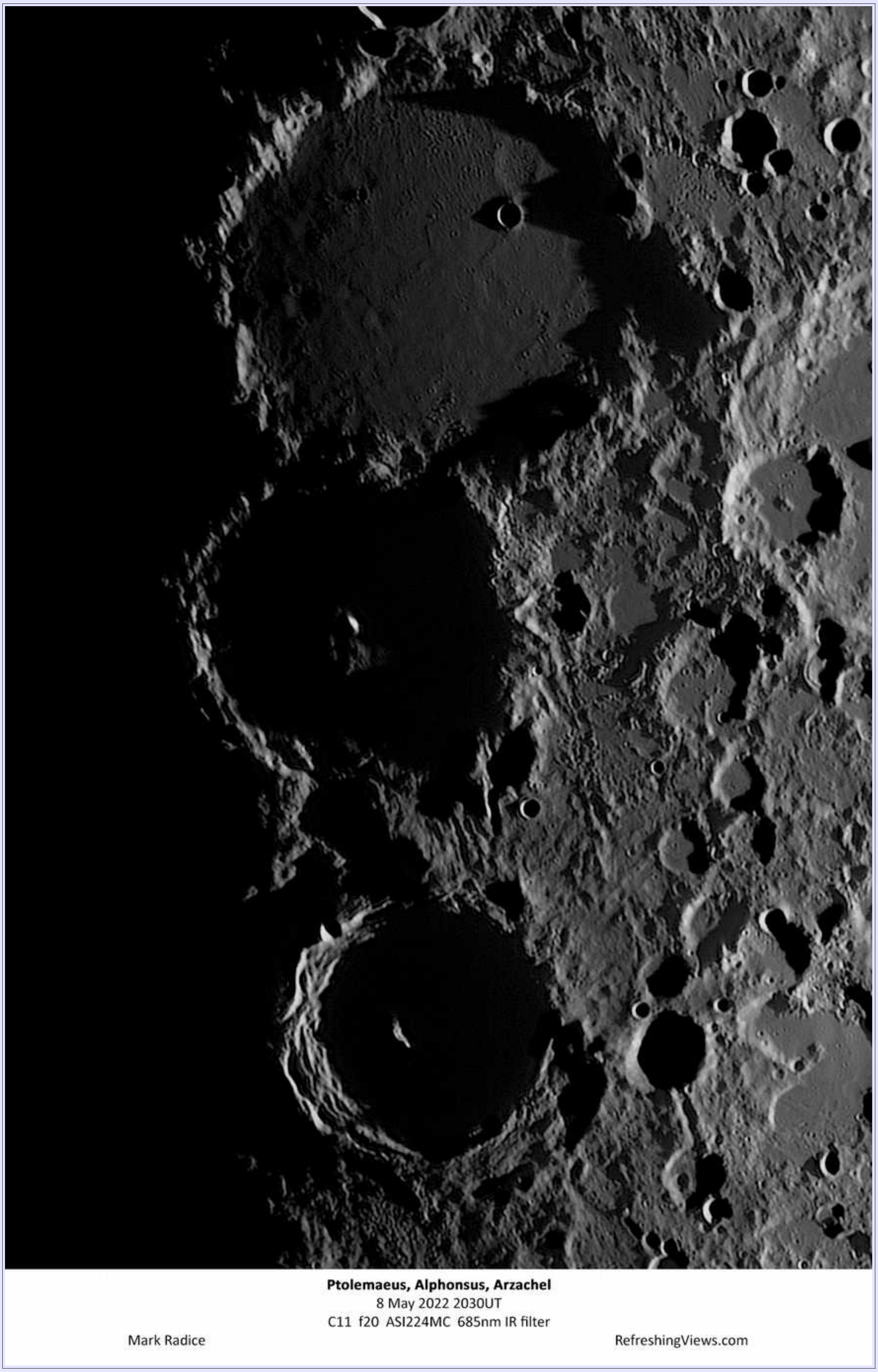


Image by Mark Radice with details as shown.

Aristarchus Plateau emerging.

Image and text by Rik Hill.

When the moon is about 12 days past new a dramatic region can be found on the terminator just north of the equator emerging from its long night. It is a collection of features marked by the bright crater Aristarchus (41km diam.) with it's strongly terraced walls crossed by radial bands stretching out from the center of the crater. In fact, this is considered the brightest large formation on the Moon. The tiny central peak, see as a bright dot in this image, only 300m tall, which is rather small. To the northeast is the slightly larger and half flooded crater Prinz (49km) with Montes Harbinger behind it. To the left of these montes, and a little farther north is the crater Krieger (32km) near the top of this image, with the little crater Van Bisbroeck on its southern interior wall.

Due north of Aristarchus are two small craters Aristarchus Z (7km) on the left and Vaisala (8km) on the right. Just south of Vaisala is a small unnamed shallow crater of about 6km diameter. It has a short rima that extends farther to the upper right (northeast) and connects with another crater, Aristarchus B (7km). Just before connecting with the crater it appears to form an "X" with another elongated depression to the south and a short wrinkle ridge to the north, Rupes Toscanelli. The depression appears to be the shallow elongated merge of two craters. It's an interesting set of small features for a good night of steady seeing.

To the west of Aristarchus is a similar diameter but shallower crater Herodotus (36km) it has an interesting southeastern wall that in this image looks like a running deer. But the most exciting feature is just north of this, Vallis Schroter the jagged upside down "U" shaped feature. It has a rill that runs most of its length. I have imaged portions of this under higher sun but not, of course, when it's full of shadow.

The next good opportunity to see this collection of lunar wonders will be on Sept. 3 and 4 which will also be a favourable libration for this region on the Moon.

Long shadows from the rim of Plato.

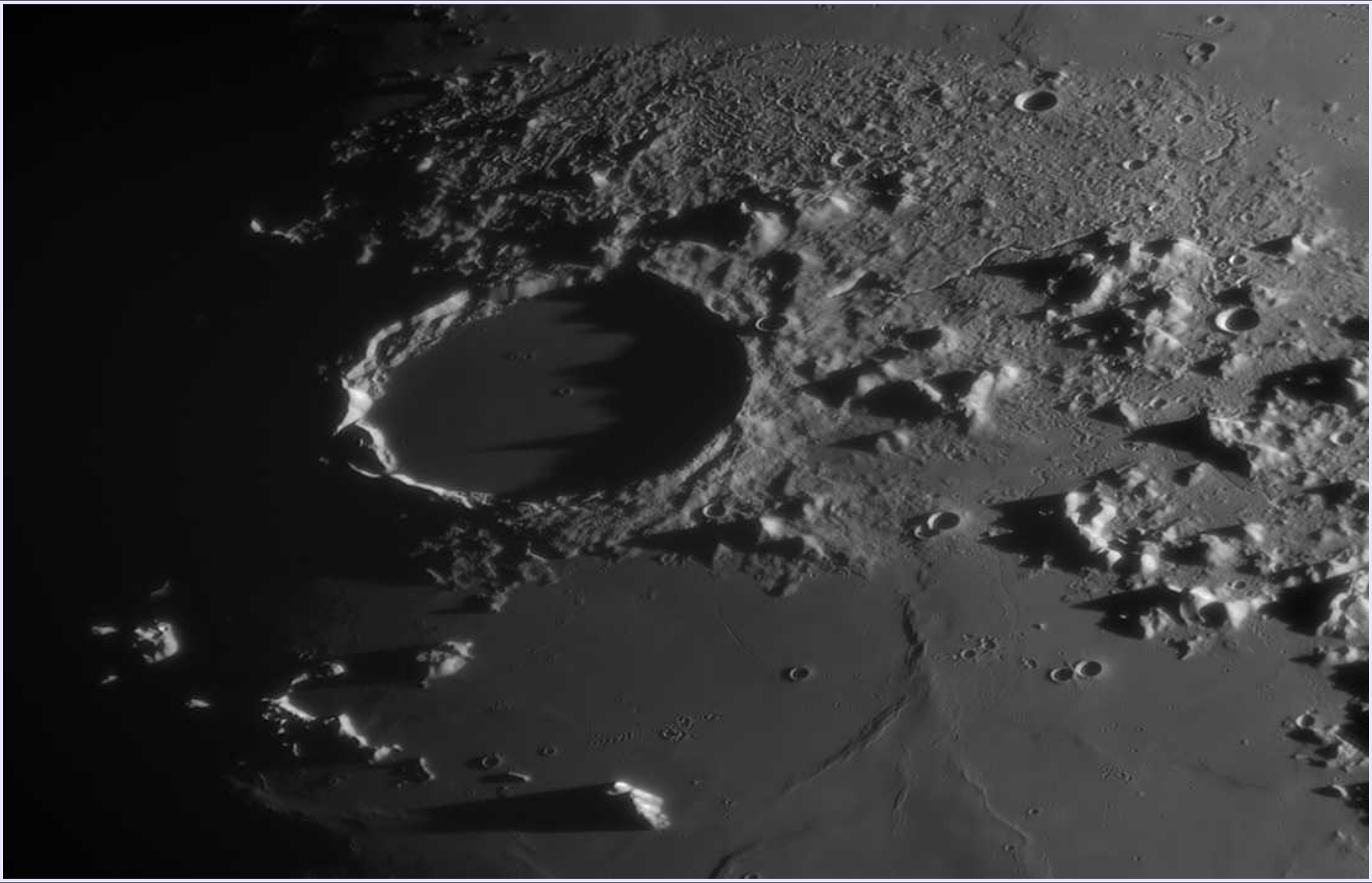


Image by Martin Lewis taken on 20th April 2021 at 20:11 using a 444mm Dobsonian, ASI174MM plus 642nm filter.

Langrenus.

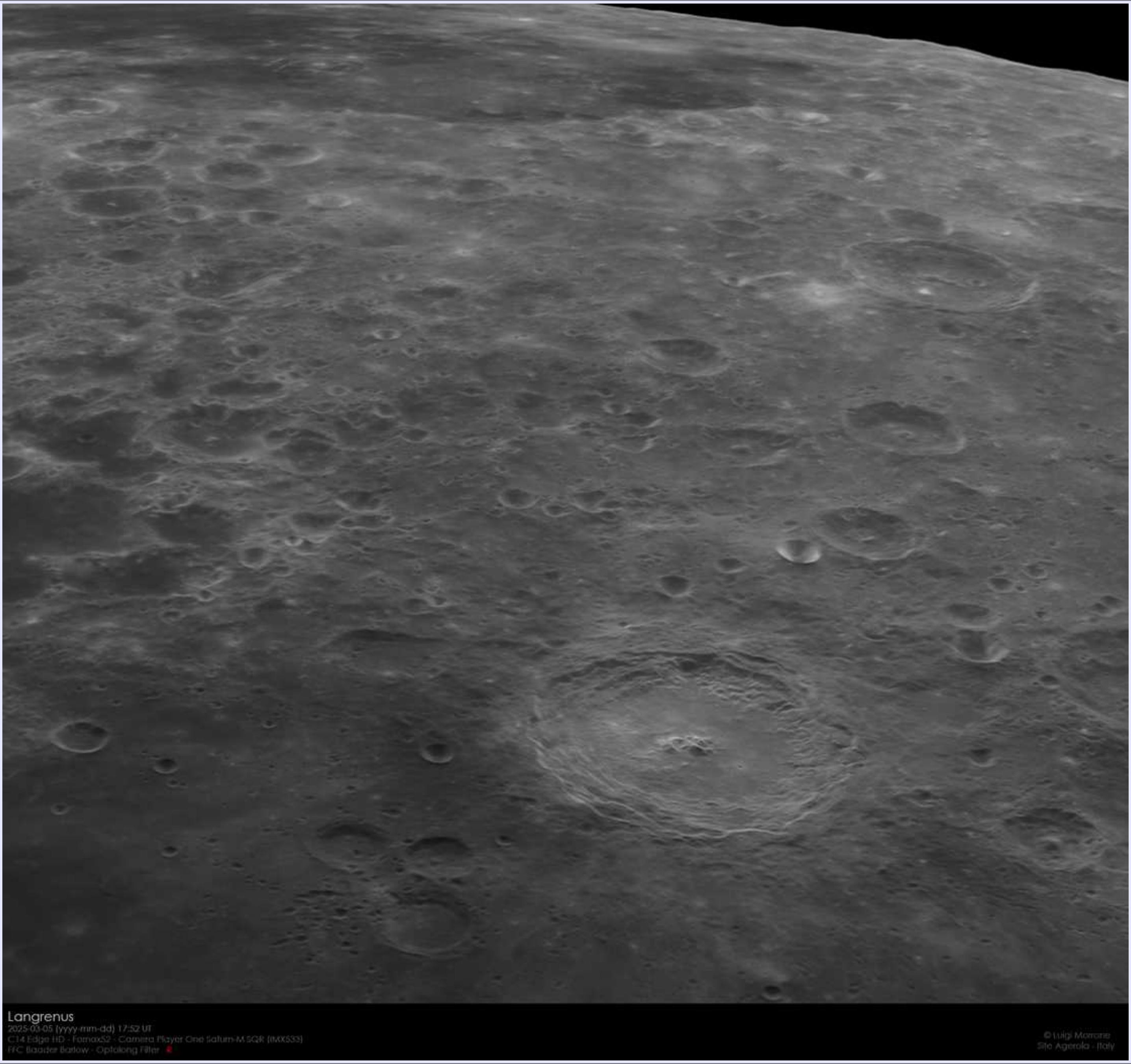


Image by Luigi Morrone with details as shown.

Archimedes.

Image by Maurice Collins and taken on 7th April 2025 at 09:01UT using a 80mm ED refractor 3xbarlow and QHY5III462C camera.

Kapteyn.

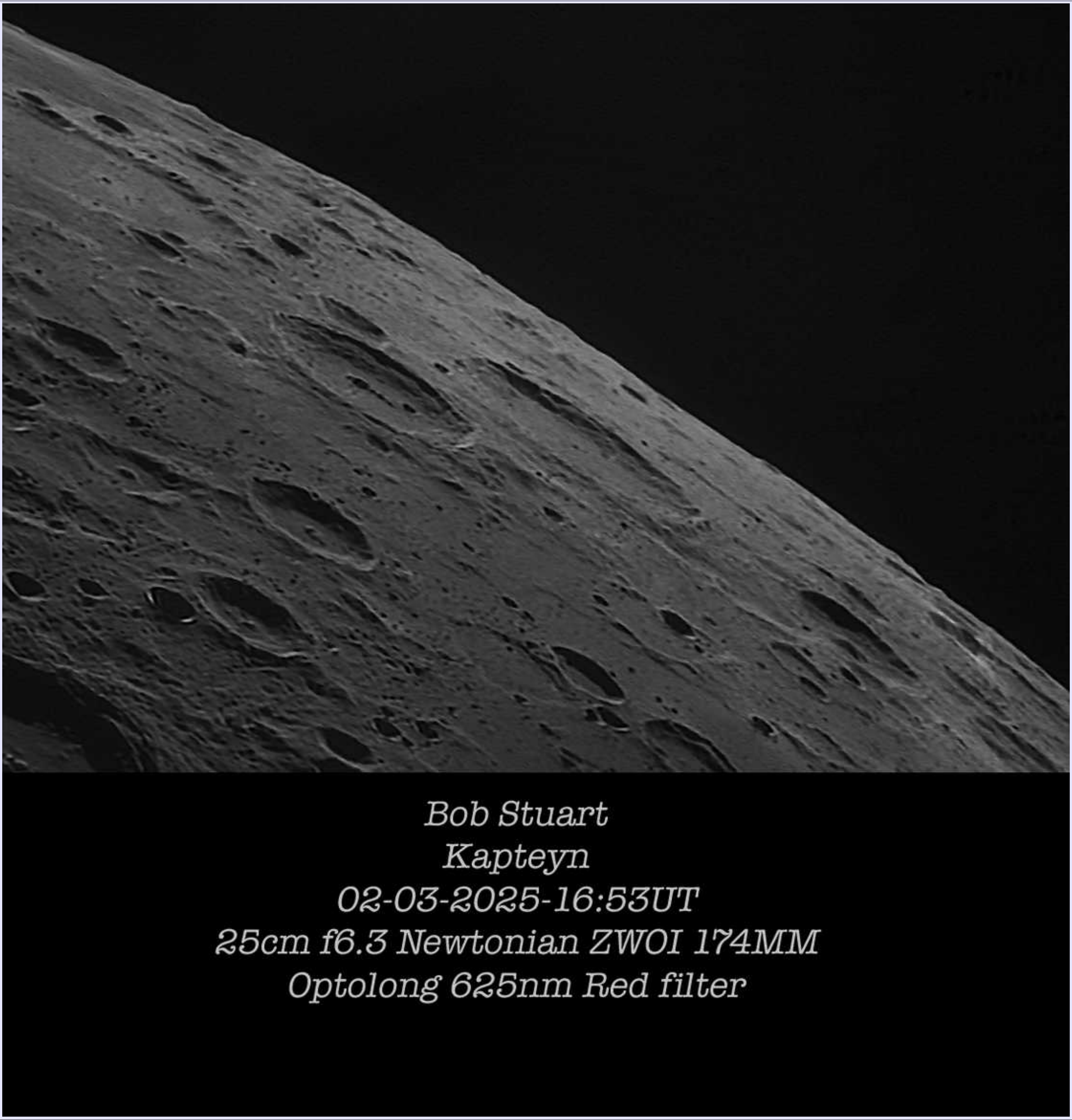


Image by Bob Stuart with details as shown.

Albategenius & Arzachel.

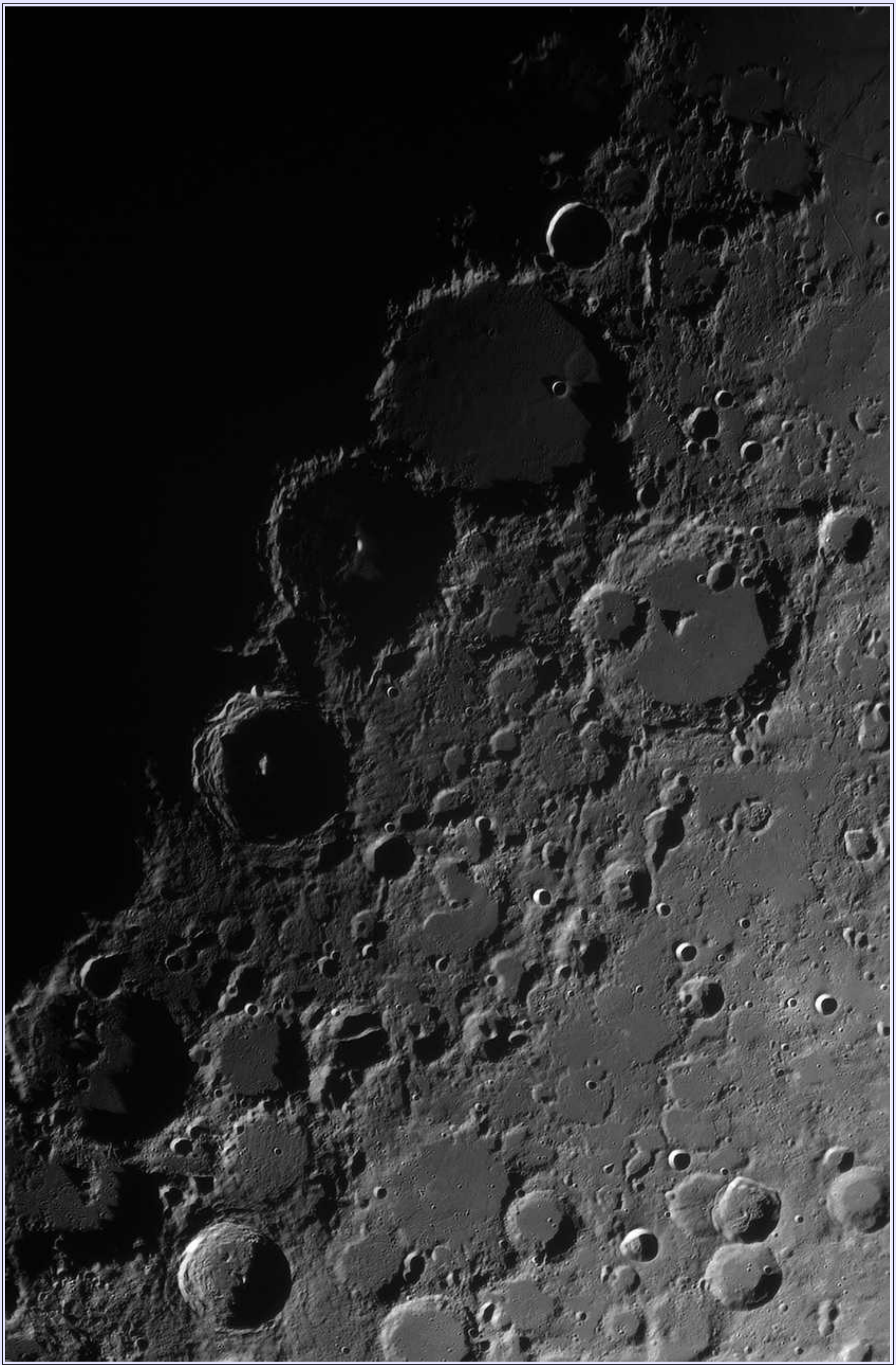


Image by Michael Buechner and taken on 10th March 2022 at 18:52 using a Tak Mewlon 250 and ASI174.

Lunar mosaic.

Image by Alun Halsey taken on August 15th 2025 at 03:59 using a Meade 12" SCT (LX200 GPS deforked) ZWO ASI585MM Pro, Astronomik 807 IR pass filter and Mesu-200 Mk1

Southern Highlands.

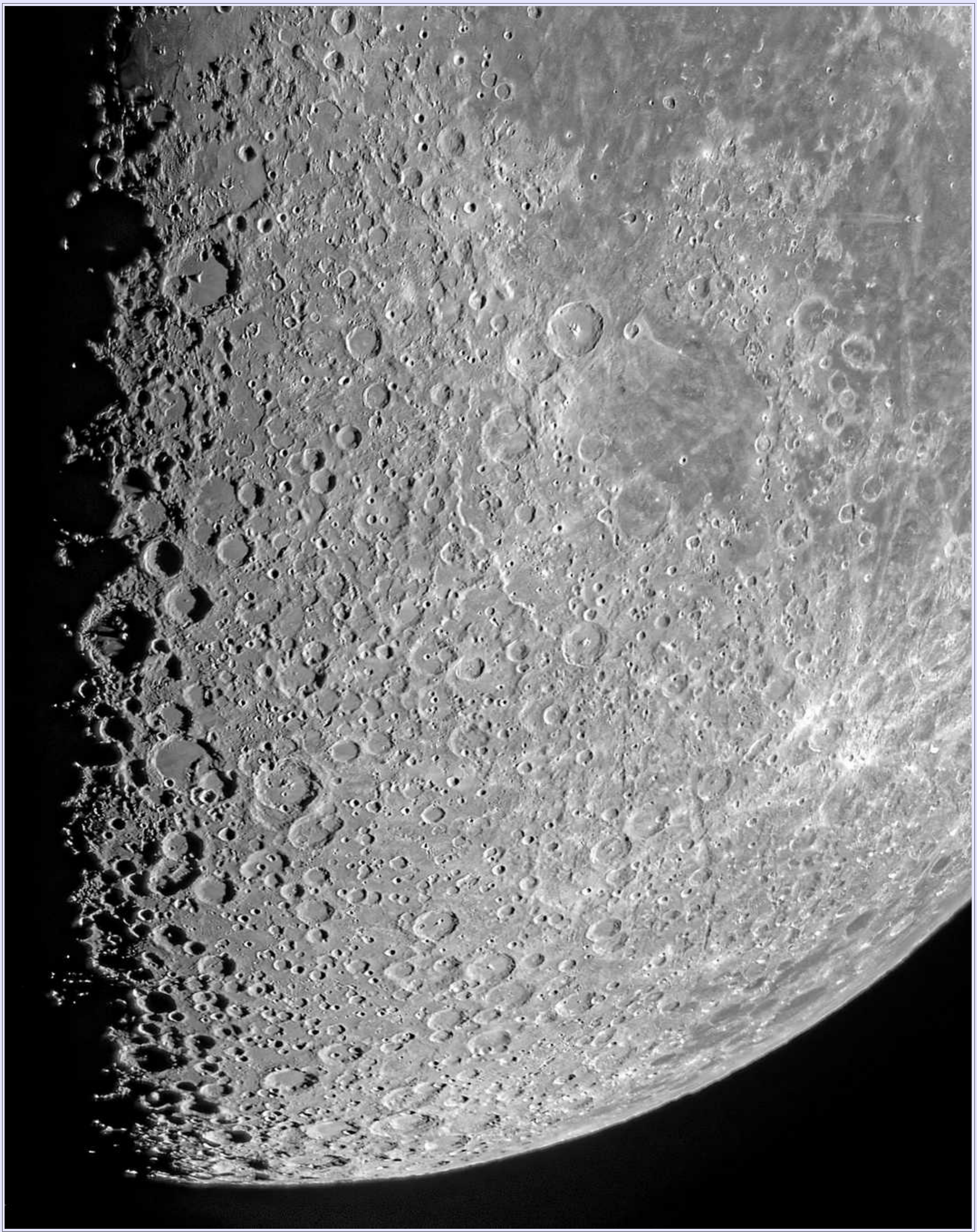


Image by Michael Hather on 25th April 2025 at 19:53 and taken using a Takahashi FC100, Televue Powermate, Nikon D500 1/800th @ ISO 3200 (single image) and Processed in DxO Photolab

Lunar Domes (Part XCIII): Domes of trachydacitic and rhyolitic volcanism. Mount Amiata complex and lunar highland domes. By Raffaello Lena

Stromboli and Vesuvius are two steep stratovolcanoes produced by explosive eruptions. These volcanoes have a high proportion of silica minerals and gas in their magma. In comparison, lunar mare domes have moderate or gentle slopes caused by fluid lava flows of basaltic composition.

Basaltic lava flows easily because of its low viscosity. This low viscosity is due to a low silica content. Andesitic magma erupts explosively because they tend to have a higher gas content. Higher viscosity is related to higher silica content.

The table below describes the average composition in SiO2 for different types of lavas.

	Basalt	Andesite	Trachyte	Dacite	Rhyolite
% SiO_2	49.20	57.94	61.21	65.01	72.82

Trachyte contains 60 to 65% silica content, thus less SiO_2 than rhyolite and more Na_2O and K_2O than dacite. These chemical differences account for the feldspar-rich mineralogy of the rock type. The mineralogical composition of rhyolite is defined as containing mostly quartz and feldspar with a total silica content of more than 69%. Quartz in rhyolite may be usually present in amounts of 25% to 30%. Feldspars often make up 50% to 70% of rhyolite.

Rhyolitic magma erupts catastrophically because rhyolitic lava has a high gas content. It is viscous and therefore traps gas, builds pressure and explosively erupts. High viscosity is related to highest silica content.

Overview of Mount Amiata

Mount Amiata (with a summit elevation of 1738 m) lies in the southernmost part of Tuscany region of Italy and the surrounding landscape is densely forested and consists of a series of roughly NW-SE trending ridges and valleys. Mount Amiata is a late quaternary complex mainly formed of ignimbrite sheets and trachytic lava domes and flows. It is part of the larger Amiata complex volcano (Fig. 1).

Radiometric dates indicate that the Amiata complex had a major eruptive episode about 300,000 years ago. No eruptive activity has occurred at Amiata during the Holocene, but thermal activity, including cinnabar mineralization, continues at a geothermal field near the town of Bagnore, at the SW end of the dome complex.

The activity of Mount Amiata during its main stage consisted of voluminous eruptions of rhyodacitic ignimbrites. This activity was accompanied or followed by the formation of at least seven major lava domes (Fulignati et al., 2014). The latest significant rhyolitic activity in the Mount Amiata area was the emplacement of one large and two smaller flows, the larger one (south of the summit) reaching a length of 5 km while being up to 4 km wide. Smaller flows of more mafic (trachytic) lava were erupted during the last activity, mainly on the eastern flank of the summit lava dome (Figs. 2-3).

A summary geologic map of the volcanic complex is reported here:

https://www.mdpi.com/energies/energies-07-07434/article_deploy/html/images/energies-07-07434-g001-1024.png

Fulignati et al. (2014) describe a modelling in 3D of Amiata which provides the possibility to interpolate the geometry of structures and the geological features (compare the 3D model with the 3D reconstruction of the highland domes reported above):

https://www.mdpi.com/energies/energies-07-07434/article_deploy/html/images/energies-07-07434-g006-1024.png

The thermal activity with hot springs, and particular concretions of calcium carbonate, is present at Bagni San Filippo (Figs. 4-5).

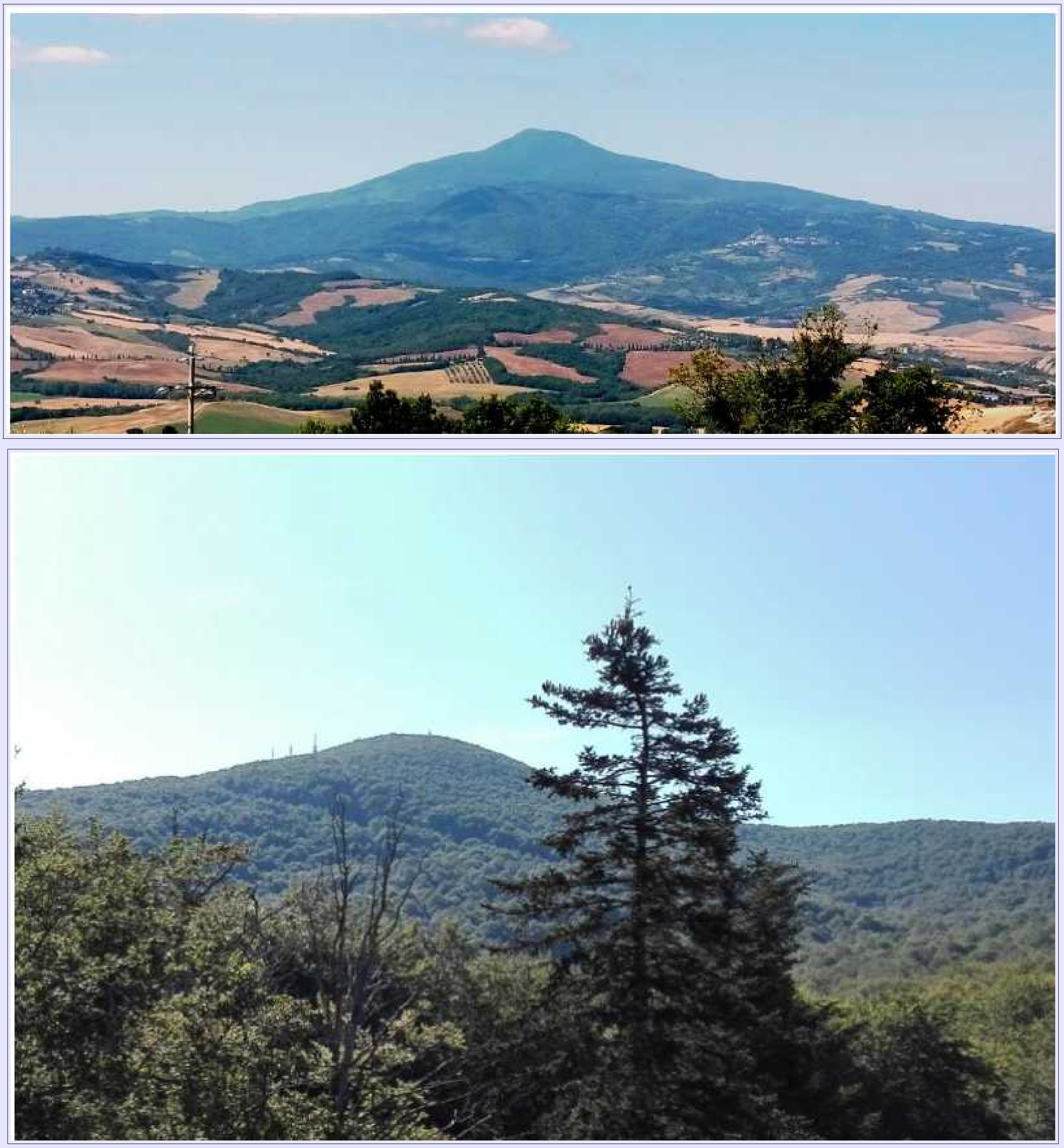


Figure 1: Mount Amiata, a panoramic view (photo of Lena).

Figure 2: Amiata trachytic lava (photo of Lena).

Figure 3: Amiata trachydacitic lava (photo of Lena)

Mount Amiata is volcanic in nature, in which eruptions of lava some 300,000 years ago superimposed eruptive rocks and magma flows over a clayey base linked to the evolution of the corrugation of the Apennine chain dating back to the Paleozoic era. Secondary volcanic activity on Mount Amiata involves the presence of high temperature thermal mineral waters, over-saturated in calcium bicarbonate rising to the surface. This neo-tectonic activity could be associated the numerous earthquakes of low magnitude located in the area of Mount Amiata.

Cinnabar is also a mineral of hydrothermal formation (Figs. 6-8), from which mercury is obtained through heating and condensation processes. The common characters in the various fields are the low presence of mercury native, the predominance of cinnabar as the main mineral and the rare association with sulphides.

For about a century (1870-1970) there was an intense industrial extraction of cinnabar, the sulphide from which mercury was obtained, in the Amiata area. For about forty years the mining of cinnabar has been completely abandoned. To remember those events, which were productive, economic and social at the same time, there are now two evocative museums, located one in Abbadia San Salvatore and the other in Santa Fiora.

Figure 4: Bagni San Filippo with thermal activity and hot springs (photo of Lena).

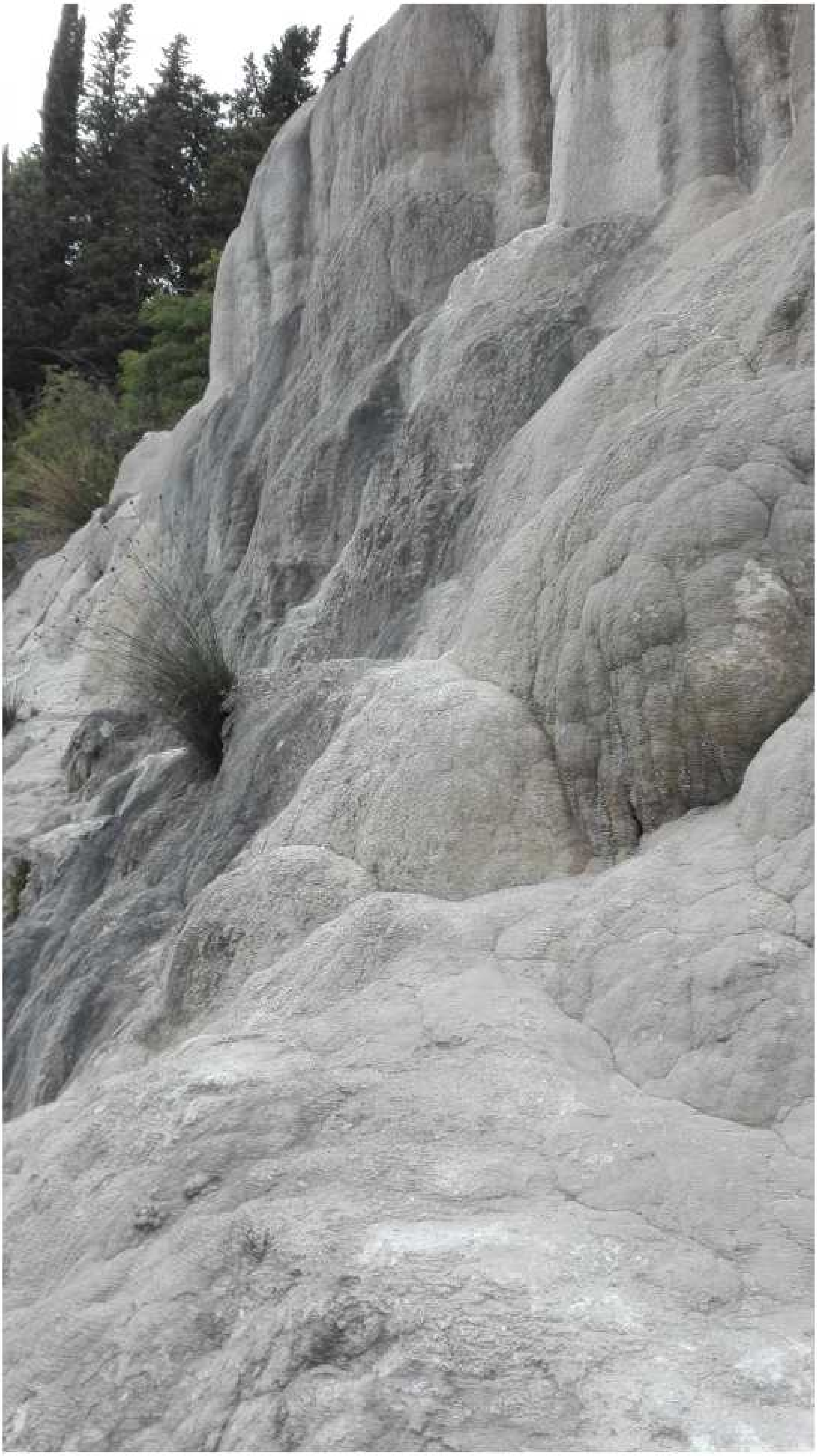


Figure 5: Bagni San Filippo concretions of calcium carbonate (photo of Lena)

Figure 6: Cinnabar, Mercury sulfide HgS, in Calcite (private collection of Lena). Cinnabar is generally found in a massive, granular or earthy form and is bright scarlet to brick-red in colour.

Figure 7: Cinnabar, Mercury sulfide HgS, in Calcite (private collection of Lena).

It is also possible to relate to the same genetic process the presence of local antimoniferous mineralization (stibnite), Sb_2S_3 (Fig. 9).

Domes of trachydacitic and rhyolitic composition

Amiata is a very ancient volcano and site of actual geothermal activity. There are lava domes originating from more viscous lava of a trachytic dacitic composition and with a higher content of silica than the basaltic lavas. There are more than seven of these domes in the Amiata volcanic complex and thus resembling to Gruithuisen lunar highland domes.

Figure 8: Cinnabar (private collection of Lena)

Figure 9: Stibnite, Sb2S3, (private collection of Lena).

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Buried Basins & Craters (a beginners guide or how you can discover a buried crater!) by Tony Cook

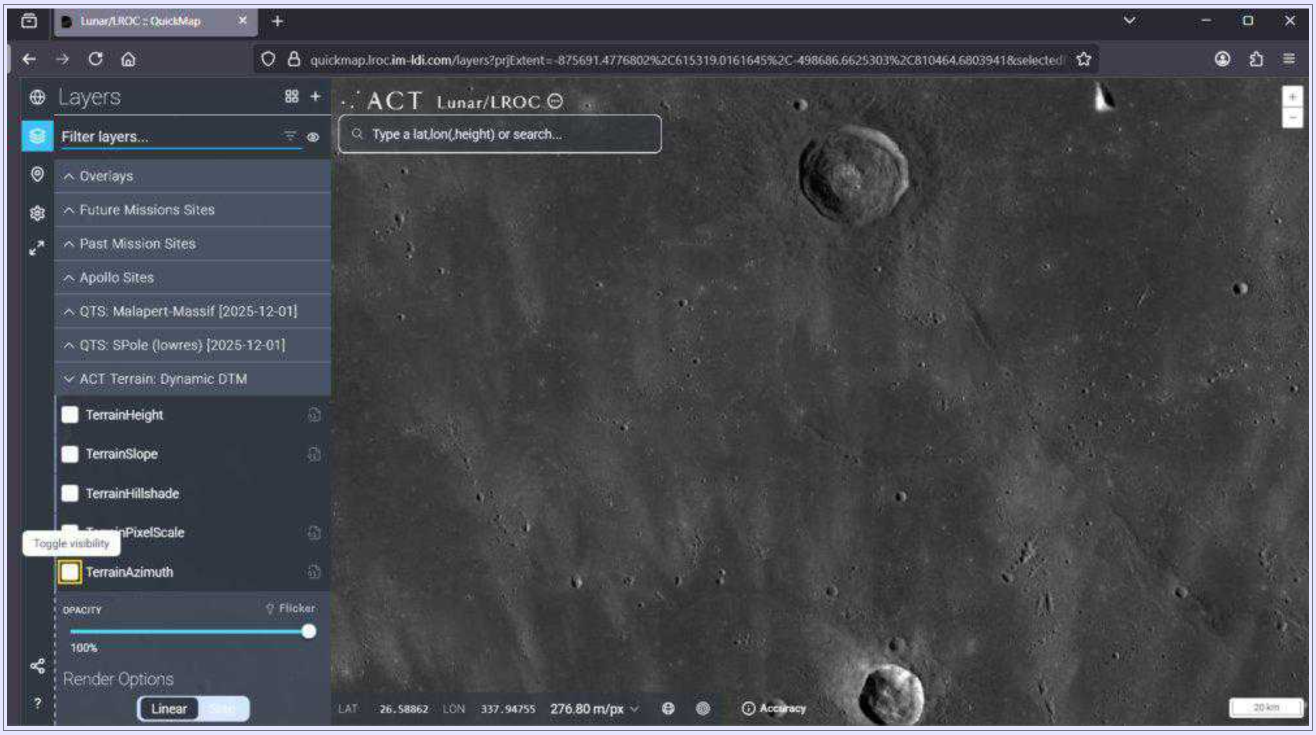

Figure 1. NASA LROC Quickmap view of the area around Lambert crater.

Introduction

Firstly, I would like to thank Skylar Rees for his efforts over the past few months writing these articles – he's done a great job and kept us well informed. As he has entered the 2nd year of his PhD work, his research is now more intense, and he has therefore to devote more time to this. If anybody would like to take over this programme and articles, please let me know.

This month's article is aimed at beginners, showing how easy it is for any of you to discover previously unknown buried craters. We may touch on what to look for, for discovering previously unknown highly degraded basins, i.e. craters larger than approximately 300 km in diameter, next month, as that is more difficult.

What is a Buried Crater?

Basically, it's a crater that has been there for approximately 3 billion years, or more, but was flooded over by lava that formed the dark lunar mare regions. Or it could be buried under ejecta debris from larger nearby craters, or perhaps it has been smashed up by more recent overlapping craters. So, all you see now are perhaps some isolated high points of the circular crater wall showing through, and maybe an isolated central peak. Sometimes the crater maybe so buried under mare lava that you just see slight arc-like mounds above where the rim is buried.

How You Can Discover a Buried crater

You can use images from a telescope at sunrise or sunset, where the sunlight is coming in at a shallow angle – this highlights shallow relief topography thanks to shadows and sunward facing slope brightness. Alternatively, you can use the NASA LROC Quickmap website: select *Projections: Equidistant Cylindrical (<75 deg.,)* or one of the two Stereographic Polar projections. Then click on the layers icon (looks like a stack of 35 mm film slides) and select *TerrainAzimuth*. Find an area of the Moon, like a dark mare, zoom in and toggle the tick box next to *TerrainAzimuth* on and off, looking for arc-like or elliptical or circular structures to appear in the terrain slope azimuth view of the mare lava, which are not visible in the usual map projected image mosaic. You can also check by clicking on the *TerrainHillshade* layer to see if there is any evidence there too. To verify that it has not been discovered before, go to the Overlay layer and click on *Nomenclature*. If a name appears at the centre of your suspected buried crater, then that buried crater is already known about e.g. Lambart R in Fig 2 (Right). If you cannot find it here, then please check out the list of buried craters on this website (see Table 2) https://users.aber.ac.uk/atc/basin_and_buried_crater_project.htm , using the longitude and latitude of the crater when you point the cursor at the centre of what you found (See Fig 2 – Far Right). Again, if it's not there then you probably have discovered a previously unknown buried crater and its time to email me (atc@aber.ac.uk), so we can add it to the list and credit you as the discoverer! Just one point to remember, please check that the circularity or ellipticity of your suspected buried craters matches that of nearby known better preserved craters.

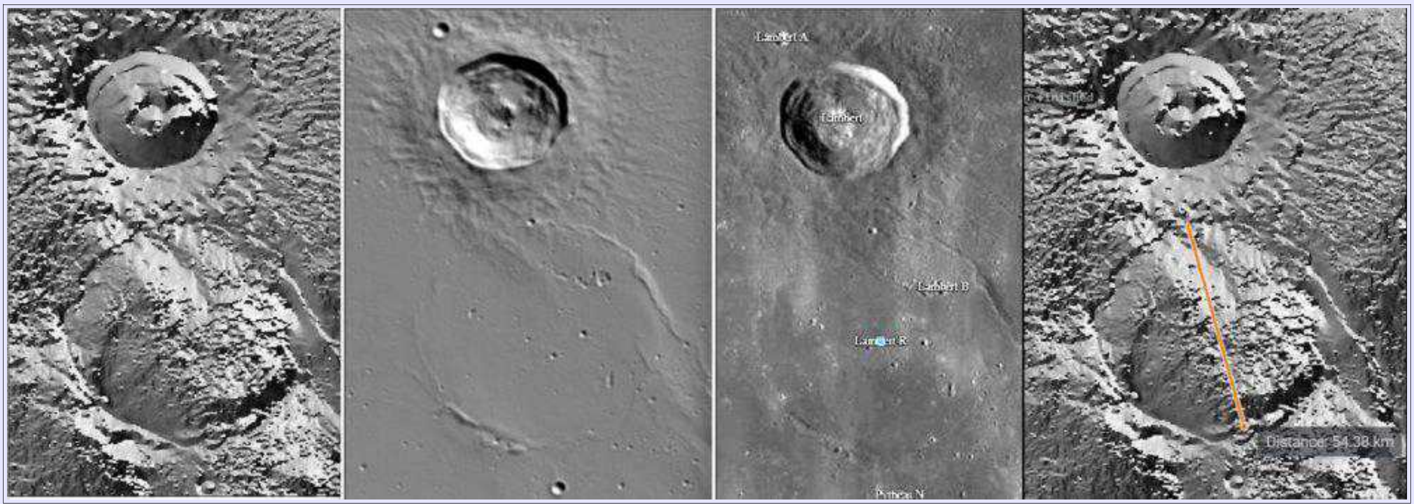

Figure 2. Lambert Crater at the top. **(Far Left)** A *TerrainAzimuth* plot showing a larger buried crater beneath Lambert. **(Left)** *HillShaded* layer, confirming the buried crater. **(Right)** The *Overlay* layer with *Nomenclature* selected with a blue dot at the centre of Lambert R a 56km diameter crater – hence previously known about. **(Far Right)** The *Draw/Search* Tool icon (Tear drop shape) allows you to measure the distance between two points, on either side of the crater, and hence find the crater diameter.

Search for Previously Unknown Buried Craters

Now let's go and find a real, previously unknown buried crater(s) to add to the list. We shall look just south east of the Messier & Messier A, glancing blow impact craters (note that these are elliptical because they are elongated in real life – most craters appear circular, unless distorted by a map projection at a given latitude) – see Fig 3 (left). I can see three circular structures here that I have labelled A, B and C – see Fig 3 (Right). A is not well defined and could be circular by chance from mare lobate flows. B is a little more certain, and C looks very definite and is the largest of all three. Table 1 below lists their centre coordinates and has an average of five diameter measurements for each crater.

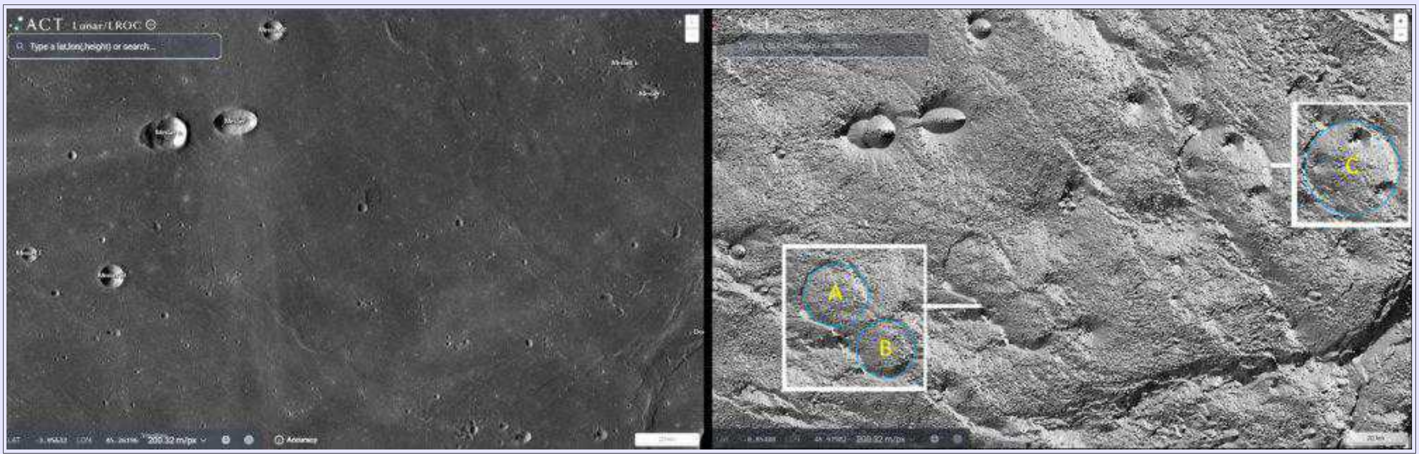

Figure 3. (Left) NASA Quickmap image mosaic view of the region SE of Messier Crater. **(Right)** *TerrainAzimuth* layer view of the same area. The white inset boxes highlight 3 suspected buried craters which are labelled A, B and C.

Crater	Lon	Lat	Diameter	Catalog ID
A	48.0°E	3.5°S	20.7 km	Cook 3
B	48.6°E	4.1°S	17.8 km	Cook 4
C	50.7°E	50.7°S	30.6 km	Cook 5

Table 1. Details about the newly discovered buried craters

I hope that next time we have an article on buried craters, many of you will have taken a look at telescope images of the terminator at sunrise/set OR will have used the NASA Quickmap web site, following the instructions above and I can start using catalog IDs with your surnames to show who the discoverer was. So, this is a challenge for you to try before the next month's newsletter. Incidentally if you think you can find a reference to the craters in Table 1 that pre-dates their discovery, please let me know and I will update the designation catalog ID in the table to reflect a previous discoverer.

Useful Links:
Please take a look at our website for other lunar impact basins and buried craters, to check if they have been discovered before, or that you may want to image:
https://users.aber.ac.uk/atc/basin_and_buried_crater_project.htm .

I am really keen to gather imagery of the less certain basins, and also for all basins and buried craters in order to find the best selenographic colongitudes to see them at sunrise and sunset. This is something that telescopic observers can participate in.

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Valentine Dome – RIP? by Barry Fitz-Gerald.

I well remember many conversations I had with Keith Abineri in the early 1990's about lunar domes and what the Lunar Orbiter IV images revealed about them, and he firstly drew my attention to the Valentine Dome (also known as Linne α) on the western shore of Mare Serenitatis. Being a veteran lunar observer and extremely active section member from the late 1940's onwards, Keith was familiar with the 'discovery' of the feature by Alika K Herring, who described it in a 1962 edition of Sky and Telescope, as well the attention the dome received from lunar observers over the following years*.

The origin of the Valentine Dome is believed to be the result of subsurface magmatic activity, where a molten body intruded into the crust, forming something shaped like a flattened mushroom, and causing the overlying surface too bow upwards[1][2]. The most recent analysis [3]of the feature largely perpetuates that interpretation and even extends the boundaries of the dome and the magnitude of the suspected sub surface magmatic activity responsible.

I have however for some time harboured suspicions about the Valentine Dome, and now feel it is time to review the dome's origin and nature – I am sure it may precipitate some disagreement, but if you go back through the Lunar Section archives, the exchanges in 'The Moon' often involved differences of opinion on the origin and nature of various features, and it might be refreshing to think that there is still scope for such a debate at a time when the Moon is subject to an increasing amount of professional scientific attention.

The Apollo 15 image shown in Fig.1 shows that the Valentine Dome looks like someone has dropped a pancake on to the lunar surface – it is a broad circular structure about 33kms in diameter but only rising some 230m above the mare surface, giving slopes in the region of 0.4° so hardly a stiff slog uphill. Its western margin transitions imperceptibly into the surrounding mare, whilst the eastern margin is marked by a distinct 60m high escarpment, but having said that it slopes at only a shade over 4°, so again hardly precipitous. A curving rille cuts the dome, trending NW-SE, it can be followed beyond the dome in both directions, in to the adjacent highlands to the NW and out onto the mare surface in the SE.

Fig.1 Apollo 15 image AS15- 91- 12372 showing an oblique view of the Valentine Dome – viewed from the NE.

The surface of the dome has a number of small rounded hills projecting above its surface, with a cluster of more elongate hills (with a NW-SE trend) clustered around its southern edge. There appears to be nothing anywhere on the dome to indicate volcanic activity, and the surface is pretty much the same spectroscopically as the surrounding mare. This observation has been used to support a 'Laccolith' interpretation, as this would leave the surface uplifted but essentially unmodified. I am not completely sure of this as there are indication in the TiO_2 abundance overlays in Quickmap, that the dome surface has an elevated abundance compared to the surrounding mare. This fact is somewhat obscured by a ray composed of lower TiO_2 abundance material that crosses the dome surface from N-S (Fig.2). This may suggest that the elevated dome surface is of a basalt with a higher TiO_2 abundance but that it is embayed with mare lavas with a lower TiO_2 abundance - which could imply that the dome surface is *older* than the surrounding mare.

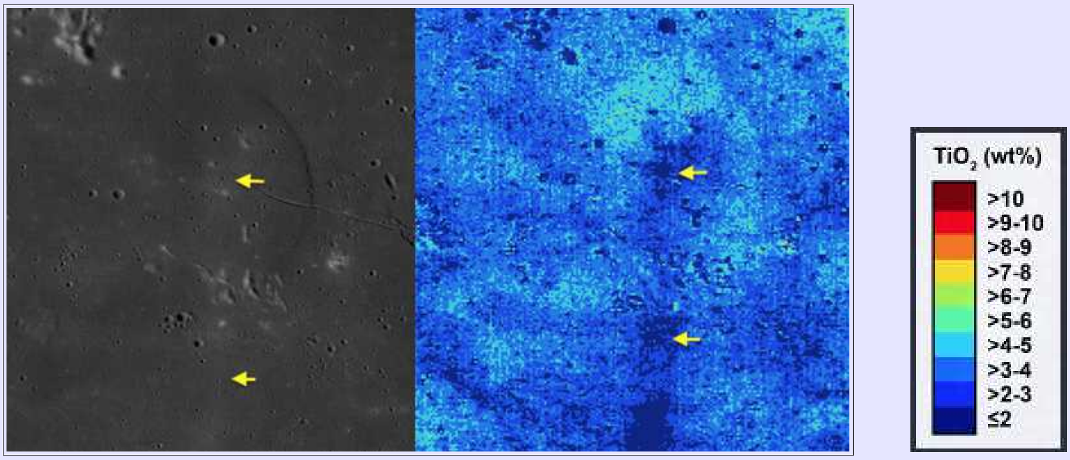


Fig.2 LRO WAC image of the Valentine Dome (left) with the same area shown with the Quickmap TiO_2 abundance overlay enabled (right). The dome can be seen to have a more yellow colour – indicating a high TiO_2 abundance, but that this is overprinted by a ray (yellow arrows) which has a lower TiO_2 abundance.

The latest research[3] based on up to date imagery and data, proposes that in addition to the main Valentine Dome (V1 in Fig.3) and a previously described smaller one to the north[4] (V2 in Fig.3) there is a third quite subtle structure nearby (V3 in Fig.3) and that is part of the same volcanic complex, increasing the extent of the proposed volcanic activity. It also proposes that a number of features within the area are actually volcanic in origin and supporting the laccolith interpretation.

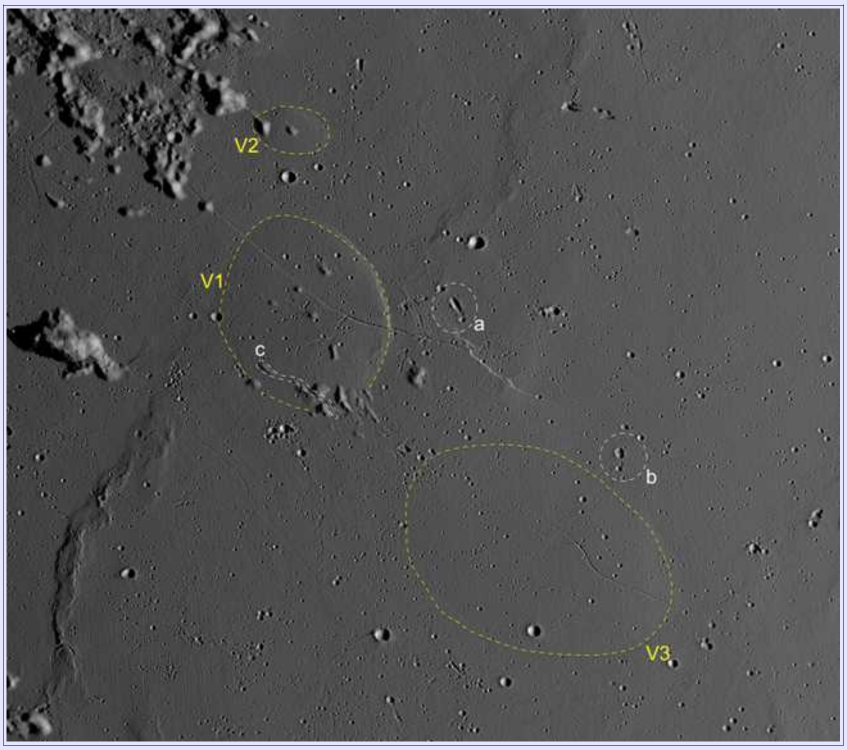


Fig.3 LRO Quickmap Terrain Shade rendition of the Valentine Dome(s) labelled V1 to 3 and identified with yellow dashed lines. Features identified in a recent study as being volcanic in origin are shown with white dashed lines (a-c). V1 is the Valentine Dome.

Starting with these suspected volcanic features – I think these may be a case of mistaken identity. In Fig.3 features a and b show two features interpreted as volcanic vents, there are no spectral differences between them and the surrounding mare, and the identification is based on morphology. Fig.4 shows LRO NAC images of these two features, and it appears more likely that these are secondary craters from some unknown impact and not vents of any sort. Feature a for instance has a tapering width profile from NW to SE, with a 'herringbone' texture visible on the surface to either side – this is characteristic of a secondary cratering, whilst feature b appears to be a simultaneous doublet impact, with a partial septum visible on the crater floor, separating the two components. So neither of these really pass the sniff test for being volcanic in origin, and can be dismissed as evidence for volcanism.

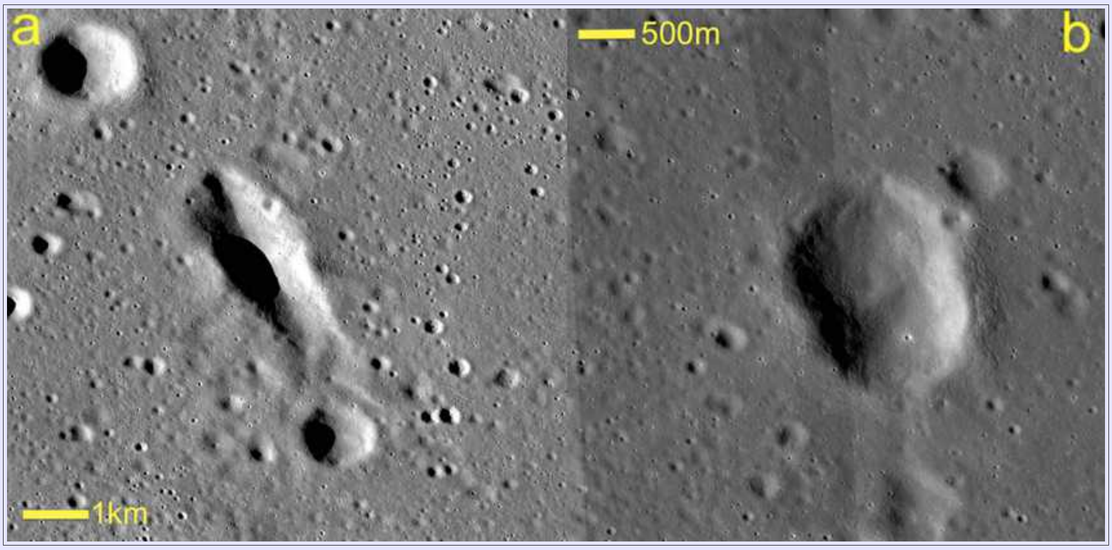


Fig.4 Features a and b from Fig.3 shown in NAC images – a appears to be a secondary crater chain – note the herringbone pattern to either side, and b is a small binary secondary impact – note the septum crossing the crater, a feature of simultaneous binary impacts.

Another feature identified as of possible volcanic origin is a sinuous ridge (feature c Fig.3) that runs amongst the hills on the southern border of the dome. This is interpreted as a dyke, a vertical sheet of lava that has ascended via a fracture in the crust, and is expressed on the surface as a ridge of volcanic rock standing proud of the surface.

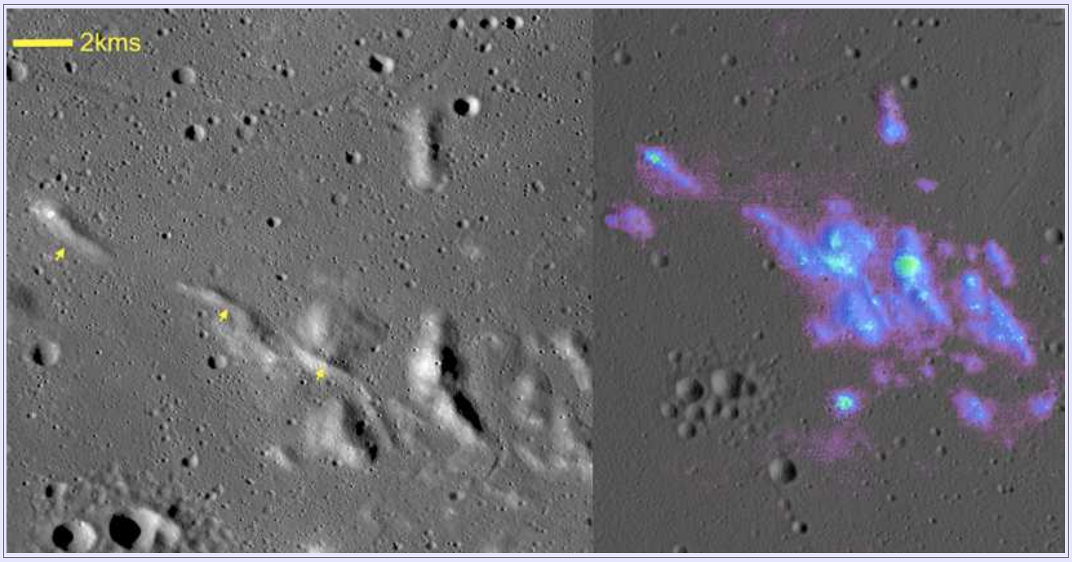


Fig.5. Feature c from Fig. 3 shown in a SELENE image (left) and NAC/KAGUYA image right. The blues and greens in the right hand panel represent rocks rich in plagioclase feldspar, typical of highland material. Note that c has this highland signature.

This is shown in the SELENE image in Fig.5, and whilst it looks odd, it is suspiciously similar in orientation to the crest of a ridge of highland material some 80kms to the SW (Fig.6), which is a submerged section of the Apennines. If the level of the mare had reached the top of this ridge, the surviving crest would look more or less the same as the suspected dyke. Additionally the KAGUYA mineral data show that this suspected volcanic feature actually has a strong signal for plagioclase feldspar, typical of highland rock, and where small impact craters have struck it, this mineral dominates the ejecta blanket, whilst a strong mafic signal, which you might expect from a dyke is absent. So on balance I think this structure also fails the test of being volcanic and can therefore add nothing to the standard interpretation of the dome.

There are a number of other arguments used to support the laccolith hypothesis for all of the suspected domes here (V1-3), I do not intend to go through all of them, and would suggest that if you are interested in these you refer to the paper [3] cited below, but suffice to say I do not think that a convincing case for maintaining the volcanic hypothesis is presented.

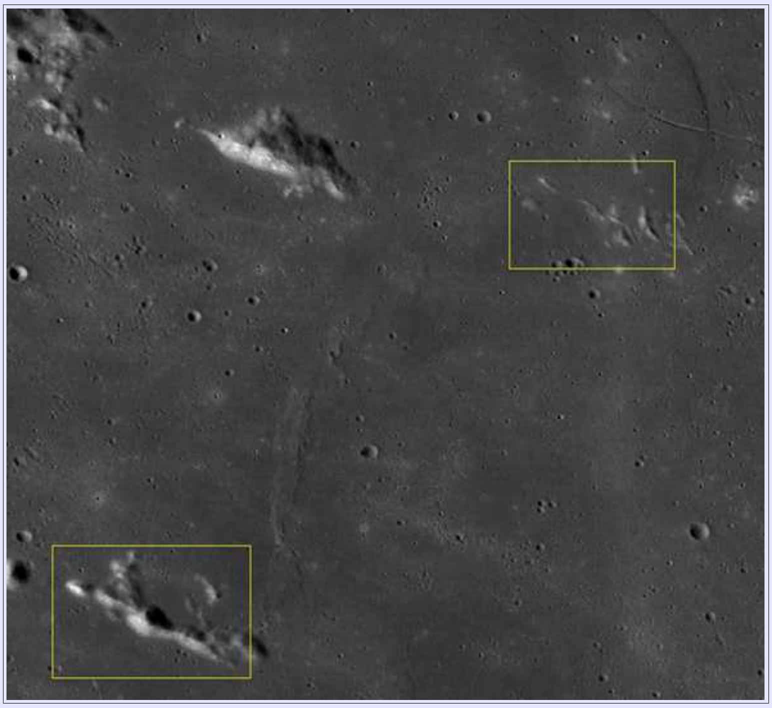


Fig.6 WAC image showing the hills with feature c (upper box) and a range of hills to the south (lower box). Note the similarity in the trend of both – roughly NE-SE.

So if the Valentine Dome (and its subsidiary structures V2 and 3) are not volcanic in origin, what are they? Well, in last month's LSC I described an unusual feature on the floor of the crater Murchison, which I suggested represented slabs of lava, that had originally formed the crust of a lava lake, that had become stranded on a pinnacle of high terrain as the lava lake dropped. I suspect that a similar process involving a subsiding lava field with a solidified crust, encountering uneven terrain beneath is responsible for these 'domes' and not volcanism.

That this is what has produced the Valentine Dome and not volcanism is suggested by the Bouguer gravity gradient map shown in Fig.7. In this overlay the blue represents dense basaltic rocks which fills the mare, and the yellows and reds the less dense highland rocks forming the Apennines and the uplifted rim of Mare Imbrium. You will note that the location of the main dome (V1) corresponds to a tongue of what appears to be the less dense highland material, albeit here submerged beneath mare lavas, and therefore not visible at the surface. The presence of this submerged highland material is confirmed by the presence of the hills poking above the surface of the dome and which are of a highland composition and represent the highest peaks of the submerged highland massif. If this dome was underpinned by a magmatic body you might expect to the area to show up as blue in this overlay indicating the denser rock beneath. Examples of this can be seen in the Gardner Megadome complex, the Marius Hills or Mons Rumker – all volcanic in origin and underlain by dense magmatic rocks – quite different to what we see here.

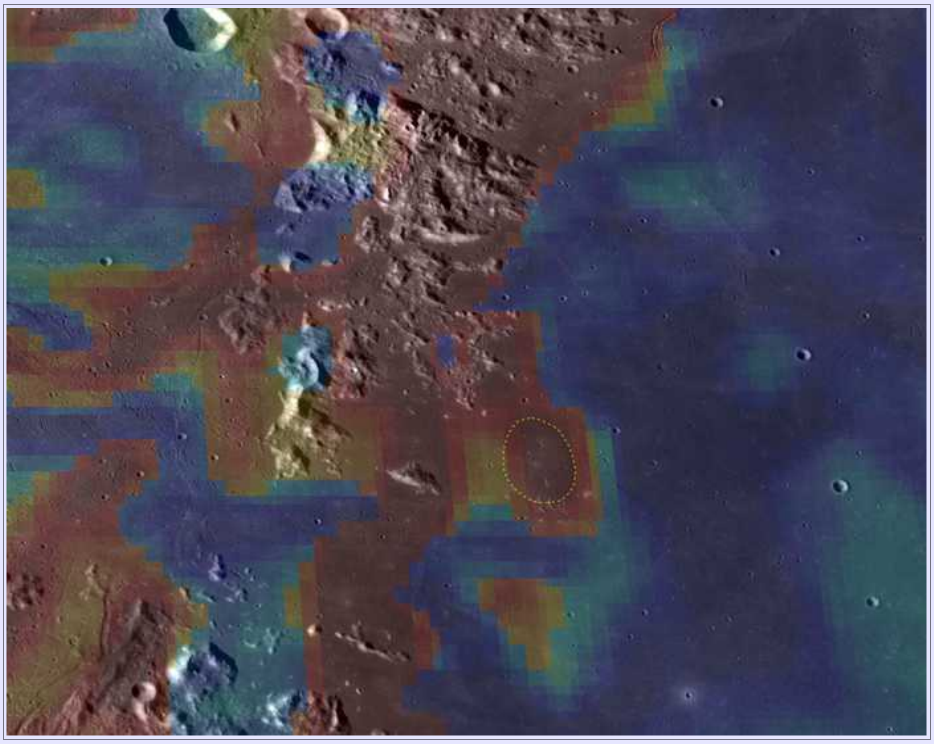


Fig.7. GRAIL Bouguer gravity gradient map overlay from Quickmap showing the Valentine Dome being underlain with less dense rocks (red) than that in the basalt filled mare and bays either side of the Apennines.

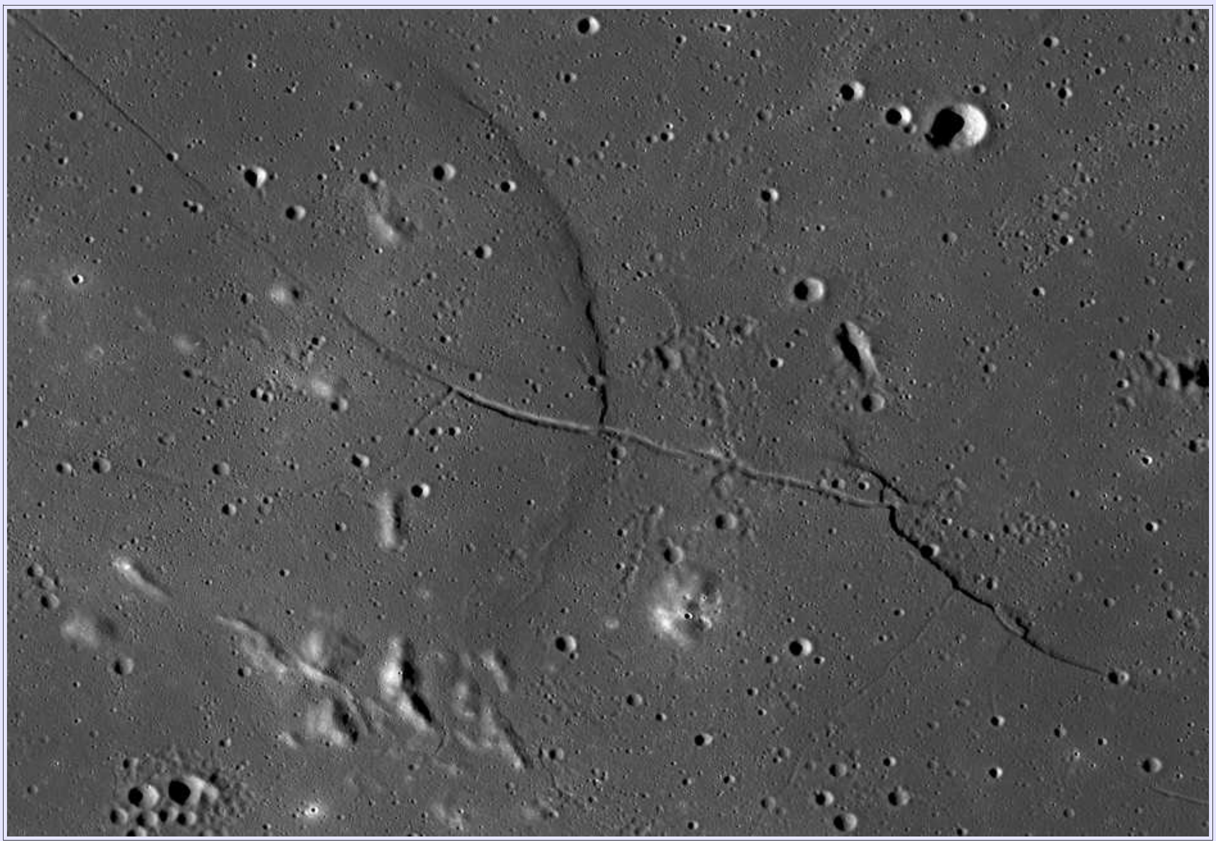


Fig.8 SELENE image of the Valentine Dome (V1) showing the graben grossing the dome from NW-SE, and how the NE side has subsided, leaving its twin to the SW as a scarp with the appearance of a normal fault.

Something else that has been suggested as indicating intrusive volcanism of the laccolith type is the fracture crossing the dome from NW-SE. This is in fact a graben, a pair of closely spaced parallel faults where the ground between has subsided. This is quite clear along the section at the middle of the frame in Fig.8 where the 700m wide and ~100m deep graben is clear, but to the NW and to an extent the SE the fracture looks more like a normal fault forming a NE facing escarpment. This is because the terrain to the north of the graben has subsided – taking the northern wall of the graben with it – and leaving the southern one on its own. This has happened unevenly, with the sections with the fault like appearance having experienced more subsidence. The likelihood is that this is a response not to subsurface volcanism, but to the fact that the mare to the NE – so towards the top left of the frame in Fig.8 has sunk under its own weight – as has happened in many mare – producing the graben we see. The bit in the middle of the dome where the graben looks indistinct is just the result of it being obliterated by the impact of a secondary crater cluster associated with the low TiO_2 ray mentioned above.

So rather than being a volcanic dome, where the surface has been forced up from below, the dome originated as a solidified crust which formed over a vast molten lake that drowned an irregular landscape beneath. Initially the surface of this lake stood at a much higher level, but as the still molten lavas beneath the crust either cooled and contracted or magmas migrated elsewhere, the chilled crusted surface to drop to a lower level. Where it encountered submerged higher ground it became stranded whilst the surrounding levels continued to drop. The highest points of the submerged terrain end up as the hills that are visible projecting above the dome surface.

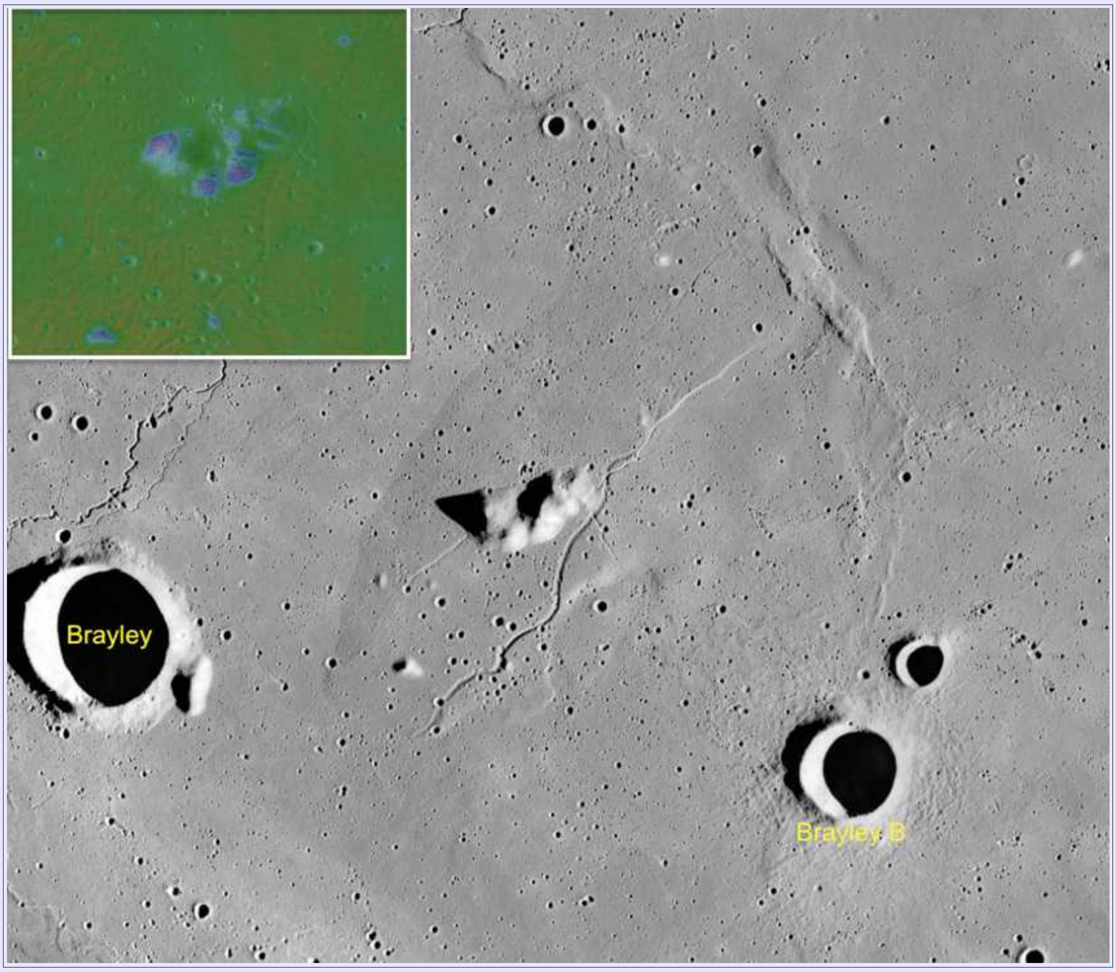


Fig.9 Apollo image AS17-M-2927 showing a possible example of the same type of structure to the Valentine Dome showing the low broad swell, highland peak and graben crossing the surface. The swell only rises some 100m above the mare surface. The inset shows the FeO abundance with the yellows and green indicating higher abundance – note much of the highland peak has an abundance similar to that of the surrounding mare, indicating that this was at one time much higher. For scale Brayley B is 9kms in diameter.

The Valentine Dome is not the only potential example of this type of structure, Fig. 9 shows another one between the crater Brayley and Mons Vinogradov, where a broad swell surrounds an island of highland material (which is part of a submerged Imbrium Basin ring). A prominent graben that is similar to that on V1 crosses the feature from NE-SW, but does not extend beyond the swell – possibly as a result of later embayment by younger lavas, but also as it may be restricted to the surface of the swell itself. In this case the highland hill rising from the dome appears to have been draped in mare lavas, having an FeO abundance similar to the surrounding mare, and suggesting that the mare lavas once stood at a much higher level.

Another nice little example can be seen 50kms to the SW of Euclides F (Fig.10) – quite modest in size, but similarly with a nubbin of highland material at its core and graben cutting its surface.

It would appear therefore that these structures are quite widespread (there are more examples, but I will not bore you with more of the same) and that they exhibit a number of similar characteristics namely:

1. A broad dome like appearance but with extremely low slopes and low elevation above the surrounding mare – in the region of 80 – 150m.

2. Hills of highland composition projecting above their surface indicating that highland terrain lies beneath the surface at shallow depth.

3. Presence of graben cutting the dome indicating that their surfaces have been subject to tensional forces.

4. An absence of any obviously associated volcanic material or structures.

5. Many have quite steep scarps around sections of their edges.

6. Many appear to be embayed by lavas of a different composition (higher or lower TiO_2) suggesting that they represent a pre-existing, older surface.

7. They do not have a GRAIL gravity anomaly consistent with an underlying body of dense magma which would indicate the presence of a laccolith.

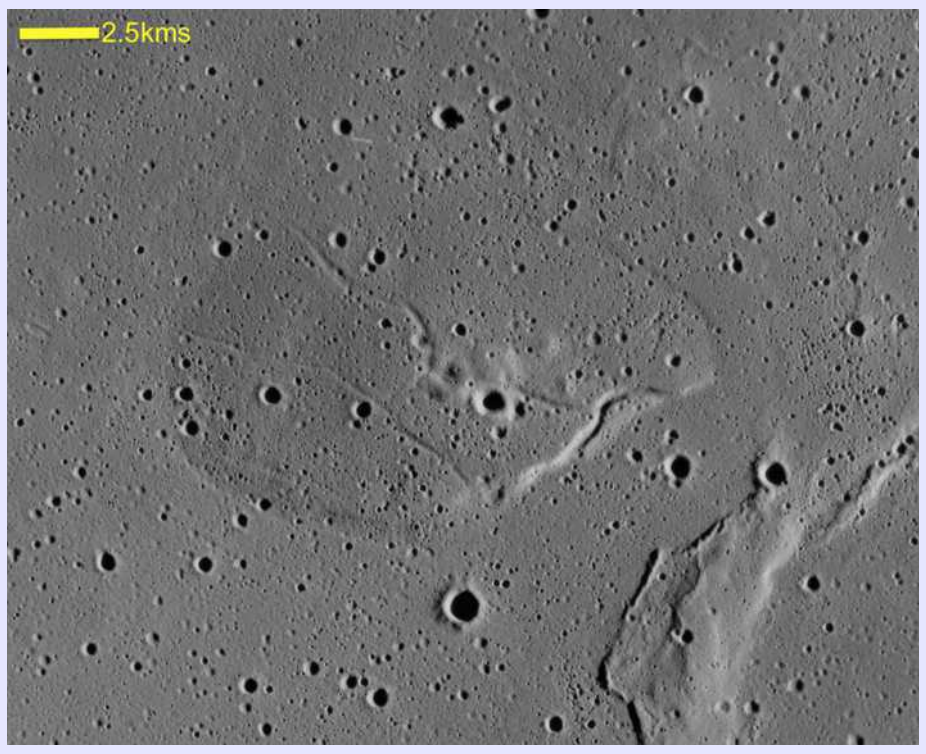


Fig.10 Apollo image AS16-M-2837 showing a small example of a dome like structure with highland hills poking above the surface and cross cutting graben. It rises some 100-120m above the mare surface.

So, with the above observations in mind, I think it is time to drive a nail through the heart of the Valentine Dome, and consign it to the ranks of the '*ex-domes*'. Instead, I think it represents one of a type of feature that I would term a 'stranded mare surface ' – where a freshly erupted mare developed a cooled surface crust, and that parts of this this crust became 'stranded' on submerged highland massifs as the mare levels dropped. These stranded sections may have then fractured as they draped themselves over the underlying topography, and even cracked at the edges as the un-stranded crust nearby continued to drop. Eruption of younger lavas (possibly of a different composition) might then have embayed these elevated stranded artefacts, a process that could enhance the circular appearance many of them have. Some of these features look quite rounded with curving surfaces and hence the 'dome' classification, but when you look closer at the topographic profiles, a flatter more slab like appearance becomes apparent. This is the case with an example on the eastern shore of Sinus Iridum (Fig.11) which appears to be a slab like structure with hills of highland material projecting above its surface, along with the ubiquitous graben fractures. This has for all the world the look of a large rectangular slab that is tilted slightly towards the centre of the sinus – and it almost looks as if it has partially sunk beneath the mare surface. This is not the case though, it has merely been embayed by younger lavas which produced this impression.

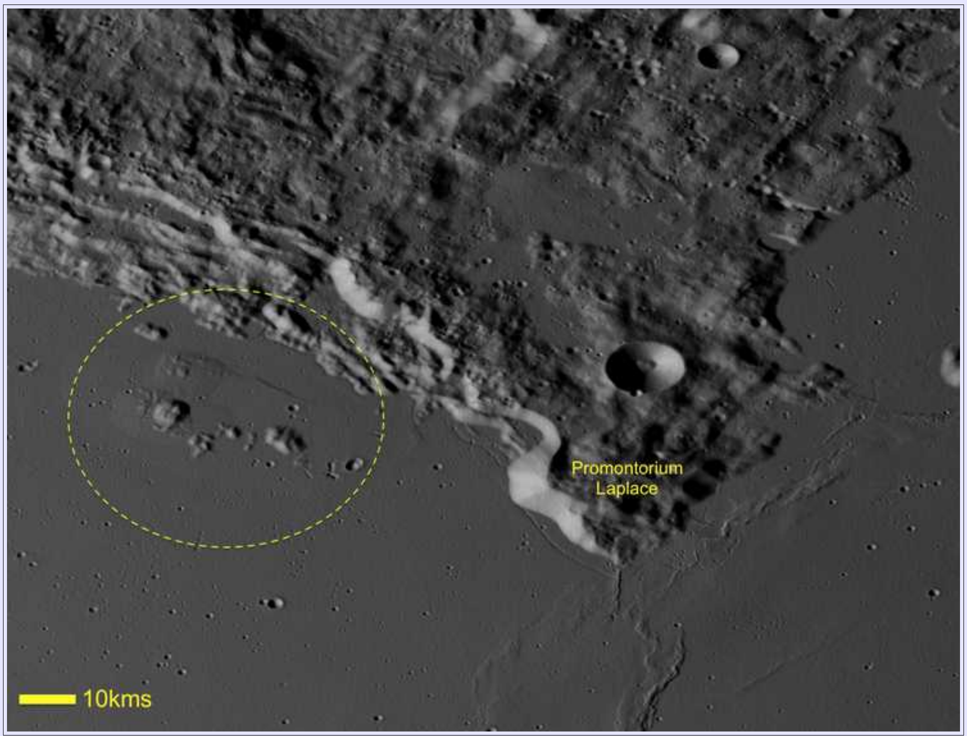


Fig.11 QUICKMAP TerrainHillshade rendition of the eastern shore of Sinus Iridum showing a slab like structure that may be of similar origin to the examples shown above, involving the stranding of a slab of mare crust on elevated, but formerly submerged highland terrain in this case part of the collapsed rim of the sinus.

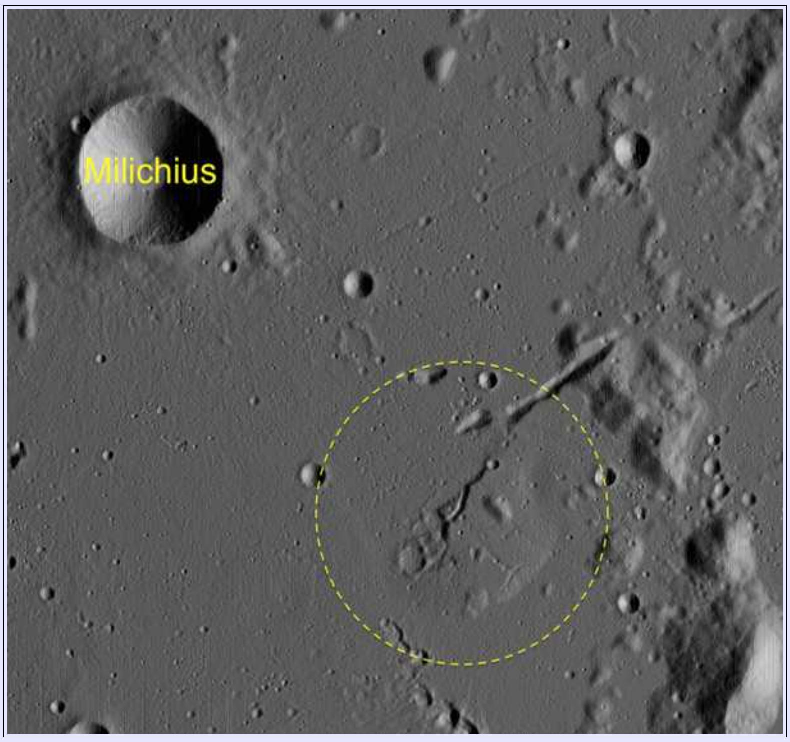


Fig.12 TerrainHillshade rendition of a possible example of a 'stranded mare surface' near the crater Milichius.

As one final example, Fig12 shows a smaller version of the Valentine dome, this one is located well and truly in amongst lots of evidence of volcanism (in the form of proper volcanic domes and fissures) between the craters Milichius and Hortensius. As with those noted above, it is a rounded, cracked structure, with a nubbin of highland material projecting above its surface. It is set in a mare like locality, but this appears to be just a shallow veneer of lava covering barely submerged highland terrain.

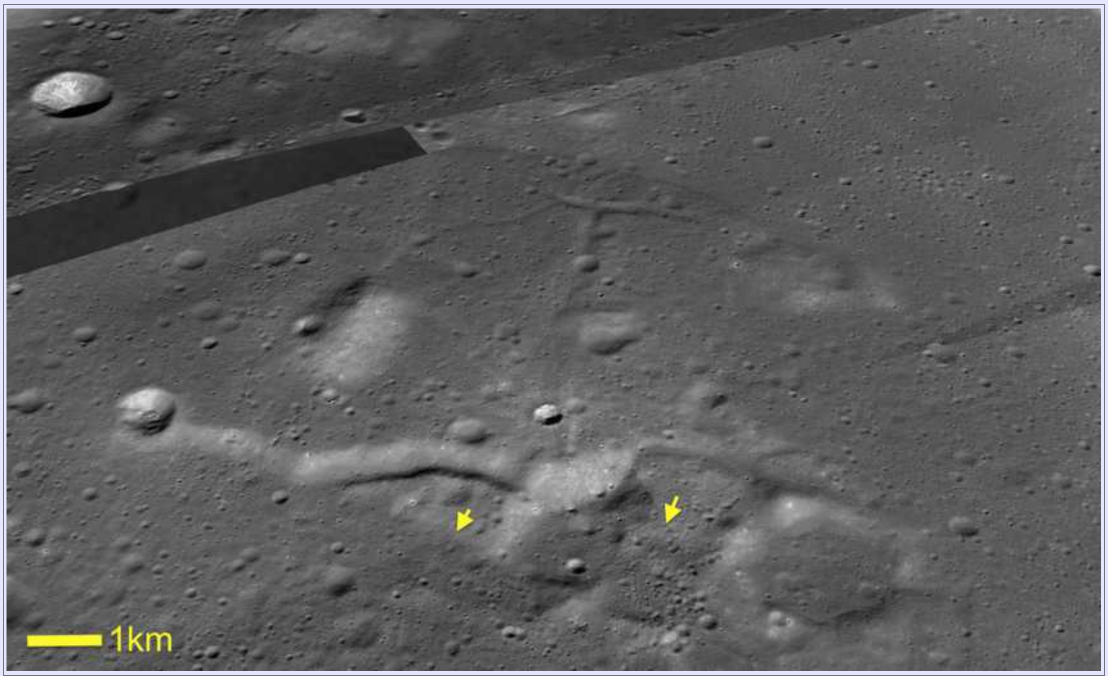


Fig.13 3D rendition of the feature shown in Fig.12 viewed from the NW showing the slab like structures that have broken off the edge along the line of the prominent fracture, and tilted downwards in the direction shown by the yellow arrows. This fracture would have looked like a graben prior to this outwards collapse.

The 3D rendition in Fig.13 shows quite clearly how the edges of this structure have snapped off along a fracture (rather like the edge snapped off a biscuit), to produce tilted slabs as their outer edges rotated downwards. The structure is consistent with the stranded mare surface model, but just to prove that life is rarely that simple, there is a structure on the surface that looks suspiciously like a volcanic vent – and other more convincing volcanic structures can be seen nearby. But these are not a fatal to the stranded mare surface model, as later episodes of volcanism may well have modified these features, but not necessarily have any role in their formation.

Any 'domophiles' out there might be a bit upset at this attempt to exile the Valentine Dome from the pantheon of lunar volcanic structures, but I think the evidence for them being remnants of older mare surfaces is more convincing than that cited in the laccolith model. You may well disagree!

* See The Moon, Bulletin of the Lunar Section of the British Astronomical Association, Vol.13, No.3, p.52 and Vol.15, No.2, pp 37-38.

1. Wöhler, C., & Lena, R. (2009). Lunar intrusive domes: Morphometric analysis and laccolith modelling. Icarus, 204(2), 381–398

2. Michaut, Chloe. (2011). Dynamics of magmatic intrusions in the upper crust: Theory and applications to laccoliths on Earth and the Moon. Journal of Geophysical Research. 116. 10.1029/2010JB008108.

3. Suarez- Valencia, J. E., & Rossi, A. P. (2024). Geostratigraphic mapping of the intrusive Valentine Domes on the Moon. Journal of Geophysical Research: Planets, 129, e2024JE008423.

4. Lena, R., Pau, K. C., Phillips, J., Fattinnanzi, C., & Wöhler, C. (2016) Lunar domes: a generic classification of the dome near Valentine located at 10.26°E and 31.89°N. Journal of the British Astronomical Association, Vol. 116, No. 1, p.34

LUNAR GEOLOGICAL CHANGE DETECTION PROGRAMME by Tony Cook.

TLP Reports: No TLP reports were received for August

Routine reports received for July included: Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: earthshine, Gassendi, Sinus Iridum, and several features. Tony Cook (Newtown, UK – ALPO/BAA) imaged: the Moon in the Short-Wave infrared. John Duchek (Carrizozo, NM, USA – ALPO) imaged: Lassell and Tycho. Valerio Fontani (Italy – UAI) imaged: Copernicus. Francesco Modello (Italy – UAI) imaged: Barrow and Cyrillus. Peter Mulligan (Sheffield, UK – BAA) imaged: earthshine. Andrew Paterson (France – BAA) imaged: earthshine and the Moon. Aldo Tonon (Italy – UAI) imaged: Barrow. Luigi Zanatta (Italy – UAI) imaged: Barrow and Copernicus.

Analysis of Reports Received (July):

Jansen, Klein and Langrenus: On 2025 Jul 01 UT 05:37-05:38 Maurice Collins imaged the whole Moon under similar illumination to the following three reports:

Jansen-Maskelyne 1969 Jul 20 UT 00:53-01:00 Observed by Jean and Collak (Montreal, Canada, 4" refractor and 6" reflector) "Jean and Collak noted obscur. between Jansen and Maskel. from term. No features discernible here whereas Proc. & Theoph. were already vis." NASA catalog weight=2. NASA catalog ID #1169. ALPO/BAA weight=2.

Near Langrenus 1969 Jul 20 UT 00:53-01:00 Observed by McNamara (Canada, 6" reflector) "McNamara saw a flash nr. Lang. (meteor?) Apollo 11 watch)" NASA catalog weight=0. NASA catalog ID #1169. ALPO/BAA weight=1.

Klein (in Albategnius) 1971 Apr 30 UT 21:30 - 1971 May 01 UT 00:00 Observed by Fitton (England, 8" reflector, x200, filters) "Attention distracted from Ptolemaeus to Klein where floor was not normal. It had a pink line at foot of inner N. wall which was bright in sunlight. Pink extended from N. to W. pt. Floor in NW quad. was reddish-brown. All similarly illum. craters were examined & no trace. Klein shifted to all parts of lens but colour persisted, but could not be induced in other craters. At 2230h floor took on more colour in NW. In filters floor detail vis. in red, almost invis. in blue, c.p. barely vis. Colour bright in red, & black in blue filter. In white light looked like atm. above surface. Ptol. was equal in red & blue, & also other craters. All seemed normal again on May 2nd. (date in ref. gives Apr 30, Moore gives Apr 31? Ap 30 wrong as feature not illum on that date, not even illum. on 5/2/71!)" NASA catalog weight=4. NASA catalog ID #1292. ALPO/BAA weight=3.

In Fig 1 (Far Left) there is a wealth of detail between Jansen and Maskelyne, so we shall keep the ALPO/BAA weight of the 1969 Jean and Collak TLP at 3 for now, though I have commented on the reliability of Jean et al observations, as has Cameron and Middlehurst. In the case of the 1969 Langrenus flash, which the observer suspects might have been a meteor impact, well Fig 1 (Left) can be regarded as a context image, but illustrates how bright a background the flash would have to been seen against. Just as an illustration, at Full Moon, the Moon has an apparent magnitude of -12.7, so a 1” x 1” angular area (typical if very good seeing resolution) would have an apparent magnitude of +4.0. Although the Moon was not Full Moon on 1969 Jul 20, the limb is probably not far off. So, I am guessing any impact flash would have to be something brighter than say magnitude +3 to +3.5 to be seen against that part of the dayside lunar limb. This is not impossible because on 2013 Sep 11 a magnitude +2.9 flash was videoed by Spanish professional astronomers. However, it could also have been a cosmic ray air shower event that the observer detected with their eyes whilst looking at the Moon. The area around Klein, a crater on the floor of Albategnius, in Fig 1 (Right) is very interesting by the fact that it’s beyond the terminator. This tells us clearly that the date of 1971 Apr 30, as listed in the ALPO/BAA TLP catalog, and also in the archives is clearly wrong. But what was the date? I decided to take a look at the original Lunar Section Circular report (Fig 2 from the 1971 Jun Circular, Vol 5, No.6, p42) and the Cameron catalog cards (Fig 3).

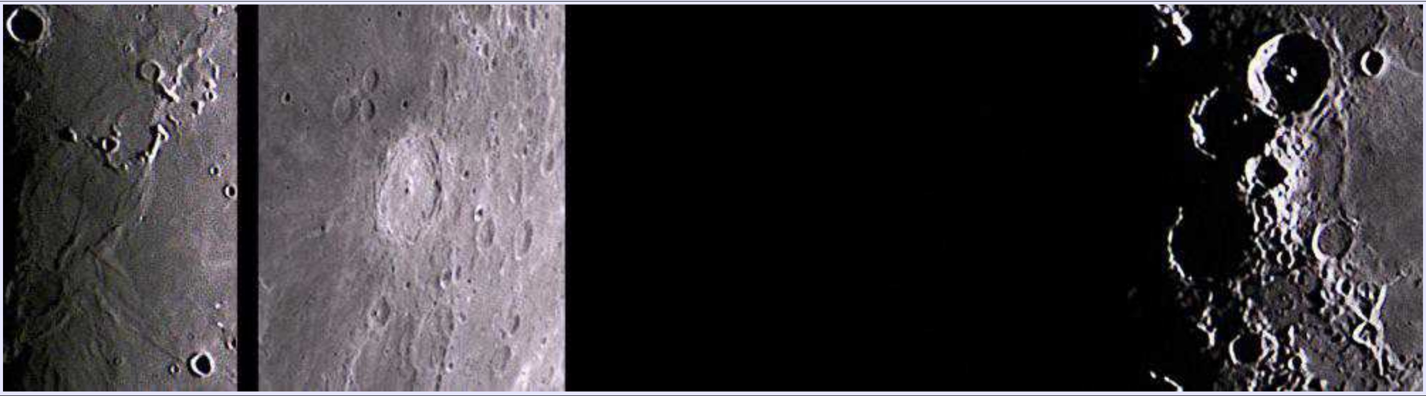
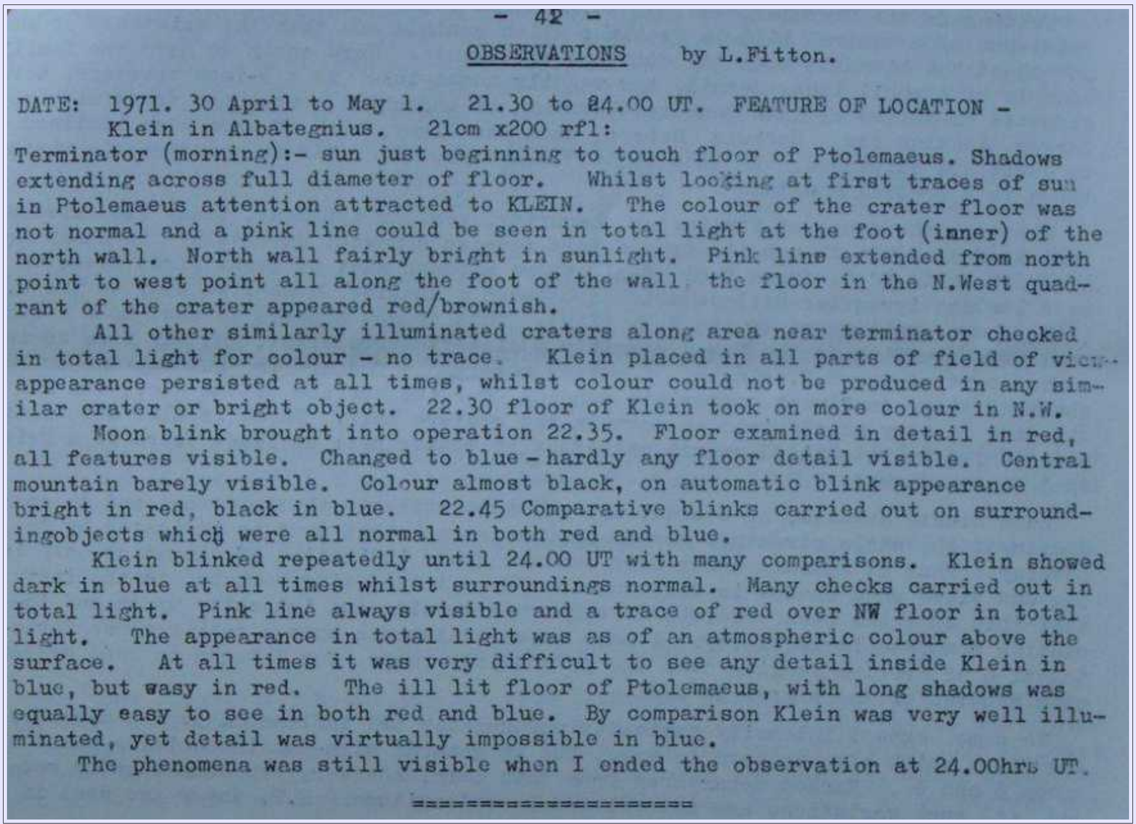


Figure 1. Sections of the Moon as imaged by Maurice Collins on 2025 Jul 01 UT 05:37-05:38 and orientated with north towards the top. **(Far Left)** The region between Jansen, a tennis racket shaped crater in the top centre-right and Maskelyne in the bottom right. **(Left)** Langrenus crater. **(Right)** The terminator and Theophilus, Cyrillus and Catherina.



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OBSERVATIONS by L.Fitton.

DATE: 1971. 30 April to May 1. 21.30 to 24.00 UT. FEATURE OF LOCATION - Klein in Albategnius. 21cm x200 rfl:

Terminator (morning):- sun just beginning to touch floor of Ptolemaeus. Shadows extending across full diameter of floor. Whilst looking at first traces of sun in Ptolemaeus attention attracted to KLEIN. The colour of the crater floor was not normal and a pink line could be seen in total light at the foot (inner) of the north wall. North wall fairly bright in sunlight. Pink line extended from north point to west point all along the foot of the wall the floor in the N.West quadrant of the crater appeared red/brownish.

All other similarly illuminated craters along area near terminator checked in total light for colour - no trace. Klein placed in all parts of field of view - appearance persisted at all times, whilst colour could not be produced in any similar crater or bright object. 22.30 floor of Klein took on more colour in N.W.

Moon blink brought into operation 22.35. Floor examined in detail in red, all features visible. Changed to blue - hardly any floor detail visible. Central mountain barely visible. Colour almost black, on automatic blink appearance bright in red, black in blue. 22.45 Comparative blinks carried out on surroundingobjects which were all normal in both red and blue.

Klein blinked repeatedly until 24.00 UT with many comparisons. Klein showed dark in blue at all times whilst surroundings normal. Many checks carried out in total light. Pink line always visible and a trace of red over NW floor in total light. The appearance in total light was as of an atmospheric colour above the surface. At all times it was very difficult to see any detail inside Klein in blue, but wasy in red. The ill lit floor of Ptolemaeus, with long shadows was equally easy to see in both red and blue. By comparison Klein was very well illuminated, yet detail was virtually impossible in blue.

The phenomena was still visible when I ended the observation at 24.00hrs UT.

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Figure 2. Page 42 from the June 1971 BAA Lunar Section Circular from 1971 Jun Circular, Vol 5, No.6.

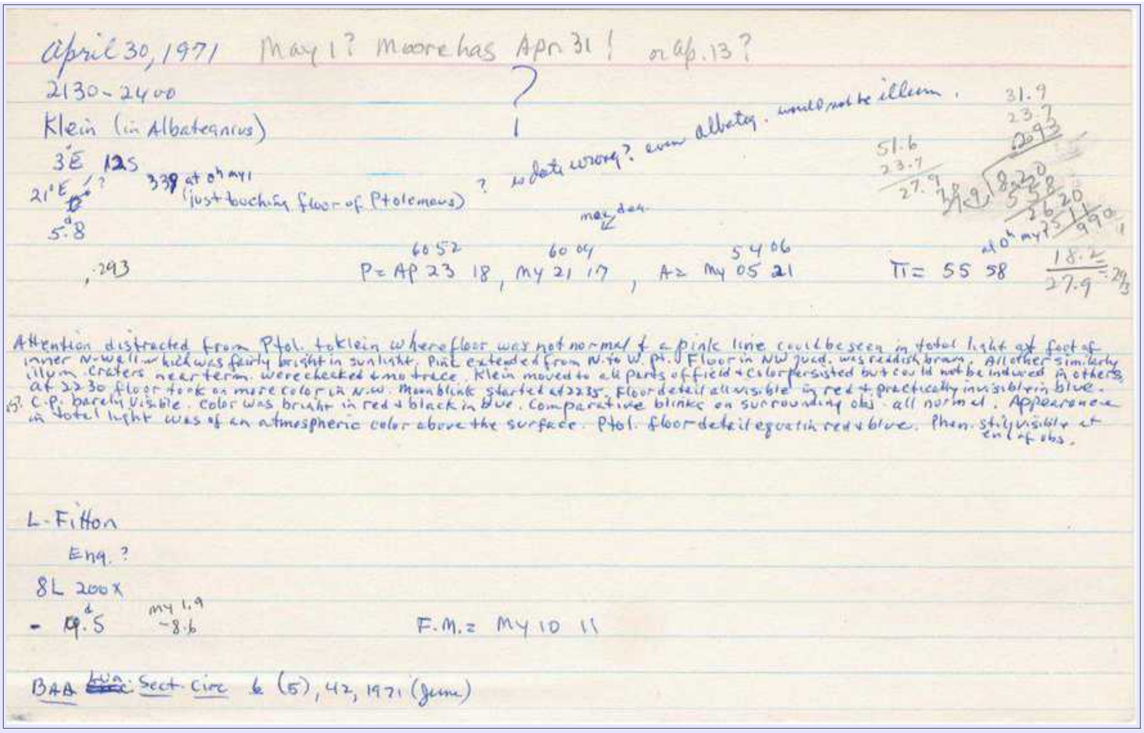

Figure 3. Entry from Winnie Cameron’s TLP catalog card index for the 1971 Apr 30? TLP event.

We shall try a new date of 1971 May 1 because Ptolemaeus, as mentioned in the TLP report, certainly would be just emerging into the Sunlight by then. The ALPO/BAA weight of 3 shall be left as it is.

Tycho: On 2025 Jul 04 UT 03:30 John Duchek (ALPO) attempted to image inside Tycho’s shadow filled interior for the following Lunar Schedule request:

BAA Request: How early can you see the central peak of this crater illuminated by scattered light off the crater's west illuminated rim? High resolution and/or long exposures needed to capture detail inside the floor shadow. All images should be sent to me on the email address below, whether or not you were successful in capturing the central peak: a t c @ a b e r . a c. u k

We have been interested in seeing how early it is possible to see the central peak in Tycho ever since Brendan Shaw imaged (Fig 4 Right) a faint patch of light there back in 2003 when the Sun was a mere 1.2°-1.3° above the horizon at the centre of this 4.7 km deep crater. Even allowing for the central peak’s height of 2 km above its surrounds, calculations showed at the time that it should not be emerging into sunlight from the shadow filled floor. In John’s image (Fig 4 Far Left and Left) the solar altitude was just over 0.1°, and in the contrast enhanced version, we see no sign of the central peak. So, if the visibility of the central peak is due to scattering off the illuminated sunlit rim, it’s simply not visible this early after sunrise. We have discussed attempts to replicate this event in the following newsletters: 2012 Sep, 2014 Oct, 2016 Mar, 2020 Jun, 2023 Feb and 2024 Jun. We shall leave the ALPO/BAA weight of this TLP at 1 for now.

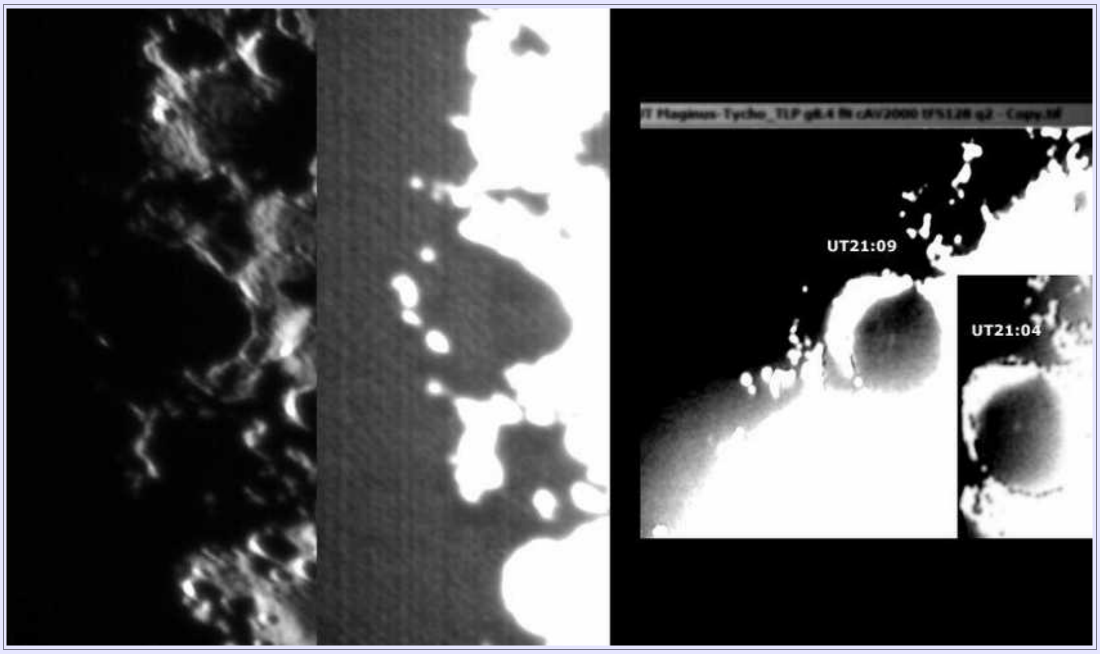

Figure 4. Tycho. **(Far Left)** Imaged by John Duchek (ALPO) on 2025 Jul 04 UT 03:30. **(Left)** Same image but contrast stretched and Gaussian blurred to minimize image noise. North is towards the top. **(Right)** Two of Brendan Shaw's images from 2003 May 09 with the UTs given in the images. North is towards the top right.

Copernicus: On 2025 Jul 04 UT UAI observers Luigi Zanatta and Valerio Fontani imaged this crater under similar illumination to the following lunar schedule request:

BAA Request: On 2012 Sep 24 E. Horner noticed a very strong red colour around part of the sunlit inner rim of Copernicus, sometimes a 1/4 and sometimes 1/2 around the interior. Quite likely this was some form of atmospheric spectral dispersion - though the observer checked for similar effects on other craters but saw none. But to be sure we would like to obtain some colour images or visual observations of this crater. The minimum sized telescope to be used would ideally a 6" reflector. Low elevation angles for the Moon are ideal as we want to try to replicate this effect if it is indeed due to atmospheric spectral dispersion. Please send any high-resolution images, detailed sketches, or visual descriptions to: a t c @ a b e r . a c. u k .

Then original observation by Sue Horner was a visual report from 2012 Sep 24, where she reported: *"I first spotted a line of red light in the interior of Copernicus, just where the sunlight met the shadowed part of the interior wall; it was a narrow line but the colour was solid. At first, I thought it was a reflection of the red light from the 'scope's hand set, as it was that shade. I moved the handset but the line stayed and remained even when I covered the handset completely. Sometimes it made a quarter-circle round the interior of Copernicus, but sometimes it extended to a half circle. I looked at the same spot with other eyepieces (20ml and 25ml with Barlow) and the line remained. I then looked at other parts of the moon, this time again with the 9mm lens. Again, there were no red lines"*. So, no filter appears to have been used to check that the colours were not atmospheric spectral dispersion, and checking the Moon's altitude at the time of the observation, this was low at 16°-11°, so is quite possible – however no similar red colour was seen anywhere else on the Moon. The images in Fig 5, some of which have had their colour saturation increased, show typical atmospheric spectral dispersion, i.e. colour fringes on contrasty bright/dark boundaries, with red tending to be more prominent as image contrast is not so good down the blue end of the spectrum. I cannot fully explain the Horner report which says that no such prominent red was seen elsewhere on the Moon, but the varying arc length of the red line could be down to seeing conditions altering the contrast, and the strength of redness could be down to the low magnification used, which always brings out colour well. We have covered this report before in the 2012 Nov and 2014 Aug newsletter. The ALPO/BAA weight shall remain as 1, but would have been very tempted to lower this to 0 if we had seen any sign of prominent redness inside where the "sunlight met the shadowed part of the interior wall".

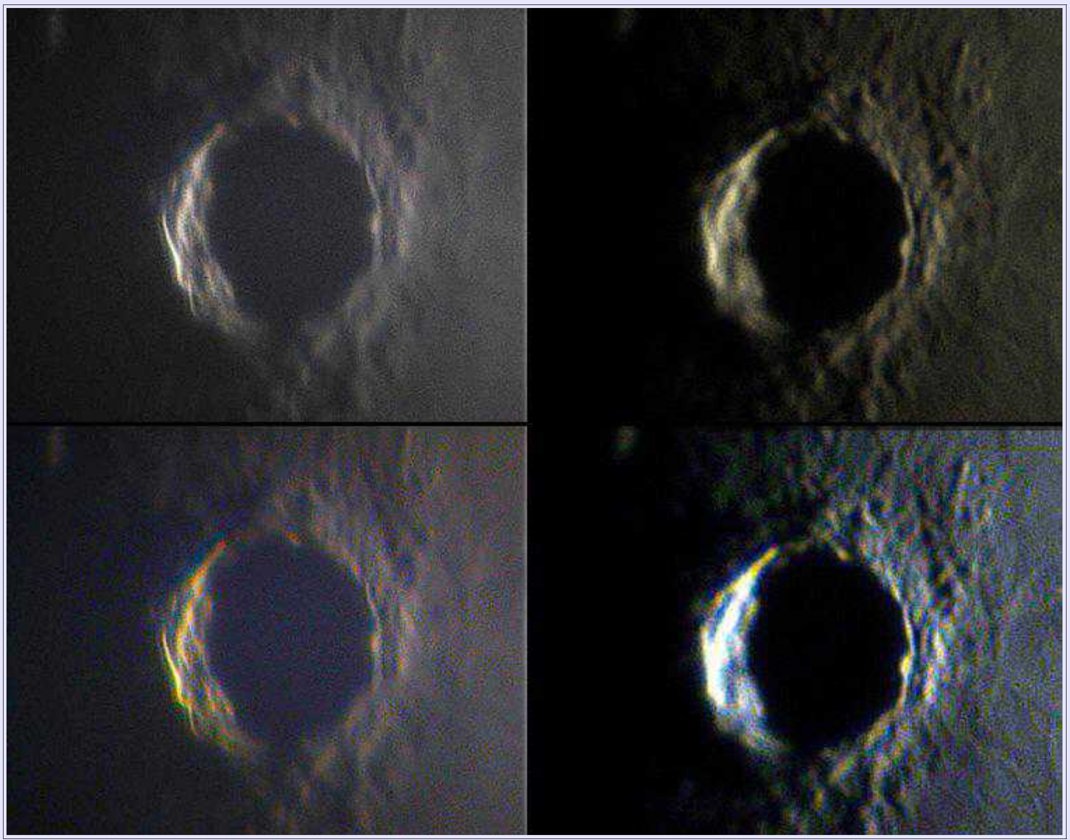

Figure 5. Colour images of Copernicus with north towards the top taken by UAI observers on 2025 Jul 4**. (Top Left)** Image by Valerio Fontani taken at 21:40UT. **(Top Right)** Image by Luigi Zanatta taken through a x2.8 Barlow. **(Bottom Left)** Valerio's image but with colour saturation increased. **(Bottom Right)** Valerio's image, after colour normalization and colour saturation increased.

Cyrillus and Theophilus: On 2025 Jul 13/14 Francesco Mondrello (UAI) was imaging the Moon for the following Lunar Schedule request (UT22:20-02:09) and a repeat illumination prediction (UT 00:02-01:36):

BAA Request: Cyrillus. There is a small white craterlet just north of the three central peaks. We are interested to receive high resolution images of this in order to find out at what selenographic colongitude, in the lunar evening, that it loses its white spot appearance. Please use scopes larger than 6 inches in diameter. Please email these to: a t c @ a b e r . a c . u k

On 1981 Oct 26 UT 20:44-21:14 M. Mobberley (Bury St Edmunds, UK, 14" Cassegrain, seeing III) noticed an ~100deg wide fan on the floor of Theophilus, radiating on the central peak up to the surrounding base of the wall next to Cyrillus crater. This fan had a hint of yellow/red. The observer did not consider this to be abnormal - there was certainly no loss of focus here as far as the observer was concerned, and no mention is made of this effect in later observations that night. Plenty of spurious colour was reported. The ALPO/BAA weight=1.

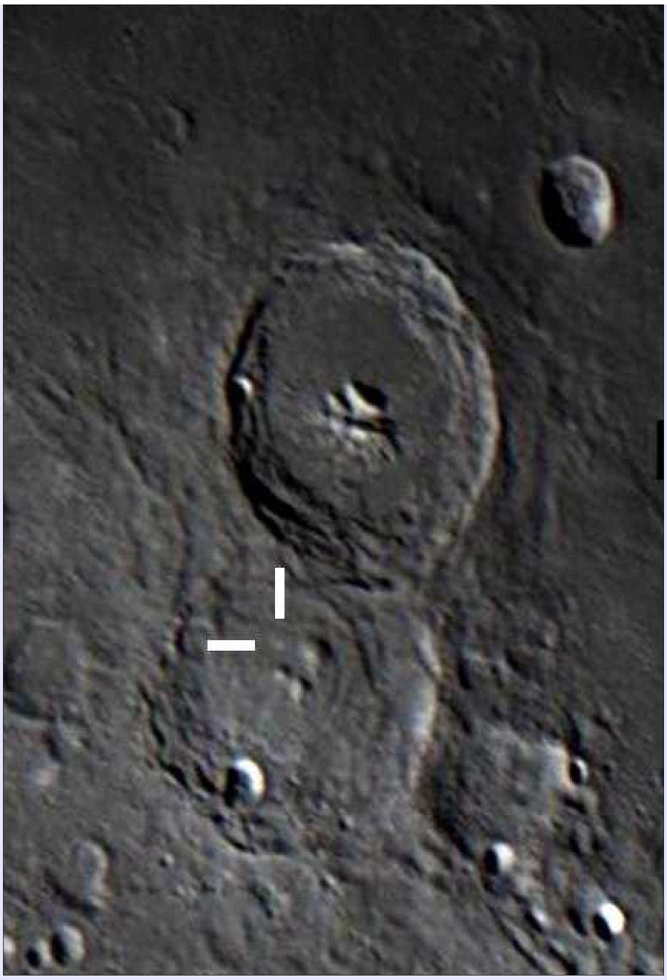

Figure 6. Cyrillus with the location of a white spot on the floor, marked. Taken by Francesco Mondrello (UAI) on 2025 Jul 14 UT 02:53. North is towards the top left.

So, it appears from Fig 6 that the white spot on the floor, just north of the three central peaks is still visible at a selenographic colongitude of 127.7°. Can we observe it at even later colongitudes?

Concerning the Theophilus appearance under the same illumination to the 1981 report by Martin Mobberley, Fig 7 is interesting as it shows the original written Mobberley report & sketch, Francesco Mondrello detailed image, a simulated seeing degraded version of Francesco's image, and even a photo that Martin Mobberley took after the time he reported the fan feature, when it was no longer visible by 21:54UT. Earlier at 20:02-20:25UT Theophilus also appeared normal to Martin. A 14 inch Cassegrain telescope was used for Martin's observations. In the modern-day image by Francesco, there is no sign of the fan shaped feature, even if one blurs one's eyes, nor any yellow colour in this region. In view of the differences between the normal appearance and Martin's report, I am tempted to raise the ALPO/BAA weight of the 1981 TLP from 1 to 2, especially in view of the fact that the fan shaped yellow cast area went from not being visible, to being present, then disappearing again. The area on the lunar surface affected was probably of the order of 2500 km^2. On the other hand, seeing conditions were variable, condensation formed on the telescope optics later and a halo was eventually seen around the Moon, so we cannot justify raising the weight to 3.

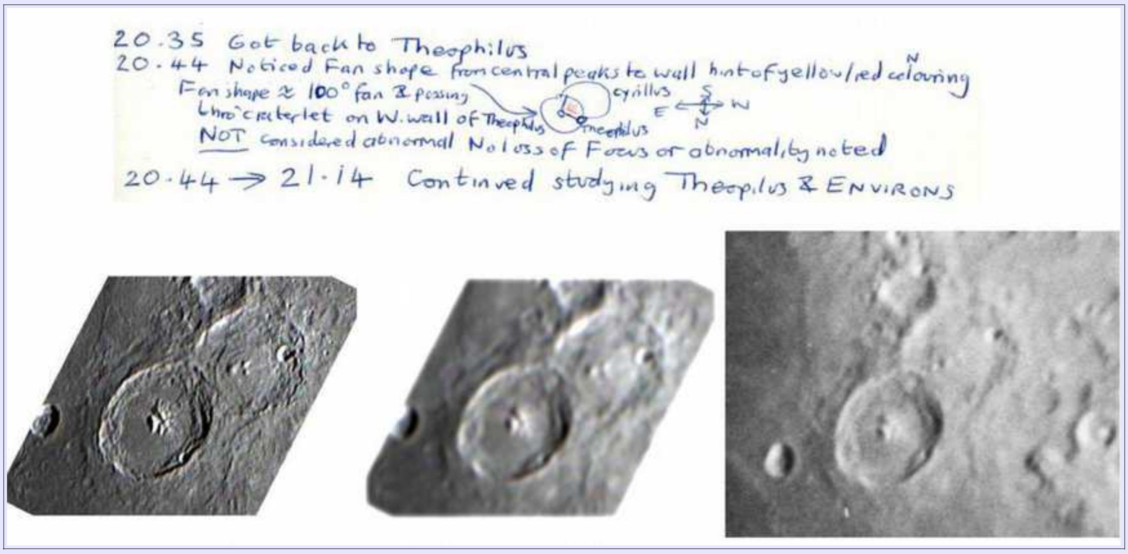

Figure 7 Theophilus with north towards the bottom. **(Top)** A visual report and sketch by Martin Mobberley from 1981 Oct 26 UT 20:44 onwards. **(Bottom Left)** An image by Francesco Mondrello (UAI) taken on 2025 Jul 14 UT 01:13 – this has been colour normalized and then had its colour saturation increased. **(Bottom Centre)** The same image by Francesco, but with simulated Gaussian seeing blur and some contrast stretching to Match the resolution in Martin Mobberley's 1981 photo. **(Bottom Right)** a photograph taken by Martin Mobberley on 1981 Oct 26 at UT 23:15.

South Pole: On 2025 Jul 22 Peter Mulligan (BAA) imaged the crescent Moon and earthshine which just by chance corresponded to the following Lunar Schedule request:

Southern cusp observed by H.Hill (UK) on 1984 Jul 25. Solar Selenographic colongitude=232.6. Observer noted a dusky ill-defined strip in Earthshine extending beyond the southern cusp that appeared "atmospheric". Note that this is almost certainly not a TLP but is worth checking out if the libration and solar colongitude is similar, just to verify that this is what the Moon normally looks like. ALPO/BAA weight=1.

Figure 8. The crescent Moon and earthshine as imaged by Peter Mulligan (BAA) on 2025 Jul 22 UT 03:06 using a Canon 600D EF-5 18-55 lens on a fixed tripod. This is a small portion of the original image which captured the Moon, Venus and Jupiter together. Image orientated with north towards the bottom to match Fig 9's orientation. **(Left)** The crescent Moon. **(Right)** Contrast stretched to bring out the tips of the crescent and earthshine.

Although Peter's image (Fig 8 - Left) is not at the same topocentric libration, and dramatically much lower in resolution, than the view that Harold Hill would have seen (Fig 9), it is the simply the best that anybody achieved in July for this part of the Moon at a similar colongitude. Just out of interest I looked through the archives to see if I could find a better match and could not. It illustrates the need for greater observational coverage in the anti-social hours of the early mornings. Harold Hill wrote to me on a few occasions and clearly stated that he had no interest in TLP, but nevertheless he did report a small number of odd appearances on the Moon that he thought would merit further investigation. His 1984 report is one of these and that's why I have mentioned it.

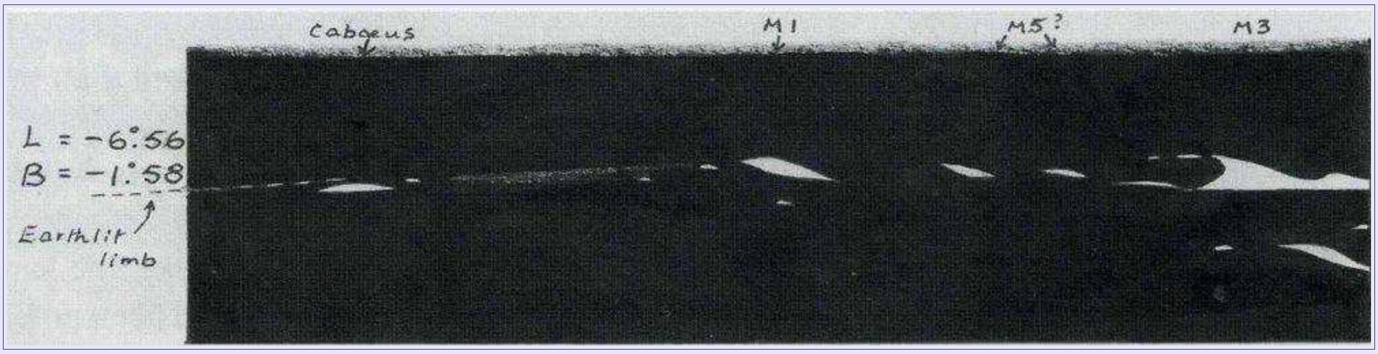

Figure 9. A close up of Fig 2 of the Moon's southern limb, from p359 from Richard Baum's article on: "The strange case of pseudo-twilight on the Moon" published in J.Br. Astron. Assoc. 120, 6, 2010.

Barrow: On 2025 Jul 31 UAI observers: Aldo Tonon, Francesco Mondello and Luigi Zanatta, imaged this crater for the following Lunar Schedule request:

BAA Request: On 1972 May 18 M.Burton (UK) saw a E-W light streak across the floor of this crater and also that the east side of the crater was very brilliant. This is probably a normal appearance for this stage in illumination, but we would like to check this out. Minimum sized telescope to use is a 5". Please send any high-resolution images, detailed sketches, or visual descriptions to: a t c @ a b e r . a c. u k .

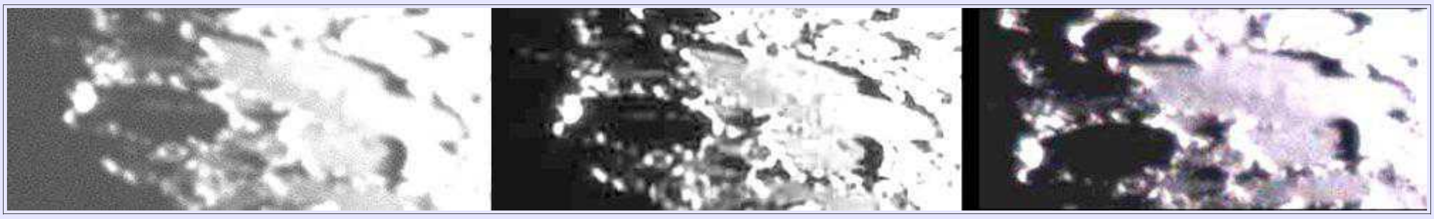

Figure 10. Barrow crater with north towards the top as imaged by the following UAI observers: **(Left)** Aldo Tonon at 19:05 UT. **(Centre)** Luigi Zanatta at 19:43UT. **(Right)** Francesco Mondello at 19:52UT.

Quite clearly all three observers (Fig 10) have found the west rim of Barrow very bright, as did M. Burton in 1971. The light streak across the floor is visible in two out of the three images though and this infers it is difficult to see at times. The TLP reported by M.Burton has long since been demoted from the TLP catalog to a weight of 0. However, we shall keep this on the Lunar Schedule website as it's a something interesting to spot on the Moon, though now has little scientific importance. It's also important to keep it on record as it may trick other observers in future into thinking that it's a TLP.

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. If in the unlikely event you do ever see a TLP, firstly read the TLP 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 TLP alerts can be accessed on https://twitter.com/lunarnaut .

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Lunar Calendar for September 2025 by Tony Cook.

This is an experimental calendar format that we are exploring. The calendar is intended mostly for UK observers. Note that for the bit about stars and planets – always check if the Moon is visible above the horizon. We will try to produce one calendar each month (only if time permits), but would really appreciate if one of our kind readers would like to take on the job of doing this – please email me on: atc@aber.ac.uk if you are interested?

Date	UT	Event (mostly as seen from UK)
2	18:00	Moon Max libration 8.2° with more exposure of NW limb
2		Moon at greatest southern declination -28.6°
7	15:28	P1 penumbral phase of lunar eclipse starts - not visible from UK
7	16:27	U1 first contact of umbral shadow on W of Moon - not visible from UK
7	17:30	U2 totality starts - not visible from UK
7	18:08	Full Moon and mid total eclipse - not visible from UK
7	18:53	U3 totality ends
7	19:56	U4 last contact as umbra leaves the Moon
7	20:55	P4 penumbral phase of lunar eclipse ends
7	22:13	Mag 4.2 Phi Aquarii reappears on bright eastern limb of Moon +/- a few min from the UK
7	23:08	Moon at ascending node
8	01:51	Northern limb graze of mag 7.5 star through S Wales to Lincolnshire, UK - see p45-46 of BAA Handbook
8	20:00	Saturn 4° S of the Moon
8	22:00	Neptune 3° S of the Moon
9	23:58	How bright is Furnerius A? (+/-25 min either side of this time?)
10	12:09	Moon closest to Earth
10	01:44	Cleomedes is nice to image or sketch (+/-30min either side of this time)
11	03:00	Any interesting penumbral fringes inside Macrobius? (+/-1 hour either side of this time)
12	03:52	Mag 4.7 Epsilon Ari reappears on eastern limb of Moon +/- a few min from the UK
12	22:00	Moon 1° N of the Pleiades but lots of Taurus star occultation reappearances from 21:02-23:10
13		Video for impact flashes in earthshine
14	10:33	Last Quarter
14	22:04	Mag 4.6 136 Tau reappearance on eastern limb of Moon +/- a few min from the UK
15	12:00	Moon Max libration 8.3° with more exposure of SE limb
15		Video for impact flashes in earthshine
15	00:17	Northern limb graze of mag 6.7 star through NW Scotland coast, UK - see p45-46 of BAA Handbook
16		Video for impact flashes in earthshine
16	04:01	Northern limb graze of mag 5.8 star through Isle of Lewis, Scotland, UK - see p45-46 of BAA Handbook
16	11:00	Jupiter 5° S of the Moon
17	18:00	Moon 2° N of the Bee Hive cluster
18		Video for impact flashes in earthshine
19		Video for impact flashes in earthshine
19	11:50	Venus occultation (UK) +/- a few min. N.B. do not look at the Sun!
19	12:00	Regulus 1.3° S of the Moon
19	13:05	Venus reappears (UK) +/- a few min. N.B. Do not look at the Sun!
21	19:55	New Moon and Partial Solar Eclipse from S. Pacific
23		Spica 1.1° N of the Moon
26	09:45	Moon furthest Earth
27		Antares 0.6° N of the Moon
29	23:54	First Quarter
29		Moon at greatest southern declination -28.6°
30	20:45	Examine the cusps of the Moon for prolongations +/- 15 min either side of this time.
30	18:00	Moon Max libration 8.5° with more exposure of NW limb

Acknowledgement: My thanks to David Teske – the ALPO Lunar Section director for providing much of this information.