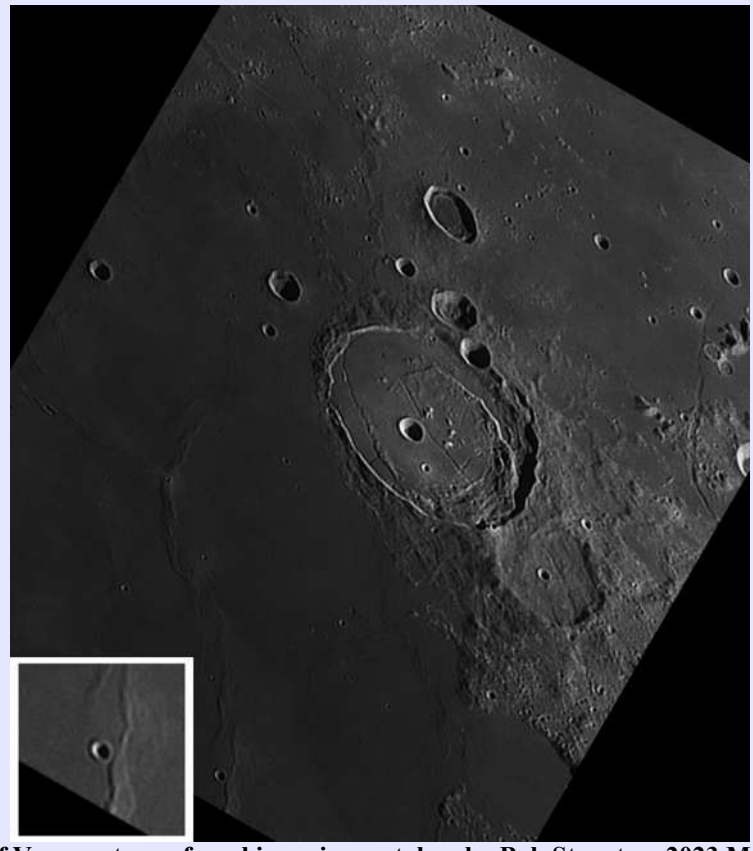
From the Director.



The location of Very crater as found in an image taken by Bob Stuart on 2023 May 26 UT 21:54

It seemed that I sparked at least some interest with the mention of "under observed lunar features". Bob Stuart has sent in several images of some of these that were on the edge of pre-existing images that he had taken. I have since updated the list here of craters that are still under-observed for you to target with new high resolution images or sketches, especially close to the morning and evening terminator. An example of an under-observed crater, now captured is the 5 km diameter Very crater which can be seen above. This was named, in 1973, after the astronomer Frank Very, but it used to be called Le Monnier B. This crater can be described as a simple bowl shaped, whose topographic relief may encroach the western edge of the wrinkle ridge Dorsa Smirnov – at least if one examines LROC Quick Map imagery carefully. This could imply that Very might be younger than the wrinkle ridge.

(Left) Astronaut Bill Anders (1933-2024) – credit NASA. (Right) Astronomer Prof Bian Warner (1939-2023) – credit IAU.

A couple of items of sad news this month. I learnt that Prof Brian Warner, passed away in June. Brian was a former BAA Lunar Section director from 1962-1964. He has studied for a BSc and then a PhD at University College London. He then moved to Oxford, University of Texas (Austin) and eventually off to the University of Cape Town, South Africa. He worked closely with Nather and Evans, whom occultation observers maybe familiar with from their pioneering work on in the early 1970's in high speed occultation photometry of the angular diameter stars, and also high speed photometry of variable stars. He subsequently specialized in variable stars and spectroscopy. I also read in the news of the passing of William Anders (1933-2024) – he flew as part of the Apollo 8 crew on the first ever circum-lunar flight in order to beat the soviets into orbit around the Moon. It was of course on this mission that the famous Earth-rise footage was obtained by Anders on Christmas Eve – though as the spacecraft was rotating, it was more by chance than plan, that they obtained the famous photographs/movie. He was still flying at the age of 90, which was unfortunately when his plane crashed into the sea off the coast of Washington State.

The Mills Observatory, Dundee, Scotland, a former base of the BAA Lunar Section – image credit: https://www.leisureandculturedundee.com/culture/mills

Another piece of news, readers may not have been aware of, is that the financial situation at the public Mills Observatory in Dundee, Scotland, has been dire, due to local council cut backs, with possible moth-balling or even permanent closure being considered. A petition to keep it open was started on: https://www.change.org/p/mills-observatory-closure. The Mills Observatory was at the centre of the BAA Lunar Section operations around 1976-1978, when the director of the observatory, Harry Ford, was also the Lunar Section director, though it also featured in the years before and after in the some of our observing programs. One of our member's Ken Kennedy has been actively encouraging new observers in Dundee, and the surrounds, to participate in lunar observing. Fortunately, a possible piece of good news is that in May a local space company, STAR-Dundee, announced that it wanted to provide £50K support for the observatory. Let's hope that this will be enough to keep the observatory running as apart from the amateur astronomy and connections, it has had a really significant impact on teaching astronomy to schools in the area.

Tony Cook.

Lunar Occultations July 2024 by Tim Haymes

Time capsule: 50 year ago: in Vol 9 No.7

[With thanks to *Stuart Morris* for the LSC archives.]

* P Moore: Phil Ringsdore Obituary.
* The Ringsdore Telescope (4"reflector donated by Dudley Fuller), is now retained by the Section.
* TLP extinction device: Dave Harry and Morgan find W25 and W44A an improved red-blue pairing over Wratten 25 red and 80A.
* Occultation of SAO 118574 observed by Mr Daly on May 1st is confirmed as double, Sep 0.84".
* List of Section Members and addresses Part-1, A-F

Prospects for July and August

The majority of predictions are Reappearance with the Moon at low altitude. I have included some details from Occult4 on double stars and there are some day-light predictions:

tau Ari on July 02 at 0446 UT, chi Leo on July 10 at 1912 UT, 19 Ari on July 28 at 0511 UT.
Kappa Cap is an RD event in the early morning of July 23 at 0042UT (0142BST), and possibly the best of the early morning events in July. Lunar occultations are down the list of priorities these days when long sequence imaging is more rewarding (asteroids, exoplanets, variable stars…) not forgetting planetary and RGB imaging So all credit to those who can observe lunars. They are becoming a rare breed.

On the subject of planets, there is an occultation of Saturn next month on August 21. The lunar phase is just past full (-97%). Even so both DB and RD events should be interesting to follow. There is a prediction for Titan (m 8.3) at RD preceding that of Saturn by 8 minutes. I suggest visual observation.

More next month.
Good observing and clear skies to all…

Occultation predictions for 2024 July (Times at other locations will +/- a few minutes)

Oxford: E. Longitude -001 18 47, Latitude 51 55 40

day	Time	Ph	Star	Sp	Mag	Mag	% Elon	Sun	Moon		CA	
yy mmm	d h m	s	No	D*	v	r	ill	Alt	Alt	Az	o	Notes
24 Jul	1 2 37	59.6 R	92900	cA0	7.9	7.9	26-	61	-8	20	89	67S
	92900 is double: ** 8.8 8.8 0.050"											
24 Jul	2 2 12	10.2 R	75815	K0	8.3	7.7	17-	48	-11	12	72	83S
24 Jul	2 2 24	19.3 R	75820	A0	8.1	8.0	17-	48	-10	14	74	77N
24 Jul	2 2 25	1.4 R	75825		8.5	8.0	17-	48	-10	14	74	54S
24 Jul	2 4 46	23.8 R	486	CB5	5.3		16-	47	6	35	100	75S Tau Ari
	486 is double: AB 5.34 8.09 0.94"											
24 Jul	10 19 12	30.6 D	1609	SF2	4.6	4.5	22+	56	8	30	240	78S chi Leo
	1609 is quadruple: AB 4.7 11.0 5.1" 271.1											
24 Jul	23 0 42	32.7 R	3175	G8	4.7	4.3	96-	158		18	165	22S kappa Cap
24 Jul	24 2 42	49.3 R	3327	K2	6.8	6.1	90-	144	-11	26	181	28S
24 Jul	26 2 14	54.0 R	109182	G0	7.8	7.4	73-	117		34	143	87N
24 Jul	26 2 59	8.7 R	50	dG5	5.8	5.3	72-	116	-10	38	156	51N 44 Psc
	50 is double: AB 5.8 9.0 1.0"											
24 Jul	27 23 8	40.4 R	299	M2	6.0	5.1	51-	92		5	75	29S 12 Ari
24 Jul	28 3 22	28 m	92821	K0	8.1	7.3	50-	90	-8	43	127	13N
24 Jul	28 3 30	27.1 R	92820	K2	8.2	7.6	50-	90	-7	44	129	56N
24 Jul	28 5 11	50.1 R	326	cM0	5.7	4.9	49-	89	6	53	163	86S 19 Ari
	326 is double: ** 6.8 6.8 0.050"											
24 Jul	29 2 58	54.0 R	93257		8.6	8.1	39-	77	-11	37	105	72N

```
24 Jul 29  8 54 21.9 R     472cA1  4.9  4.9   36-  74  39 51 230  31S zeta Ari
       472 is double: ** 5.8 5.8 0.10"

24 Jul 30  1  5 42.0 R   76336 K2  8.4  7.6   29-  65     15  70  56S
24 Jul 30  1 52 51.2 R   76358kB9  7.2  7.2   28-  65     22  78  49N
24 Jul 31  3 42 31.1 R   76904SG5  8.2  7.9   19-  51  -6 31  86  32S
24 Jul 31  3 44 28.7 R     750SG2  6.9        19-  51  -6 32  86  38S
24 Aug  1  0 51 36.3 R     890cA0  4.6  4.6   12-  40      2  45  87S 136 Tau
       890 is double: ** 4.8 6.3 0.050"

24 Aug  1  1 40 55.3 R   77724 B1  7.0  7.0   12-  40      8  54  84N
24 Aug  1  2 10 15.7 R   77752 K2  8.8  8.3   11-  40     11  59  61S
24 Aug  1  2 49 20.6 R   77804 A0  7.3  7.1   11-  39     16  66  36S
24 Aug  1  2 49 30.8 R   77798 B9  8.5  8.5   11-  39     16  66  51S
24 Aug  1  2 52  7.3 R   77806 A0  8.6  8.6   11-  39     17  66  39S
24 Aug  1  3 28 18.2 R     909SB9  6.0  5.9   11-  39  -8 21  72  20S
   909 is triple: Aa,Ab 6.1 9.2
```

D* : The D column indicates a Double Star in the Washington Double Star Catalogue. The characters w,S,c etc indicate the type of double explained in Occult4.

New doubles are being discovered in occultation recordings, particular close doubles. The separations are usually small and in the range 10-100 mas. Please send double star occultation reports to the LS. High frame-rate recordings are desirable when possible.

Contact the Occultation Subsection to request predictions for your location and instrument.

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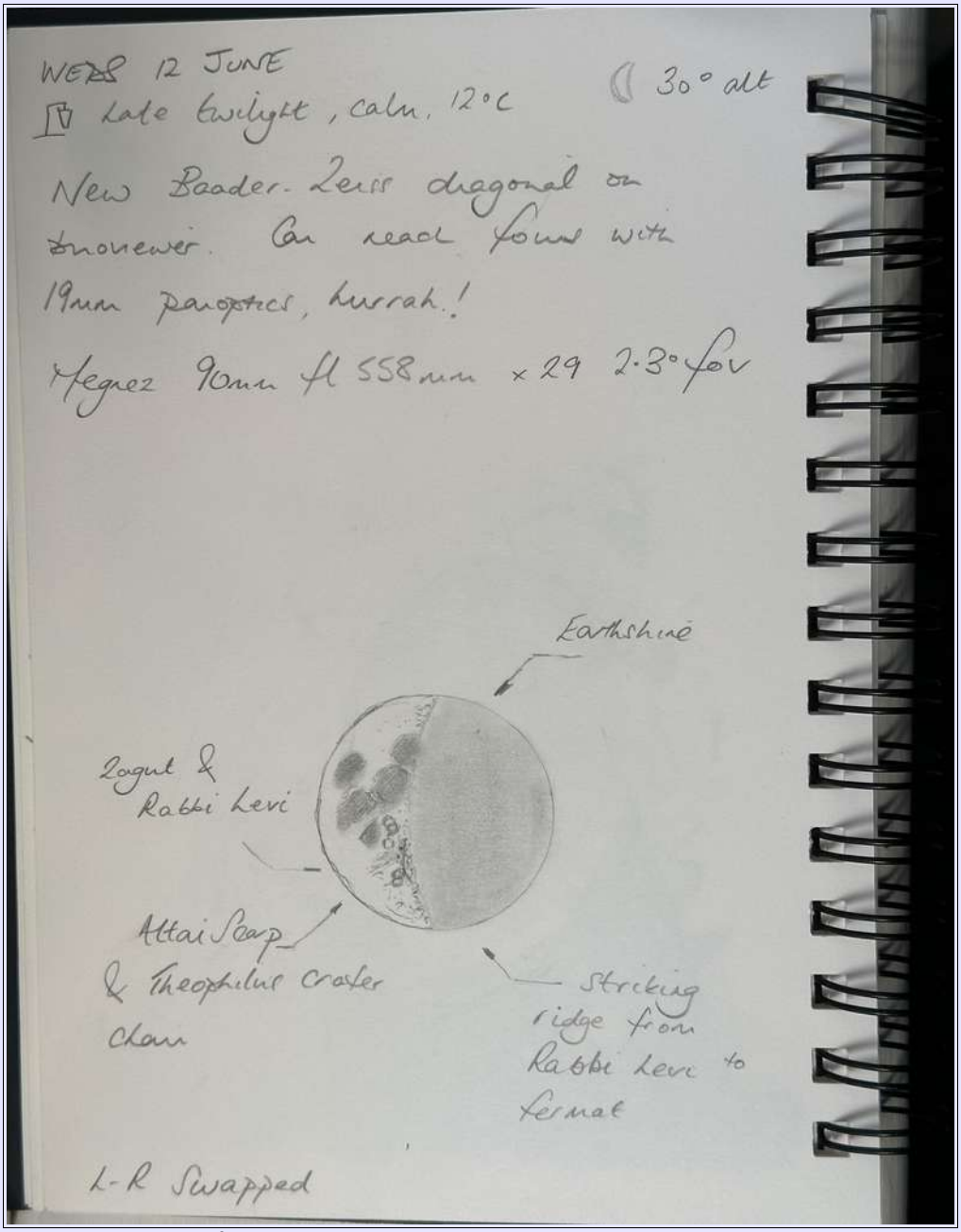
Letters/E-Mails.

Impact Basin Hidden in Plain Sight by Mark Radice.

Date/Location: 12th June 2024 2330UT, Salisbury, England - Quite warm and still, sky still blue with mid-summer twilight.

Equipment used: Megrez 90 on AZ4 with Denk binoviewer 19mm Panoptics (29x 2.3Ofov)

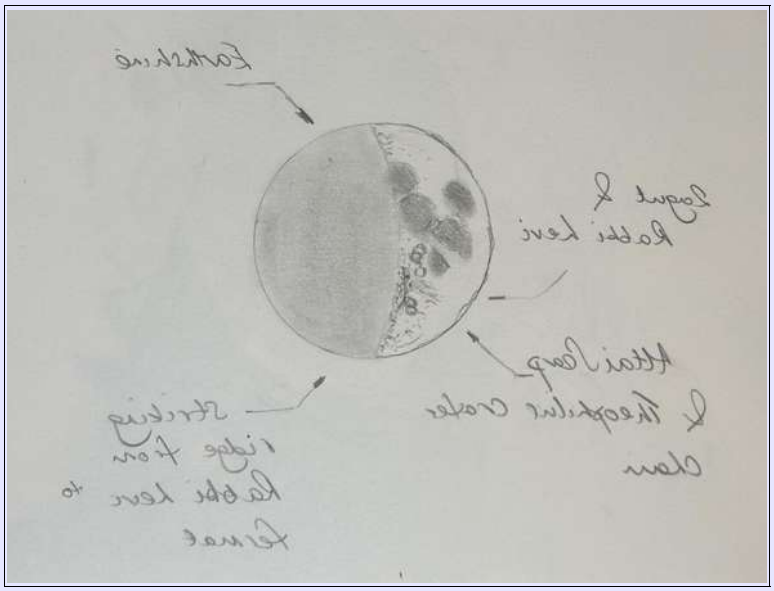


Notebook entry for 12th June 2024. Note this is a binoviewer view so east and west are flipped!

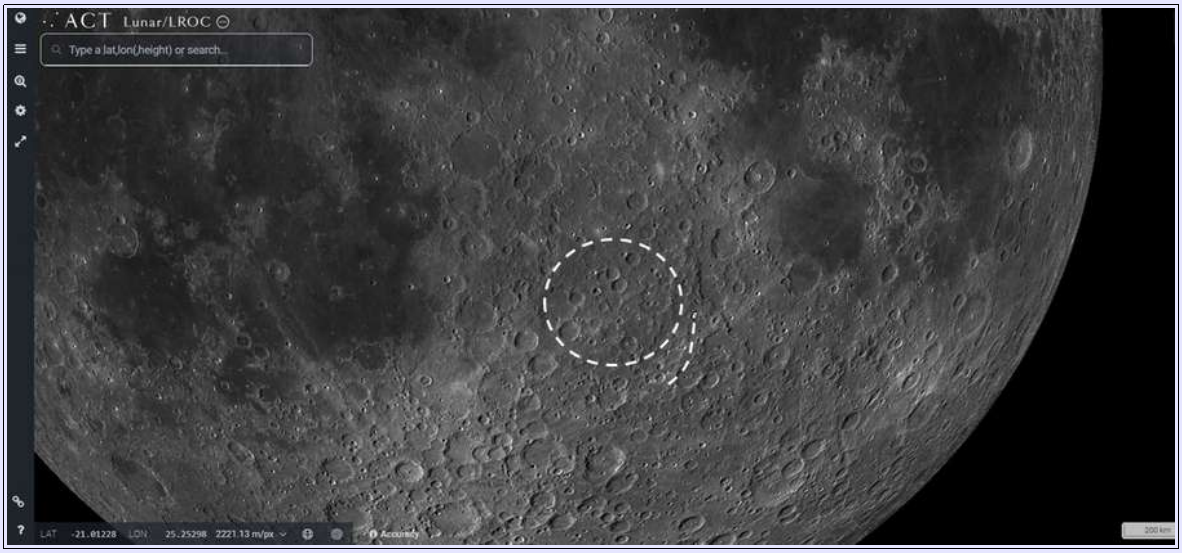
Notes: The near first quarter moon (6.2 days old) was shining at about 30 degrees altitude in the southwestern sky. Being so close to midsummer, the sky was still a dark blue and bright enough to see the bats hunting in the cool evening air.

Swinging my scope and bino-viewer (with a new Baader Zeiss prism diagonal) revealed the glorious details on the lunar surface as the dark side glowed gently with earthshine. A truly wonderful view – all the better for using a low power, easy to set up rig.

My eye was caught by the Theophilus crater chain and adjacent Altai Scarp. While noting this into my journal my eye was drawn to a striking ridge running approximately north-south from Rabbi Levi towards Fermat. It was casting a prominent shadow that I did not recognise so noted to follow up later.



Lunar disc from notes but orientated to correspond to image below.



LRO Quickmap view of Werner-Airy Basin.

Searching this feature on LRO QuickMap shows it be the rim of an ancient impact basin, long since covered with fresh craters. It's quite apparent in the images below. I wonder why I have not noticed it before despite looking at the moon numerous times? Further searching shows this is the Werner-Airy impact basin, approximately 500km in diameter and hidden in plain sight! Further reading shows I cannot, alas, claim any credit for discovering this feature as it has been noted on Cloudy Nights and also features in Chuck Woods Moon Wiki.

Note I only observed the outer rim of this ancient basin as the basin itself was still hidden in the earthshine. Proof that there are enough lunar features to last a lifetime!

Further details are on my blog: http://www.refreshingviews.com/lunar-impact-basin-hidden-in-plain-sight/

Trans-Atlantic stereo Moon anyone?

The following was received from Randy Trank of the Rockford Amateur Astronomers, Rockford, IL USA:

'I don't know how often this has been tried before, but if someone in the U.K. would like to try a simultaneous photo with me of the moon or a close-up of some feature, we could compare the photos and if nothing else, try making a stereo photo thanks to the parallax. From what I see on Stellarium, considering our longitudes, it looks like the ideal timing would be when the moon is about 3 hours east of my meridian and 3 hours west of yours when the moon has a high declination. (October to February timeframe?)'

Tony Cook wrote back to Randy:

Concerning the trans-Atlantic stereo parallax experiment that you propose - it is certainly worth trying though I think we will be hindered by the weather, attempting to do this at the same time.

A good formula, as used by stereo matching software - (but should work with visual viewing of stereo images) is:

Height Accuracy (in km) - 0.2 x pixel scale (km/pixel) / (base line/dist to Moon)

So plugging in the distance between London and Chicago (say) this is about 6000 km (but we have ignored straight line distance and used great circle distance)

*Let's say we have a pixel scale in the CCD camera of 0.5km per pixel - plugging these into the eqn gives: 0.2 * 0.5 / (6000 / 384400) = 6km*

So you would not be able to discern topography unless it was greater than 6 km high. If you used a better image scale of say 0.2 km/pixel then this gives you a height accuracy of 2.5 km which is an improvement but not great.

What you would be able to see easily though would be the curvature of the lunar surface when attempting trans-atlantic stereo.

A slight modification to this is to abandon doing this at the same time and just concentrate on imaging a feature on different dates, at similar illumination, but at extremes of topocentric libration. This way the baseline can be a lot bigger than the radius of the Earth and this increases the stereo base-line and gives you much better height accuracy.

If anyone is interested in such a project please contact me, the Editor and I will forward your details on to Randy. Good Luck!

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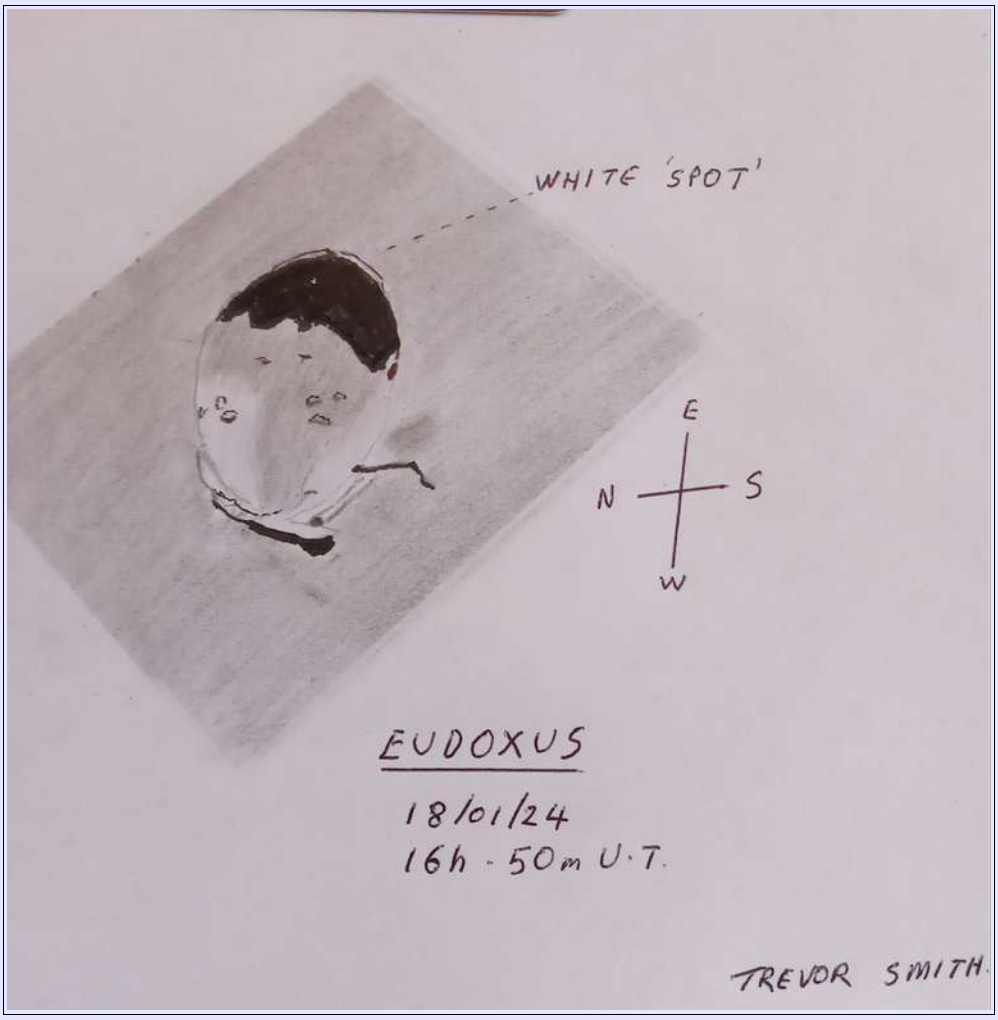
Observations.

Eudoxus.



17TH JANUARY 2024 TREVOR SMITH

16" F·6 NEWTONIAN
9·5 mm PLOSSL X 247
ANT IV QUITE POOR AGAIN.
NO WIND BUT VERY COLD. −4°c.

1 MAUROLYCUS.
I OBSERVED FROM 19h·00m UT TO 19h·20m UT SO I WAS SOMEWHAT LATER IN STARTING OBSERVING THAN THE RECOMMENDED TIME OF 17h·31m UT TO 17h·42m U·T.
I SAW THE CENTRAL PEAK WHICH WAS VERY EASY IN BOTH RED AND BLUE FILTERS. THE EASTERN HALF OF THE FLOOR OF MAUROLYCUS WAS IN BLACK SHADOW. THE CENTRAL PEAK WAS CASTING A SMALL SHADOW TO THE WEST.
A SMALL CRATER WAS VISIBLE ON THE SOUTHERN FLOOR. TO THE EASTERN PART OF THE CENTRAL PEAK WAS A BRIGHT ELONGATED MOUNTAIN WHICH WAS EASILY THE BRIGHTEST PART OF THE CENTRAL PEAK COMPLEX.
THE WESTERN INTERIOR RIM OF MAUROLYCUS WAS QUITE BRIGHT IN THE LUNAR MORNING SUN.

2 ARISTARCUS 19h·21m U·T COULD NOT BE SEEN IN THE MOONS DARK HEMISPHERE.

3 APIANUS D
I OBSERVED FROM 19h·25m UT TO 19h·45m U·T.
THE WEST RIM WAS VERY BRIGHT AND MOST OF THE CRATER WAS IN SUNLIGHT. THE INTERIOR EAST AND SOUTH WALLS WERE IN BLACK SHADOW.
NO COLOURS WERE SEEN TO THE BRIGHT WEST RIM AND ALL LOOKED NORMAL TO ME.

OBSERVATIONS CEASED AT 19h·45m U·T AS IT WAS JUST TOO COLD TO CONTINUE.

THURSDAY 18/01/24 TREVOR SMITH.

16" F·6 NEWTONIAN
9·5mm PLOSSL X 247
ANT IV. NOT VERY GOOD AGAIN!

1 EUDOXUS
I OBSERVED FROM 16h·50m UT TO 17h·17m U·T. SO I WAS SLIGHTLY OUT OF THE RECOMMENDED TIME SLOT OF 16h·17m UT TO 16h·47m U·T
NO LINE OF LIGHT WAS SEEN IN EUDOXUS BUT A FAINT PIN-PRICK OF LIGHT WAS VISIBLE AT TIMES IN THE BLACK SHADOW OF THE EASTERN FLOOR OF THE CRATER.. CONDITIONS DID NOT REALLY ALLOW AN ACCURATE DRAWING TO BE MADE BUT A ROUGH SKETCH IS SHOWN BELOW.
EVERYTHING ELSE LOOKED NORMAL TO ME.

IT WAS NOT QUITE AS COLD TONIGHT AS LAST NIGHT BUT CONDITIONS WERE STILL QUITE UNCOMFORTABLE.

CLOUD STOPPED THE SESSION AT 17h·17m U·T

Drawings and observation notes submitted by Trevor Smith.

Bessarion.

Image by Bob and Sophie Stuart with details of time/date and equipment as shown.

Yangel Dome.

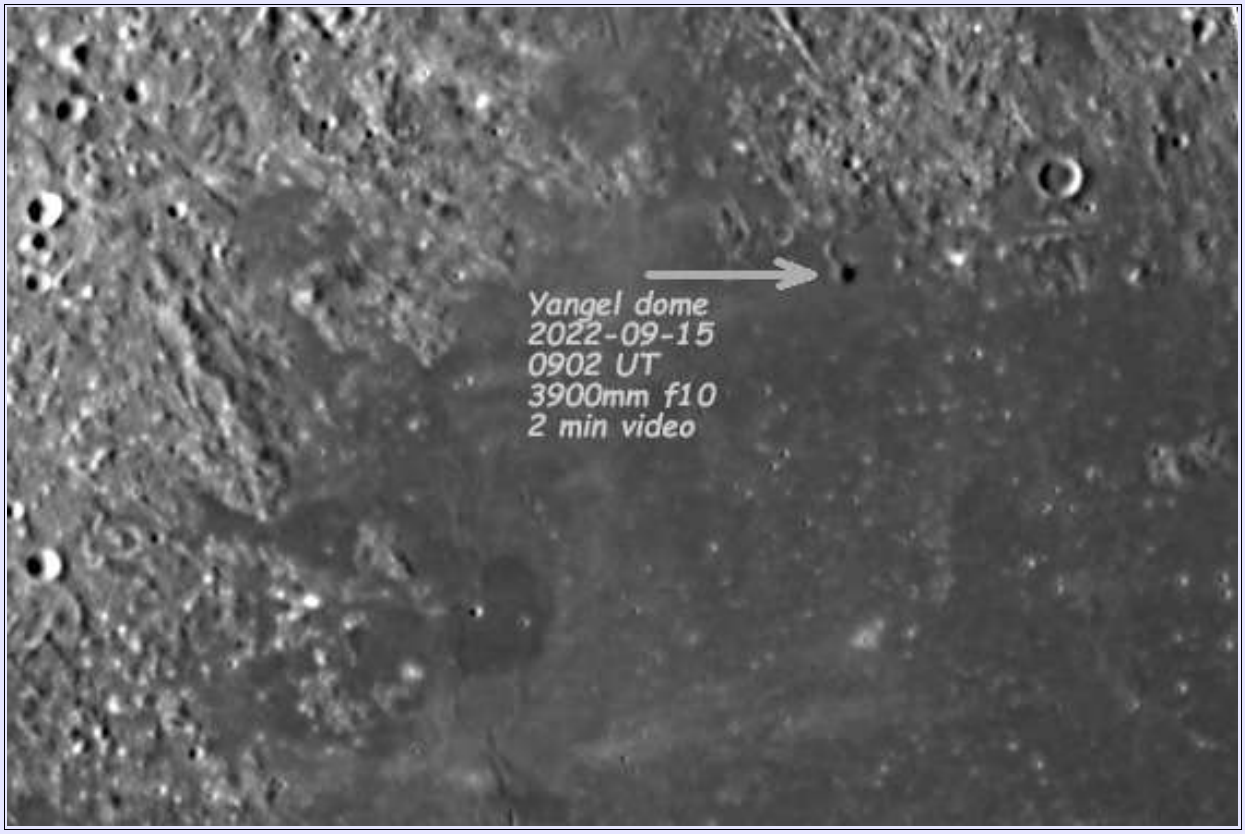


Image by Randy Trank with details of time and date as shown.

Sabine and Ritter.

Image by Bill Leatherbarrow and taken on the 12th June 2024 at 2051hrs using a OMC 300mm Mak Cass.

The Northern Mountains.

Image and text below by Rik Hill. Time/date and equipment as shown.

Just south of the Montes Caucasus are the very dramatic northern peaks of the Montes Appenninus. At the top of the image is the shadow filled crater Autolycus (41km diam.) and due south of that, in the shadow of the montes is the Apollo 15, Hadley Rille base. Further south is the crater Conon (22km) with Aratus (10km) to the upper right of Conon. To the lower right from Autolycus there's the Rimae Fresnel. Just to the right of them is a shadow filled crater that appears to be sitting on top of a mountain. This is Santos-Dumont (8km) a 2km deep crater with Promontorium Fresnel just to the upper right of it casting a spectacular shadow back towards the Rimae. Below this crater is a double peaked mountain with the brighter peak on the right being Mons Hadley, a grand 4800m high mountain. The reader is encouraged to identify all the peaks and features between Santos-Dumont and Conon using something like LROC Quick Map or Virtual Moon Atlas. It is a very rich area.

The large mare to the right is Mare Serenitatus. Along the south shoreline, at the bottom of this image, you can see more rimae, the Rimae Sulpicius Gallus. Above this are three parallel vertical "wrinkle ridges" or dorsa with Dorsum Von Cotta on the right, Dorsum Owen above and a bit left of it and finally Dorsum Gast on the left near the shore. On the southern end of Dorsum Owen, the shortest of these ridges, is a very strange and unique feature called Vallis Krishna combined with Rima Sung-Mai and on the left end Yoshi. You will need a good steady sky and high magnification for this feature as it is only 3km across and 2km high. I recommend visiting Vallis Krishna on the-moon.us/wiki website first to understand this area. It is well worth the time spent.

Lastly, Dorsum Von Cotta points due north to a white spot that is an ejecta blanket for the small crater Linné in the middle of the ejecta. This is the crater that had been observed in antiquity as ranging from 8 to 10km diameter on different atlases, but was reported missing by J.F.J Schmidt in 1866 at the National Observatory of Athens using the 158mm refractor, then the largest instrument they had. After much controversy and argument (that did include some observations!) it was been proven to be a 3km diameter crater, which is difficult to see from Earth again requiring a good steady sky and high magnifications.

This image from parts of two 1800 frame AVIs, stacked with AVIStack2 (IDL),assembled with Microsoft ICE and further processed with GIMP and IrfanView.

Go and see for yourself, it's a delightful challenge!

Moon over Newtown.

Image by Bob Bowen taken on 19th June 2024 at 23:53 hrs BST using a Canon EOS 7D Mk2, Canon 70-200mm 2.8 L IS USM Lens, Canon Extender EF 2x II, ISO 200. 1/160 sec, f5, 400mm, Cropped & Sharpened on Apple iMac's Preview App. Hand held leaning on garden fence.

6.7 Day old Moon.

Image by Maurice Collins with details of time/date and equipment as shown.

Fracastorius.

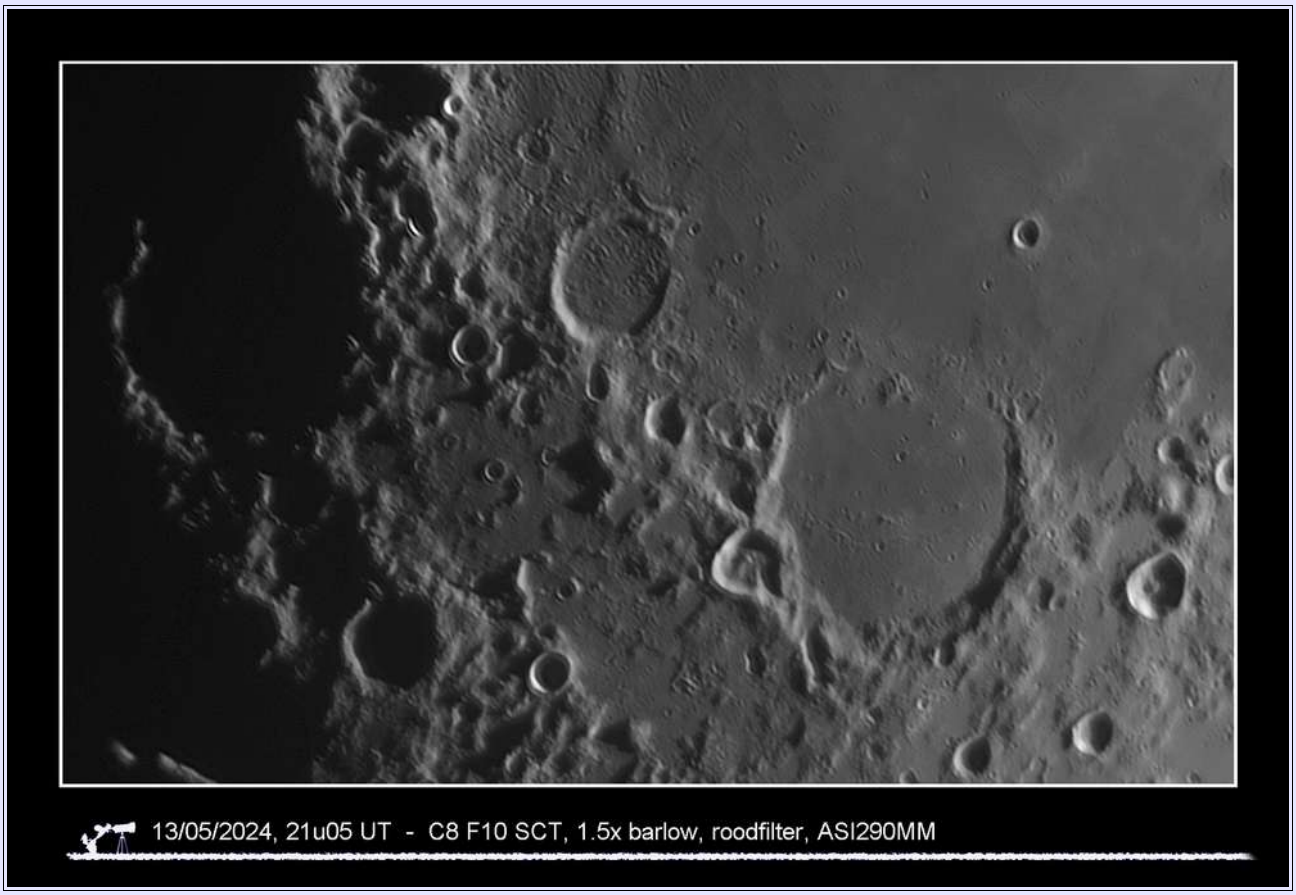


Image by Alexander Vandenbohede with details of time/date and equipment as shown.

Catena Abulfeda.

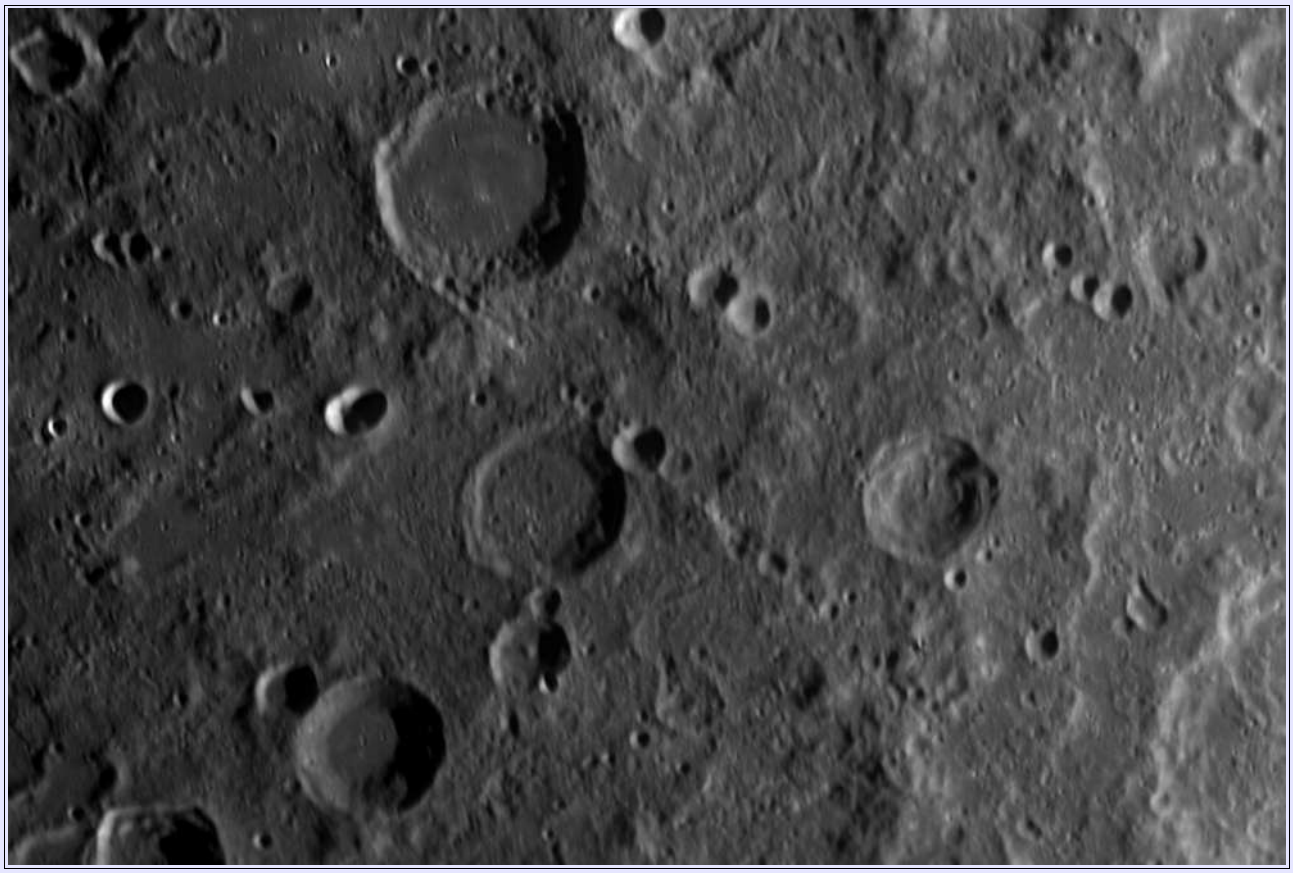


Image by Mark Radice and taken on 15 May, taken with C11 using the lucky imaging using of best 1,000 from 5,000 video frames.

Janssen.

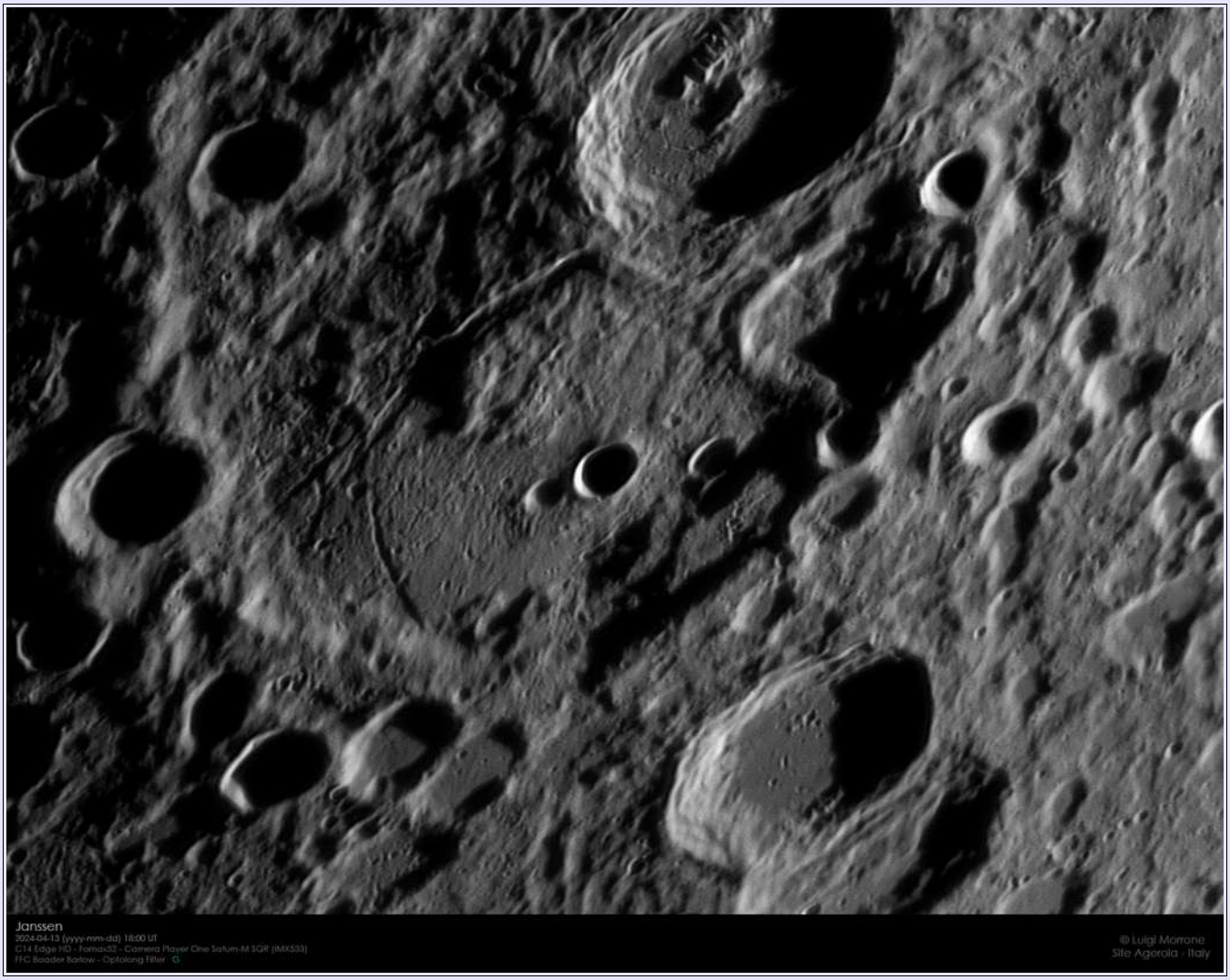


Image by Luigi Morrone with details of time/date and equipment as shown.

The Moon in colour and monochrome.

Image by Mario Rui Abade (details of time/date unknown)

Ptolemaeus.

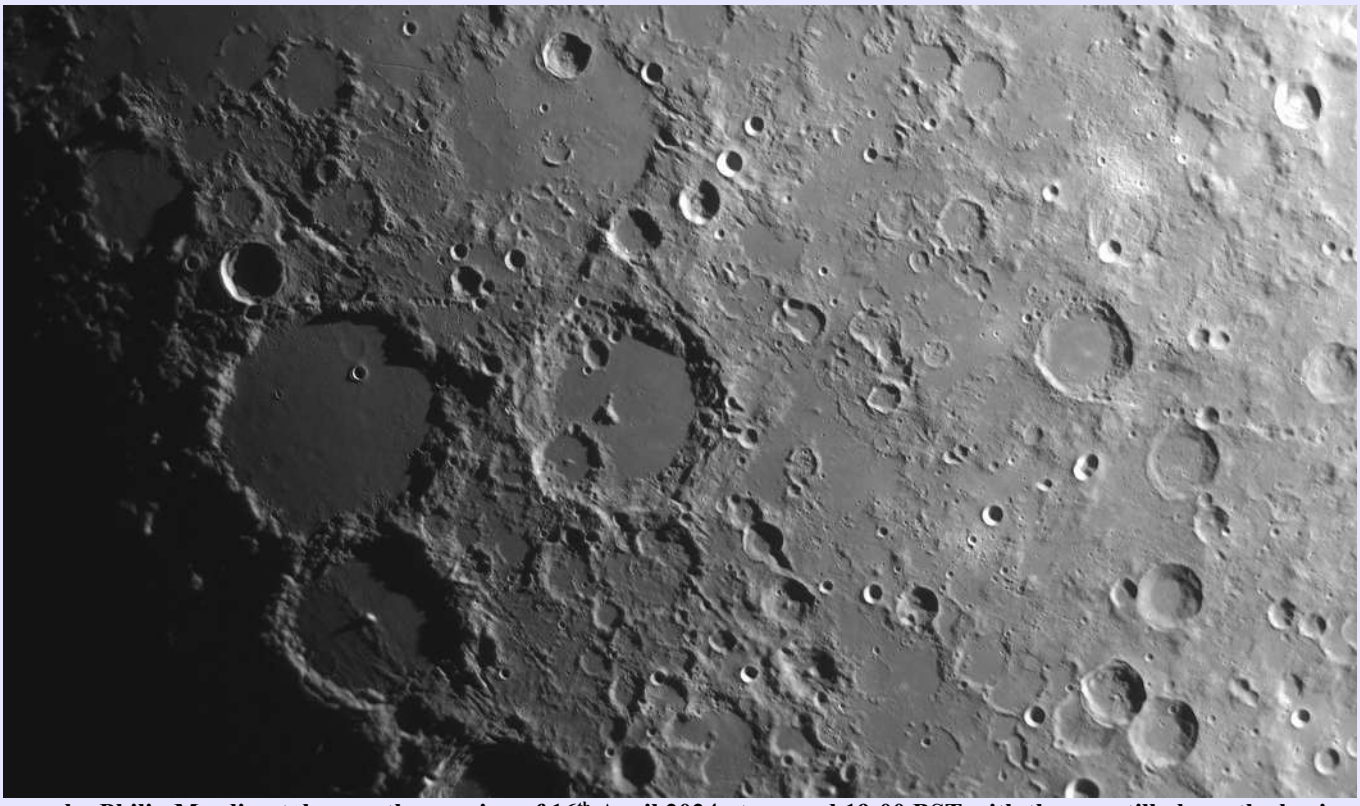


Image by Philip Masding taken on the evening of 16th April 2024 at around 19:00 BST with the sun still above the horizon. using a 250mm SCT, ZWO mono camera and IR pass filter.

Lambert.

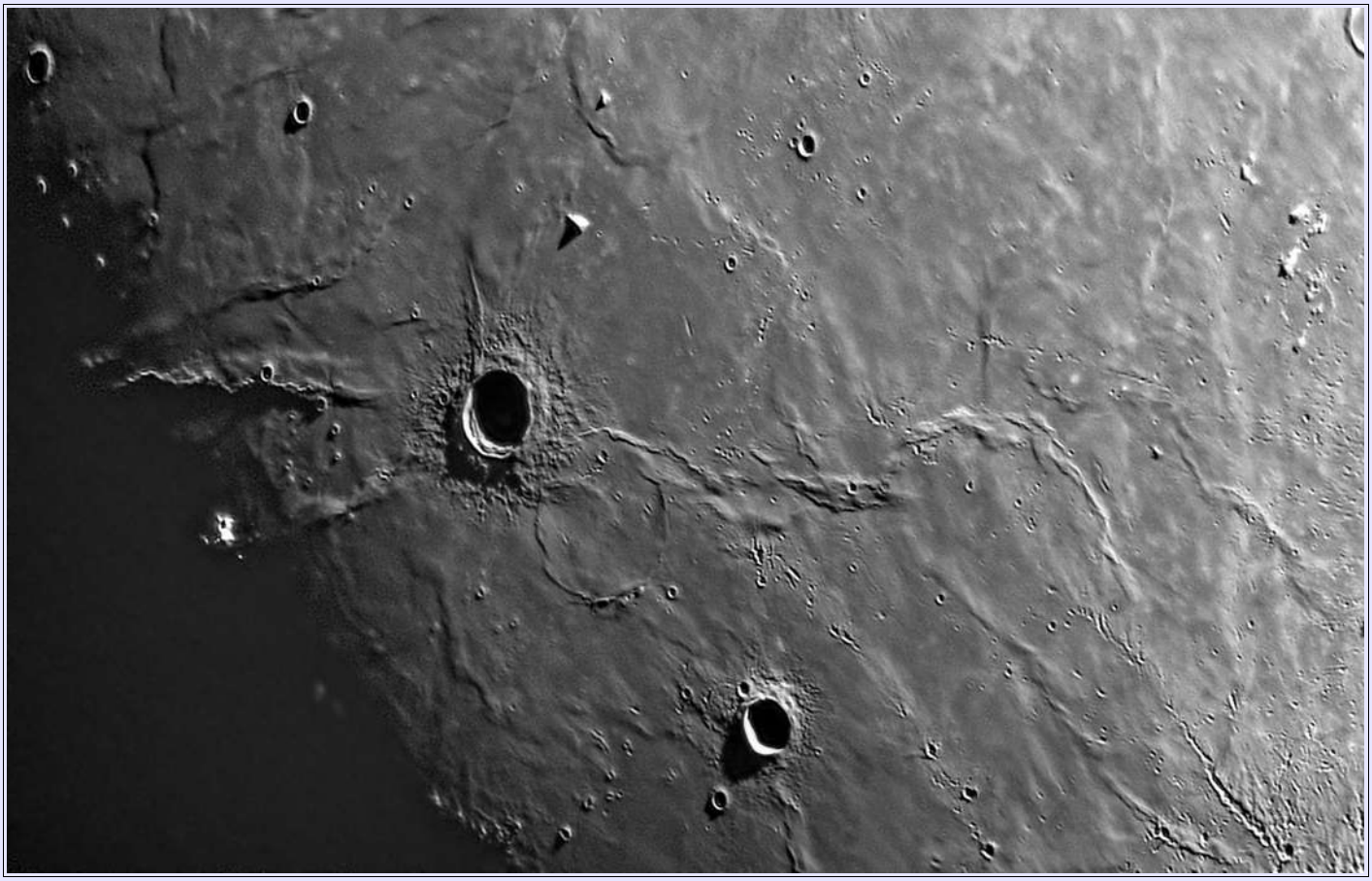


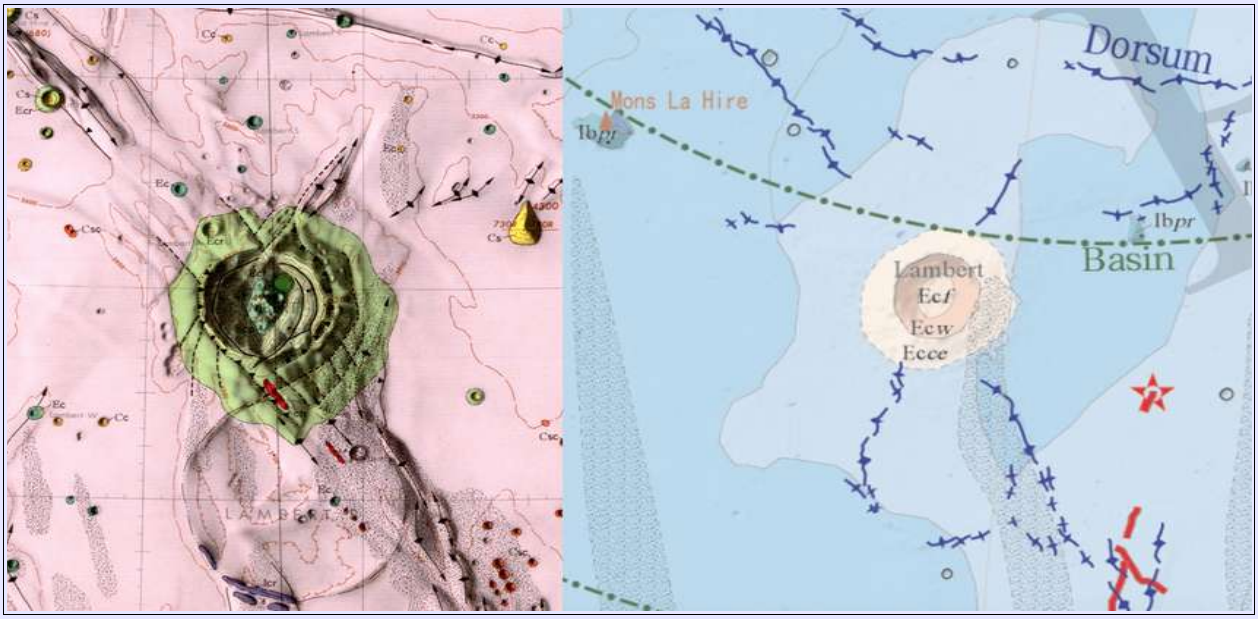
Image by Leo Aerts from an imaging session in March 19th 2024 using a Celestron C 14 and, green filter.

Ed.Notes:

Low angle illumination images never fail to reveal some unusual features, and Leo's image here is a good example. I have enlarged a portion of it slightly to show Lambert and its surroundings in more detail. A wealth of detail shows up – but I am going to restrict these notes to the fine ridge (approx. 40kms long) that extends to the north from the northern rim of Lambert, and indicated by the yellow arrow.

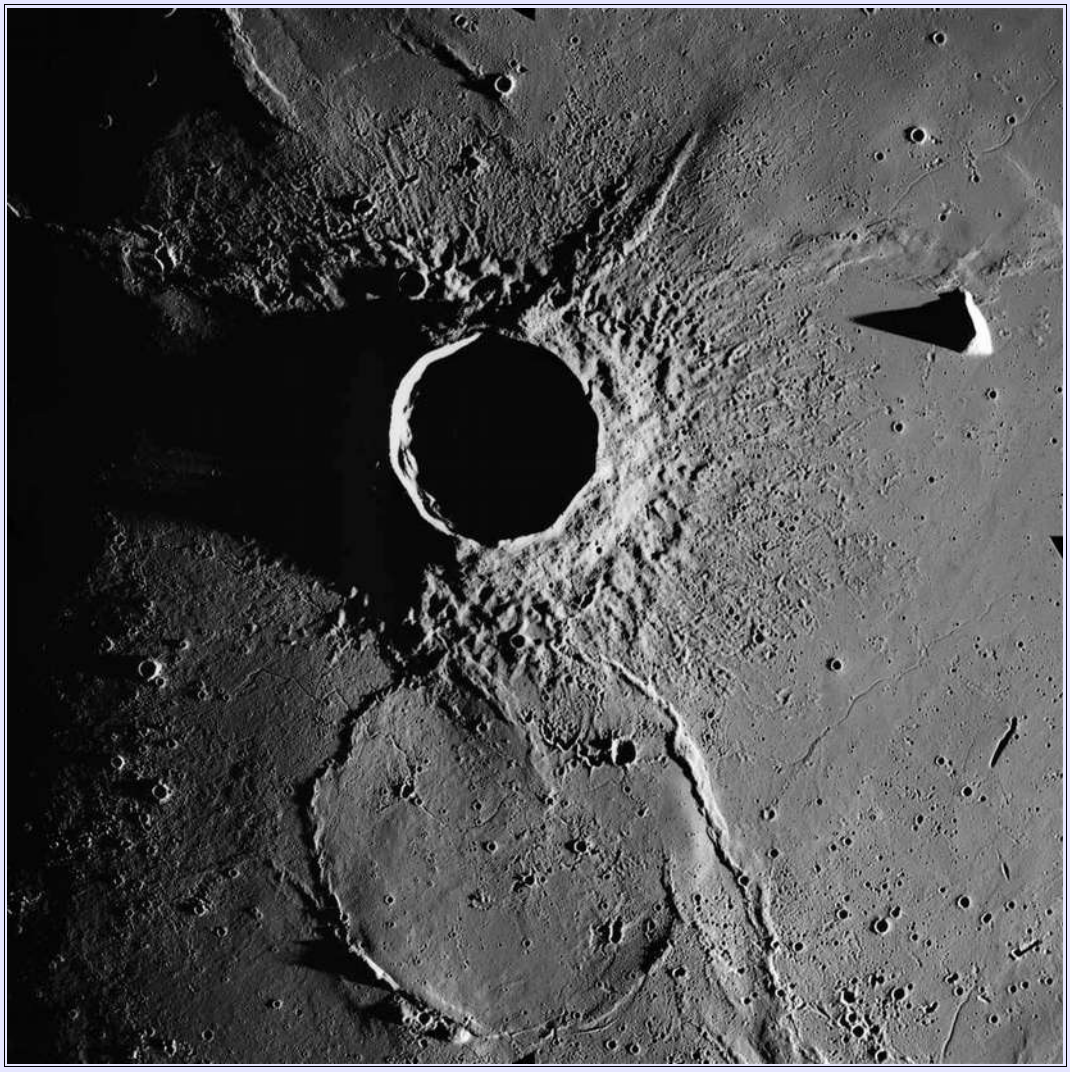
This part of Mare Imbrium is strewn with mare ridges – many apparent in this image, and it would be natural to assume that this was just another example of this type of feature.

The USGS Geological Map* of the area as well as the more recent Geologic Atlas of the Lunar Globe** show this feature as a wrinkle ridge, but the Unified Geological Map overlay in Quickmap show it as “Eratosthenian Crater Unit" – and as part of Lambert's ejecta blanket.



USGS Geological Map (left) and Geologic Atlas of the Lunar Globe (right)

The Apollo 10 image (below) shows a bit more structure in this feature, and it is clearly quite distinct from the nearby mare ridges, and appears to be set within the ejecta field of Lambert. So which interpretation is correct – is it a mare ridge of part of the crater ejecta?

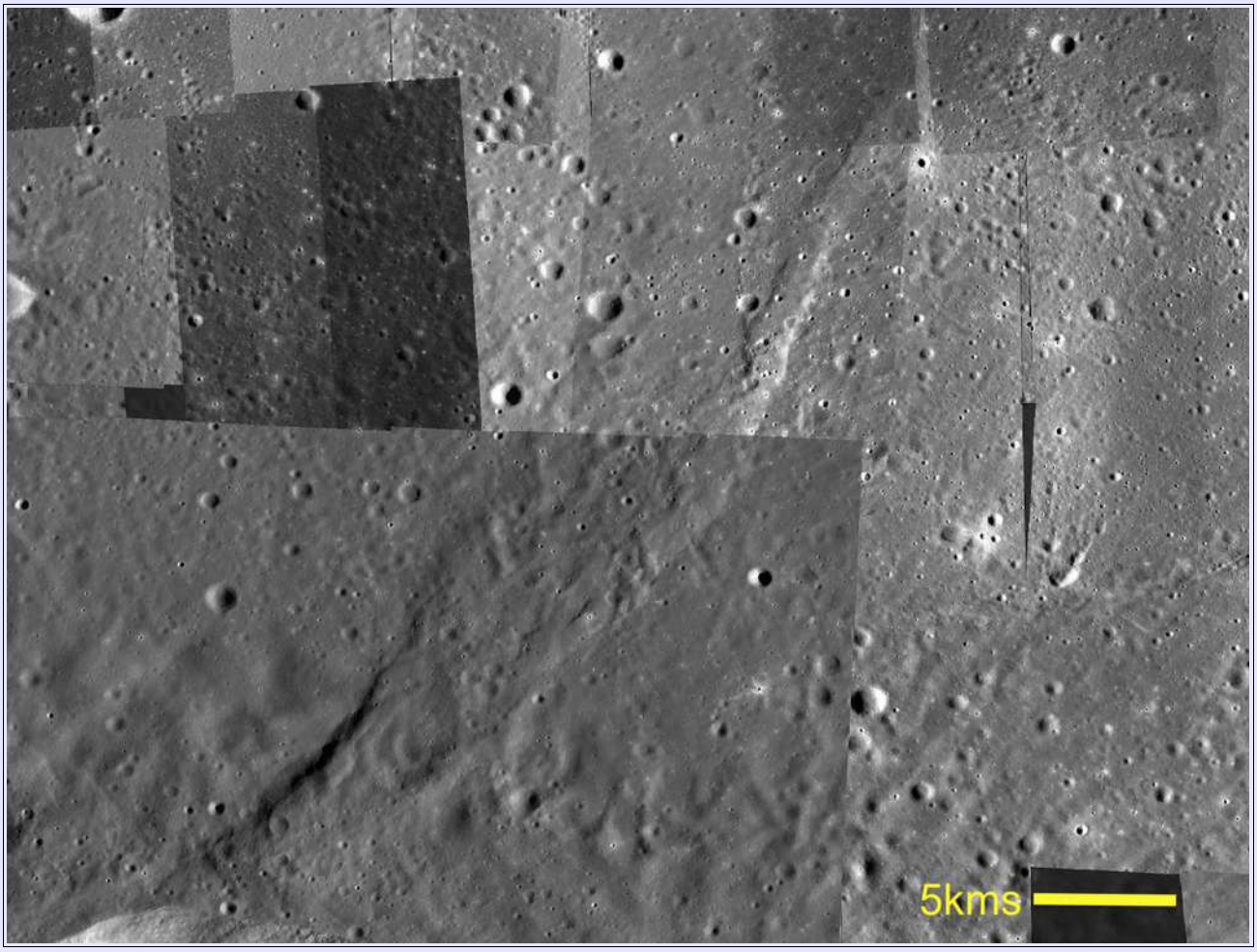


Apollo Image AS15-M-1010

The image below gives the game away, as what we can see with a reasonable degree of clarity is that this ridge is part of a larger stream of impact melt ejecta that has flowed down the northern glacis of the crater and away to the north. Near the rim this ridge is some 250m high and 4kms wide – so quite a substantial structure built up from flowing molten material. The structure broadens out and decreases in height as you travel north, and it develops into something of a channel with a central trough – with the eastern edge being the most prominently developed. This eastern edge to the channel is what we see as the sharply defined ridge in Leo's image.

This sort of structure is not in the least bit unique, I described a similar one to the south of Arago in a recent LSC, and if you have a look at the ejecta of Aristoteles you will see something similar to the north, which grades in to a crater chain about 50kms beyond the crater rim. In the case of Arago, I think the impact melt flow exploited a low point in the rim to flow over, I think the same is true in the case of Lambert, as the rim adjacent to this 'flow' is lower on average than the remaining rim height around the rest of the crater circumference.

As with some terrestrial lava flows, I think it possible that this flow of impact melt developed 'levees' or ridges along the edge as the melt there cooled and became more viscous, whilst that in the central part of the flow remained mobile for longer, which resulted in the central part of the flow draining away to leave the somewhat channel like structure we see left behind.



LRO NAC image of the flow structure emerging from the northern rim of Lambert (which can be seen peeking over the bottom left edge of the frame). Note the channel like appearance of the proximal part of the flow, whilst further from the crater rim the easternmost margin of the flow is most prominent.

As far as *why* the melt was ejected from the crater, two possible mechanisms suggest themselves. The first is that Lambert formed by a low angle impact from the south – in some examples of this type of event, there is enhanced production of melt and preferential distribution in the downrange direction. In this case however I think it more likely that rim collapse in the immediate post impact interval may well have displaced the impact melt pool that formed in the crater in the moments after impact, and that either it found its way up and over the crater rim at a low point *or* the low point formed as a result of thermal and mechanical erosion of the impact melt flow. It is interesting that the only impact melt visible now within the crater itself is almost adjacent to the location of this flow.

* M. H. Carr, USGS, 19650101, (LAC-40) Geologic map and section of the Timocharis region of the Moon: , https://doi.org/10.5066/P95SEBL1.

** Geologic Atlas of the Lunar Globe, Chinese Academy of Sciences

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Basin and Buried Crater Project by Tony Cook.

This month I thought that I would pick another suspected buried crater at random from the buried crater database and see what we can learn about it. QCMA 101 is located at 63.8˚W, 3.4˚S and has an estimated diameter of 76 km according to Evans, A. J., J. M. Soderblom, J. C. Andrews-Hanna, S. C. Solomon, and M. T. Zuber (2016), Identification of buried lunar impact craters from GRAIL data and implications for the nearside maria, Geophys. Res. Lett., 43, 2445–2455, doi:10.1002/2015GL067394. QMCA stands for Quasi-Circular Mass Anomaly – in other words there is some sort of circular feature in gravity data but nothing so obvious in terrain maps or imagery of the area.

So our task is to check out the gravity data, take a very careful look at other remotely sensed data in order to see if there is any physical evidence for partial remains of say a crater rim or central peak, to check the coordinates and diameter, and hopefully if we have observations sent I, to will be able to determine the best morning and evening selenographic colongitudes to see the buried crater or basin at.

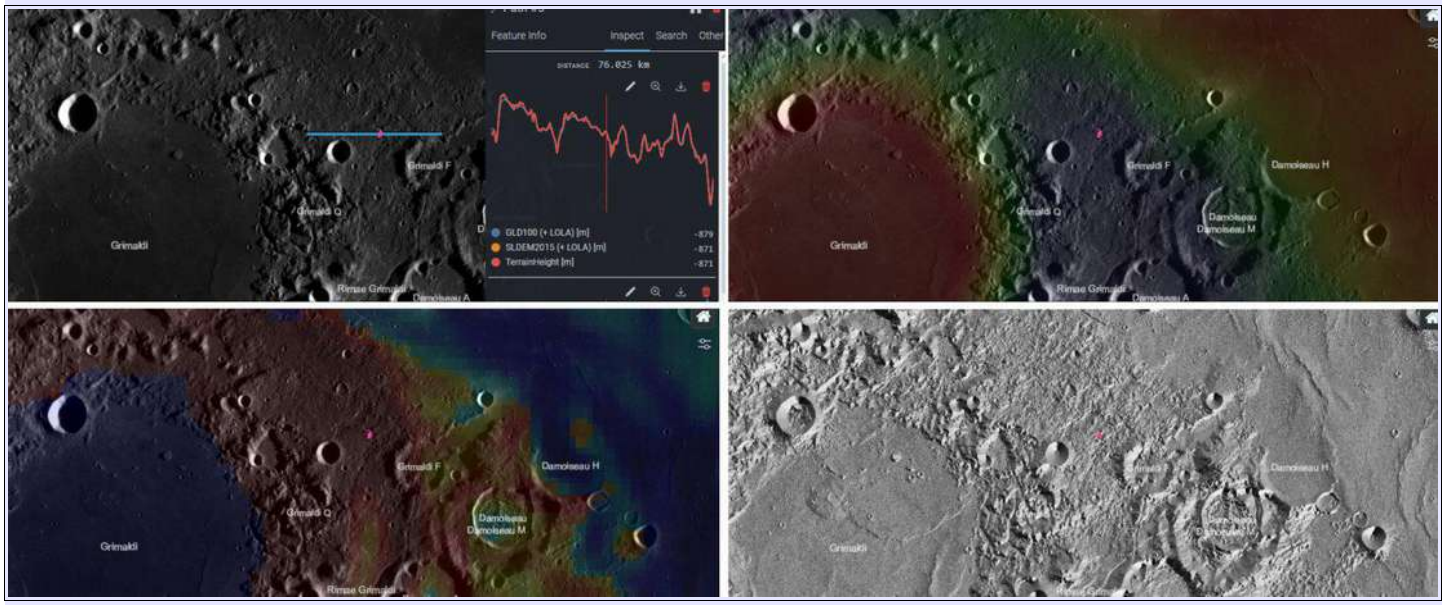
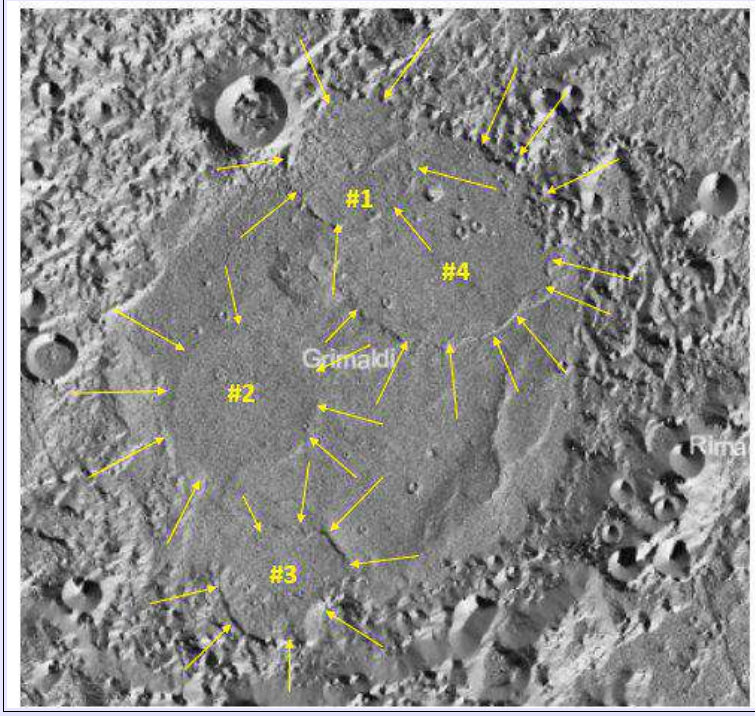


Figure 1 The location of QCMA 101 as indicated by the pink spot near each NASA ACT Quickmap screenshot centre. arrows. **(Top Left)** An image mosaic with a lot of shadow and a light blue bar showing the effective extent of the hypothetical 76 km diameter buried crater. **(Top Right)** GRAIL Bouguer Gravity map 6-600 degree. **(Bottom Left)** GRAIL gravity gradient map. **(Bottom Right)** Slope azimuth map.

Now QCMA 101 is incredibly difficult to find evidence for if you examine the usual remote sensing datasets. Firstly one might expect to find some arcs of the rim, or the remains of a central peak in image mosaics of the surface with a lot of shadow (Fig 1 – Left) but there is no sign of anything of the order of the size of the scale bar in diameter. The gravity and gravity gradient data do not help either (Fig 1 – top right and bottom left). The usual trustworthy slope azimuth map, does not show any evidence of the remains of a 76 km diameter crater here. Although not shown here, a simple digital elevation model topography map or a hill shaded relief map (neither shown here) do not reveal evidence of a buried crater. Therefore I shall assign a weight of 0 to QCMA 101, meaning I do not think this is a buried crater.

Interestingly if you look off to one side in the azimuth slope map, at the floor of Grimaldi (Fig 2) , then there are hints of up to four buried craters . These will be added to the buried crater catalog.

So if you wish to go and take a look at buried craters #1 to #4 on the floor of Grimaldi, whilst observing, then please try at local sunrise or set on the Moon. However you may find this a challenge as Grimaldi is fairly foreshortened by the limb area of the Moon especially due to libration.



No.	Lon (deg)	Lat (deg)	Diameter (km)	Weight
#1	68.3W	3.4S	39	4
#2	69.4W	5.8S	41	2
#3	69.0W	7.6S	38	3
#4	67.4W	4.1S	65	4

Figure 2. (Left) LROC Quickmap Slope Azimuth map with buried craters #1 to #4 indicated. **(Right)** table of buried crater parameters.

If you think that you have discovered a new impact basin, or unknown buried crater, please check whether it has been found previously on the following web site, and if not email me its location and diameter so that I can update the list.

https://users.aber.ac.uk/atc/basin_and_buried_crater_project.htm.

Alternatively, if you want an observational challenge, try to see if you can image one of more of the basins or buried craters at sunrise/set and establish what colongitude range they are best depicted at. Or you can even do this "virtually" with LTVT software. As you can see from the tables on the web sites there are lot of blank cells to fill in on the sunrise and sunset colongitude columns – so a good opportunity for you to get busy!

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A dissection of Polybius K and 'Larrieu's Dam' by Barry Fitz-Gerald.

Fig.1 Polybius K and 'Larrieu's Dam' as imaged by Bill Leathertbarrow on 12th June 2024.

Bill Leatherbarrow sent in the above picture, taken on 12th June this year and commented on the unusual shape of Polybius K, with its conspicuous straight north western wall known as 'Larrieu's Dam'. This feature was discussed in detail by Nigel Longshaw in his comprehensive 2008 JBAA article*. As you can see from Bill's image, K is an odd 'D' shaped crater, approximately 12kms across and to the SW of Polybius, and just to the east of the Rupes Altai.

Fig.2 shows the location of K in its wider geological context and within the SW quadrant of Mare Nectaris, where it is located on a flat plain between the Rupes Altai and the middle (visible) basin ring. Both Bill and Nigel suggest that the fracturing and faulting associated with this basin may have something to do with the unusually straight NW rim of Polybius K, with Nigel pointing out that the hypothesised 'Lunar Grid', whatever its origin, might have played a part in influencing the form of features in this area, and this may be a factor, despite the fact that no really obvious alignments stand out. The edge of the Altai scarp does however show a rather 'saw toothed' appearance to the SW of Polybius K that might be a result of a fracture system radial to the basin centre, or as a result of some process akin to that which produced the radial Imbrium Sculpture. In the present case the line of the dam in 'Larrieu's Dam' does line up with these features, so its formation may owe something to their presence.

A sense of some of this possible fracturing can be gained from the rather colourful USGS map 'Geologic map of the Rupes Altai Quadrangle of the Moon' reproduced in part in Fig.3**. This shows a number of lineaments and suspected faults orientated both radial to Nectaris, with one actually running along the base of the NW rim of K, and others bordering a somewhat square trough to the north of K and between it and Polybius C and G.

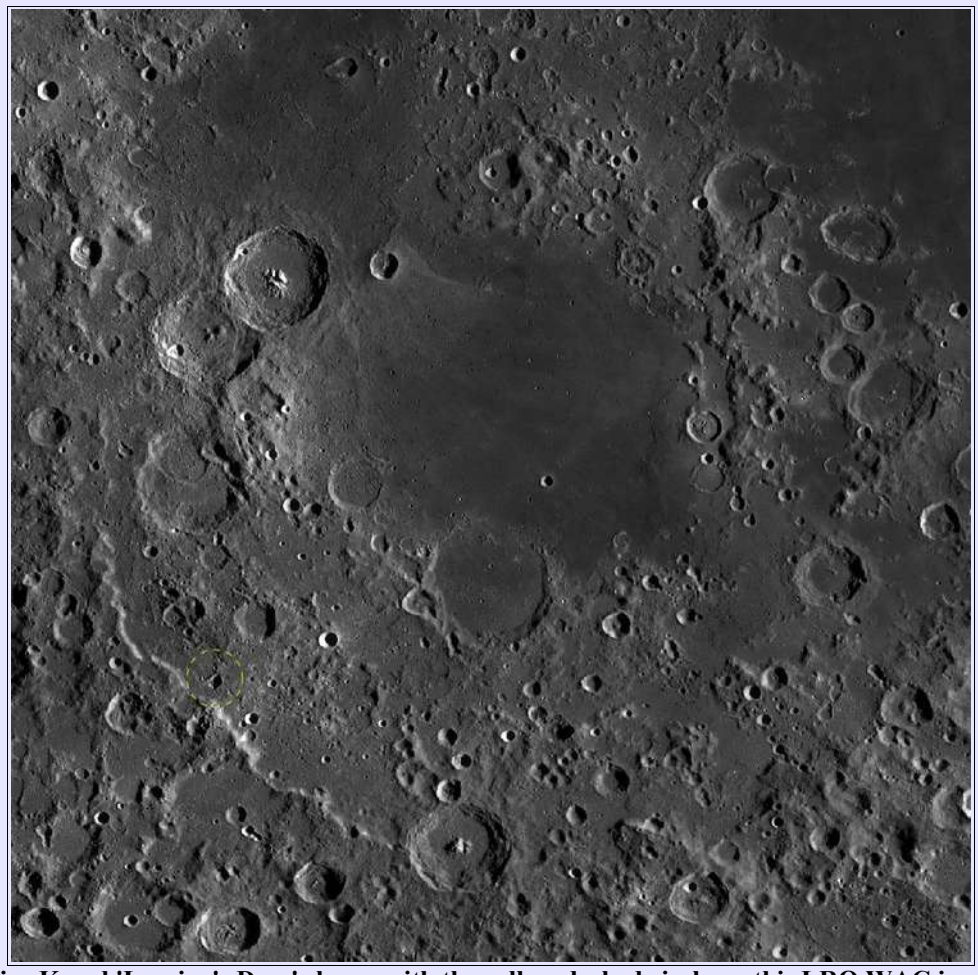

Fig.2 Polybius K and 'Larrieu's Dam' shown with the yellow dashed circle on this LRO WAC image of mare Nectaris.

Fig.3 Polybus K area taken from Geologic map of the Rupes Altai Quadrangle of the Moon

This trough is quite clearly visible in Nigel's drawings as well as Bill's image, and as can be seen in Fig.4, which is a cross section N-S over Polybius K, the terrain to the north of the NW rim is much lower, a possible factor in the rim's enhanced visibility under certain lighting conditions. The straightness and prominence as 'Larrieu's Dam' *may* therefore down to two factors, one - the influence of a fracture or fault radial to Nectaris that had an impact during that crater forming process by producing preferential excavation along that line of weakness and two – the relatively large height differential between the rim and the terrain to the north. But this is just one possibility.

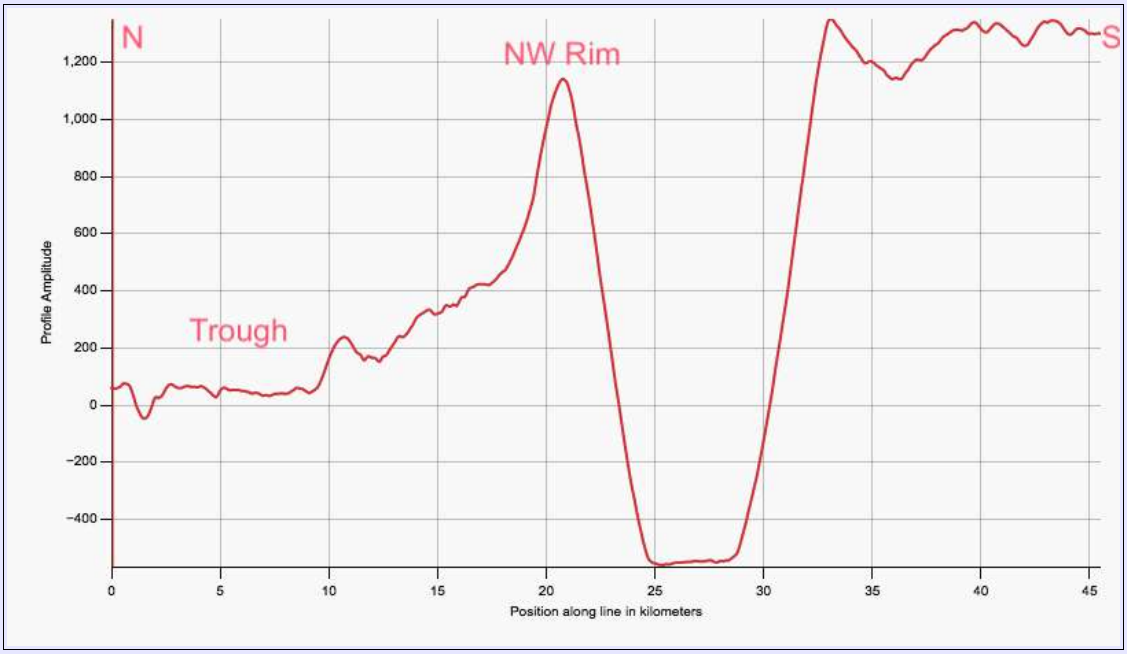

Fig.4 LRO Cross section N-S over Polybius K.

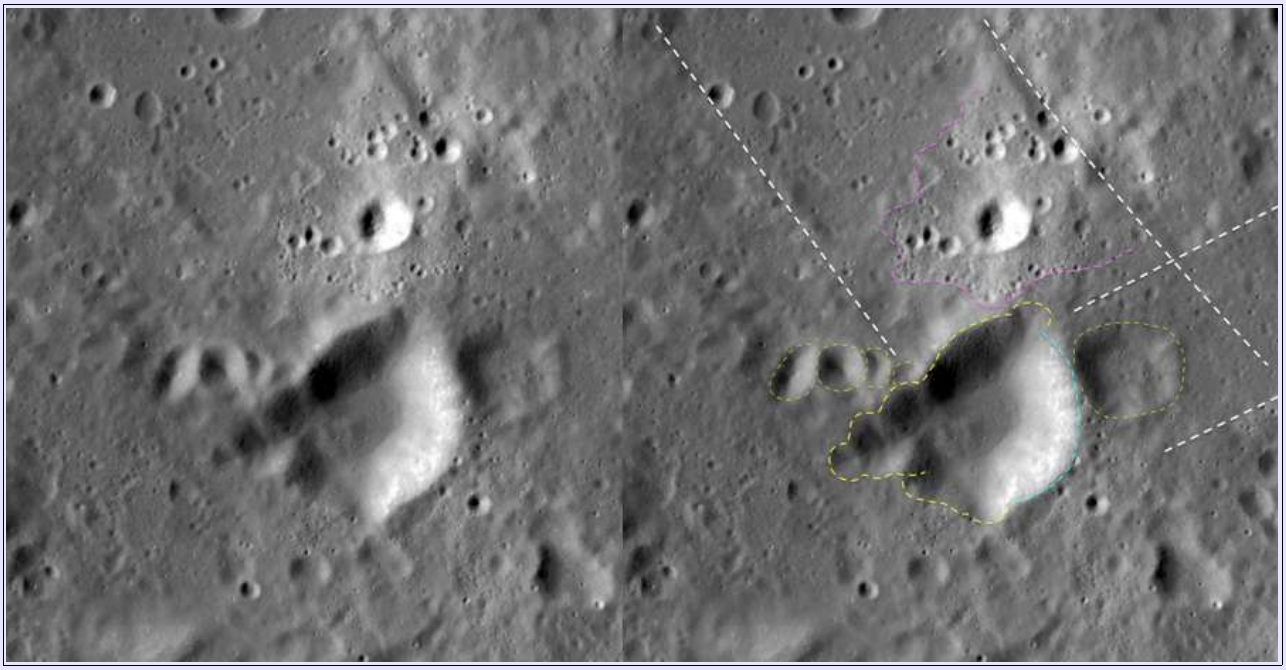

Fig.4 LRO WAC image of Polybius K. The right panel is annotated to show what appears to be a secondary crater chain or 'catena' (dashed yellow) what appears to be the rim of an ordinary bowl shaped crater (blue dashed) and smaller secondaries (fine yellow dashed). Possible lineaments are shown (white dashes) which may have had some structural control over the formation of the crater.

There is more to Polybius K than just the oddities noted above, and this is nicely demonstrated in the WAC image reproduced in Fig.4. This shows that Polybius K rather than being a simple, albeit oddly shaped crater, is in fact something of a chimera, with part of the crater rim (blue dashed line R/H panel) looking to all intents and purposes like a small, bowl shaped primary impact crater, whilst the rest of the rim, including the NW rim that forms the dam (yellow dashed line R/H panel) appears to be the rim of a small secondary crater chain. This chain partially overlies an older secondary cluster just to the NW (fine yellow dashed line R/H panel), and off to the NE is a fresh secondary cluster at the core of a bright ray element can be seen, which seems to have originated from a primary impact somewhere to the SW (within the lilac dashed line). The fact that the secondary chain that forms part of Polybius K is elongated in a direction radial to Nectaris explains why the dam *appears* to be a long straight structure, quite different to the southern rim, and results in the D shaped planform we see.

In Fig.4 you can see that this secondary cluster is composed of *at least* 4 partially overlapping craters, with the largest component to the east and decreasing in size to the west. In Nigel's JBAA paper he notes that the dam has a '*buttressed appearance'* with a number of spurs to the north, this probably reflects the fact that the dam itself is composed of the joint rims of the smaller crater components in this small chain. The individual craters of this small 'catena' open in to one another as can be seen in Fig.5, with the combined floor having a V shaped groove running the length of the chain. This groove is occupied by a ribbon of smooth, dark material which is likely to be unconsolidated regolith that has cascaded down off the walls of the craters to build up a distinct deposit (you need to zoom in on the various NAC views to see this). You can see exactly the same morphology in another small crater chain to the SE of Polybius K and which straddles the Rupes Altai (Fig.5 yellow arrow).

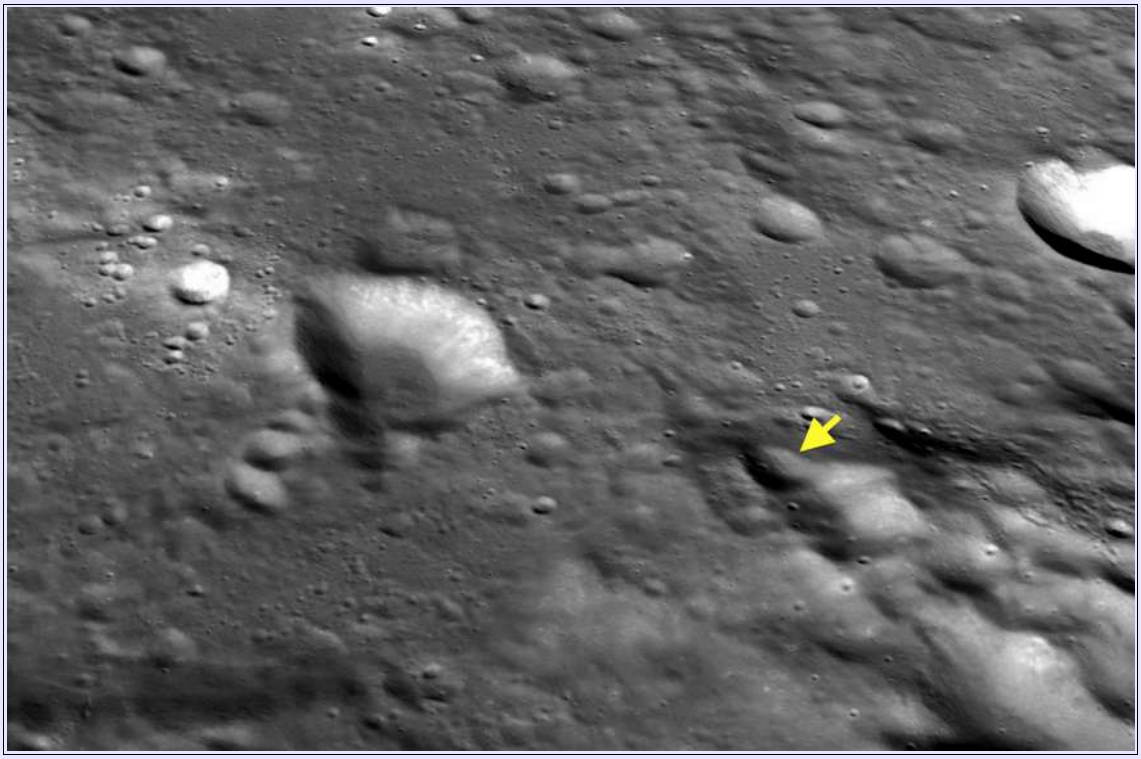

Fig.5 LRO 3D rendition of Polybius K viewed from the west. Note the 'dam' is made up of the joint walls of the 'catena' or secondary crater chain outlined in yellow in Fig.4. The yellow arrow shows another small crater chain sharing the alignment and morphology of the Polybius K one.

Now, I may have given the impression that what we have here is a small crater with a younger secondary crater chain superimposed on it, but what is probably more likely is that the *whole* structure of Polybius K is a secondary crater, and that the 'catena' I have been describing is just a sub-structure of a much larger single feature. You can see fairly convincing analogues of this type of structure in the ejecta blanket of the Orientale Basin, where you have a secondary crater with sharp up-range and cross-range rims , but where the down-range part of the crater has been blasted away by ejecta, leaving behind a crater chain or in the case of the one shown in Fig.6 a number of crater chains. This type of process can account for the morphology of Polybius K, indicating that the whole structure is as I have suggested a secondary crater cluster. If this is the case it is

clearly not a secondary of the Nectaris Basin, despite being orientated roughly radial to it, and must be associated with a much younger structure, possibly Mare Crisium.

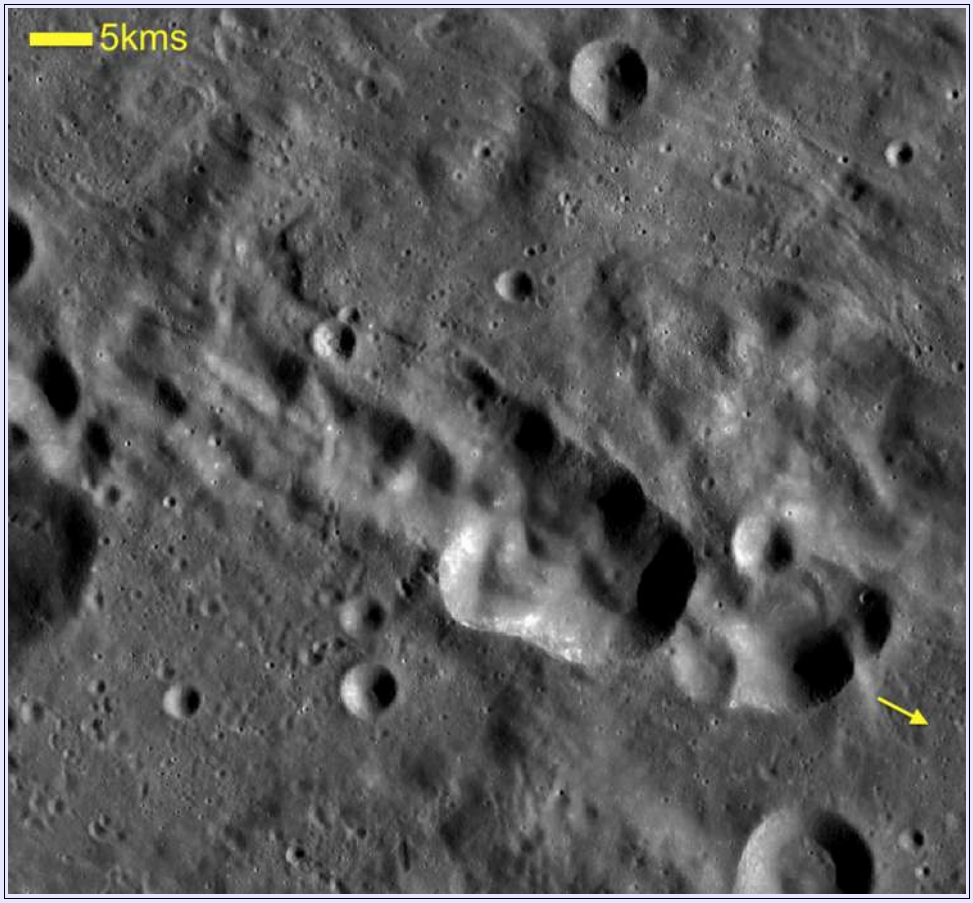

Fig.6 A secondary crater cluster in the ejecta of Mare Orientale, showing a main secondary crater with sharp up-range and cross-range rims but with the down-range rim blasted away buy the impact of ejecta to produce a crater chain(s). Note how the northern rim of the cluster looks superficially like what we see in 'Larrieu's Dam'. The Orientale Basin id off to the lower right (yellow arrow).

To summarise then, Polybius K appears to be a secondary crater consisting of a larger component with a sharp rim and a number of smaller components which includes a crater chain that extends in the down-range direction which explains the absence of a western rim to the crater. The structure called 'Larrieu's Dam' is the combined northern rims of the smaller craters that make up the secondary crater cluster – which accounts for its elongate nature and the buttressed appearance noted above. The *straightness* of this feature *may* owe something to the structural control of underlying fractures and faults associated with the Nectaris Basin, but this is not essential part of the explanation, as other such clusters such as the one shown in Fig.6 can assume an elongate form simply as a result of the impact process. The drop in elevation to the north of Polybius K where there may be a fault bounded trough may serve to accentuate the visibility of the 'dam' under certain illuminations.

*Longshaw, N.. (2008). 'Larrieu's Dam'; the 'rediscovery' of a seldom explored topographical lunar feature in the foothills of the Rupes Altai. Journal of the British Astronomical Association. 118. 87-90.

**Rowan, L. C. (1971) Geologic map of the Rupes Altai Quadrangle of the Moon, USGS Publication.

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Lunar domes (part LXXXII): Marth dome with a concentric crater on the summit.
by Raffaello Lena.

Introduction.
The concentric crater (CC) Marth (29.3° W 31.1° S) is located near the centre of Palus Epidemiarum. Palus Epidemiarum is separated from Mare Humorum by relatively narrow highland terrain, characterised by the craters Douthorne and Ramsden, and from Mare Nubium by craters Campanus and Mercator. Marth is a relatively isolated object, the closest relevant features are Marth K located to north-east and Mercator B located to east, both at about 45km. To the north, at about 57kms, lies Campanus B. The closest lunar features from Marth are two unnamed elevations located to the west. Marth is characterised as being a concentric crater (CC). The CC is visible in Fig. 1. The average dimension of the inner ring is 2.1km, the average dimensions of the outer ring is 4.0km, giving a ratio In/Out = 0.52, consistent with the average CCs ratios.

Figure 1: Marth Concentric Crater on the summit of a dome.

Trang et al. (2011) proposed a morphologic classification of CCs based on the reciprocal shapes of the crater rings. They defined three end members: the first one consists in CC where the inner ring is a continuous smooth torus. Marth belongs to this category. The mechanism of formation of CCs is still an open debate in lunar science. CCs tend to be located near mare/highland boundaries, in the neighbors of isolated mare ponds, and within floor-fractured craters. Trang et al. (2011) proposed seven possible formation mechanism, partly exogenic and partly endogenic. I focus on three of them, the first one exogenic and two endogenic ones.

One possible explanation for the CCs formation is an impact event that happens on terrain on which the surface layer is weaker than the (much stronger) substrate. In this case any crater at a reasonable distance from the target CC should share the same destiny of being concentric. The other two mechanisms relate to mare volcanism. The first one, the volcanic extrusion hypothesis, puts the link between extrusive domes and impact as the cause of CCs: in fact, according to this hypothesis, such domes were constructed by two cycles of lava extrusion followed by a crater event in the centre of the dome.The second one, the igneous intrusion hypothesis, extends the cause of formation of floor fractured craters to CCs: in this scenario, the inner ring is formed by magma that intruded into the crater distorting it from below, but without the magma being extruded. Distribution of CCs and floor-fractured craters is in fact very similar.

The main evidence for distinguishing the two hypothesis regards the relation between the crater and the surrounding terrain lithology: in the case where the CC's composition is equivalent to that of the surroundings terrain, the igneous *intrusion* is more likely. In the case where the CC lithology is *different* from the surrounding terrain, a mafic extrusion could be one possible explanation.

Topographic data were provided by the WAC-derived digital terrain model (DTM) at the 100 m/pixel scale (Scholten et al., 2010). Fig. 2 displays a 3D reconstruction provided by the corresponding WAC-derived digital terrain model. A depth of 190 m for the shallow inner crater and an elevation difference of 85-90 m between the crest of the outer rim and the surrounding surface were derived. Hence, the centre of the inner crater lies at about 290 m below the surrounding surface. The corresponding profile derived by the GLD 100 data is shown in Figure 3.

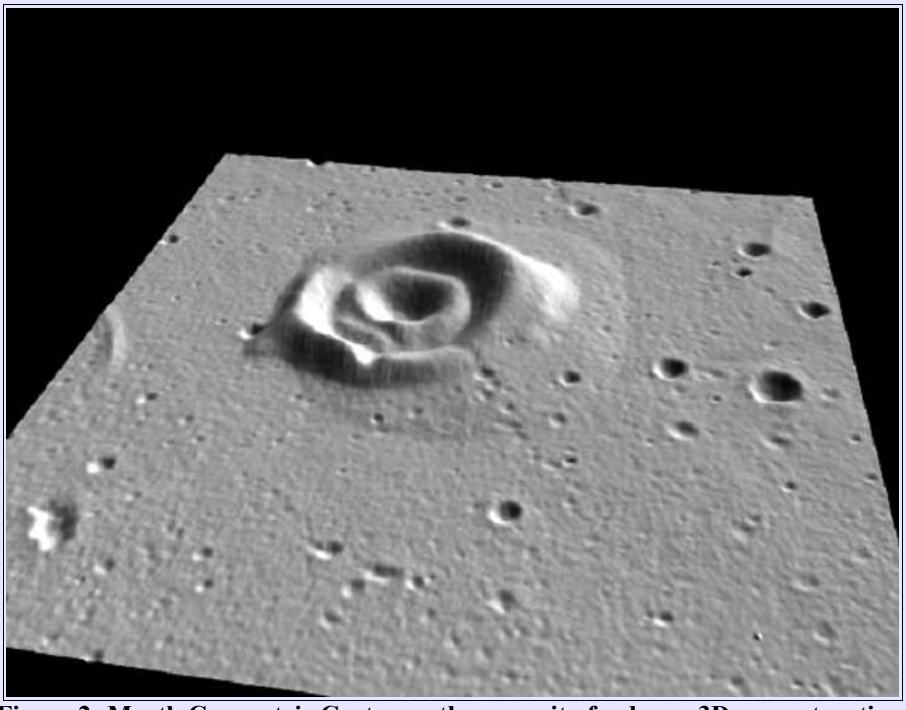

Figure 2: Marth Concentric Crater on the summit of a dome. 3D reconstruction.

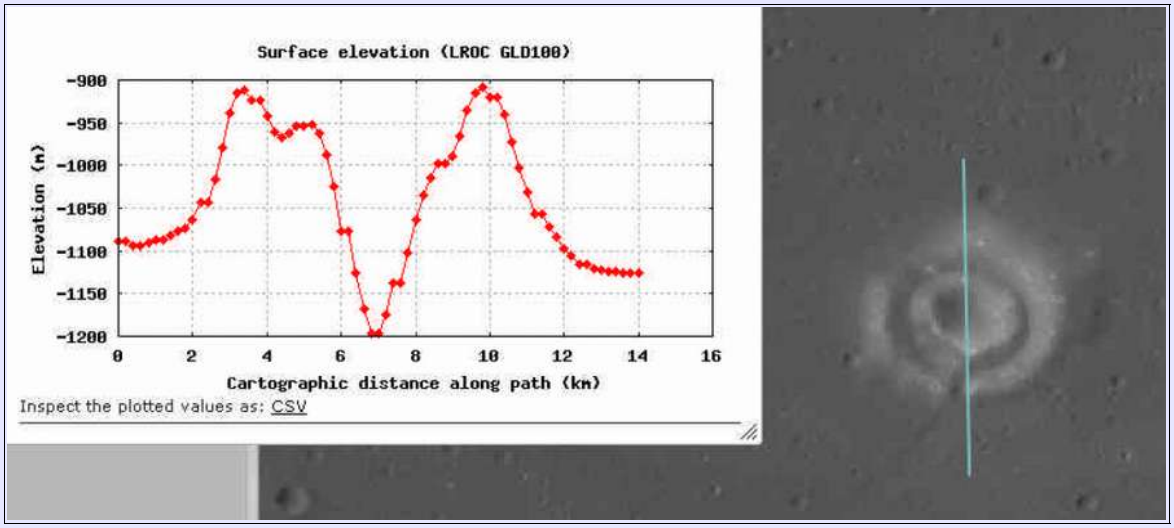

Figure 3: Profile of Marth Concentric Crater on the summit of a dome.

Elemental composition: The higher values for Fe, Mg and Ti were inferred at the surrounding soil where the concentric crater Marth is located, with about 8.3 wt% Fe, 6.2 wt% Mg and 1.2 wt% Ti. The lower values for

Fe (6.3 wt%), Mg (5.6 wt%) and Ti (0.5 wt %) correspond to higher amounts of Aluminium and Calcium wt%, inferred for the concentric crater, typical of highland composition. Using the inferred elemental abundances no significant compositional differences between the inner ring and outer ring of the concentric crater is observed (see Fig. 4). Elemental abundances maps show that Marth crater is characterised by a relatively low Fe, Mg and Ti abundances and relatively high Al and Ca contents, typical of highland material.

Petrographic map: The red to orange colour in the petrographic map indicates the presence of a mare basalt composition. The blue coloration indicates very low iron rock, typically consistent with ferroan anorthosite or generally highland-like material. The green colour indicates the presence of magnesium suite rock and is sensitive to the presence of olivine. The light purple colour shows a mixture of highland material (blue) and mare basalt (red). The map is reported in Fig. 5.

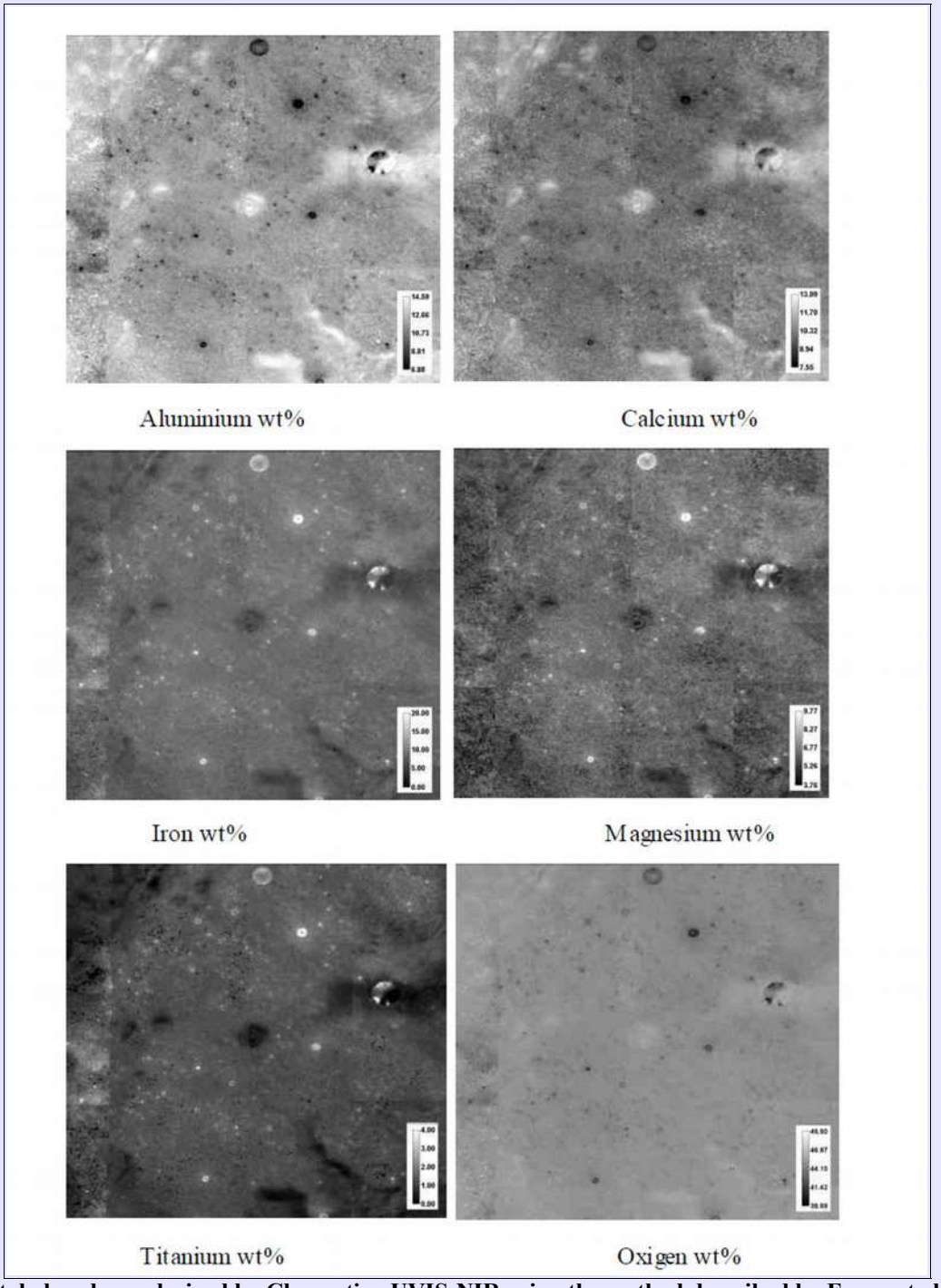

Figure 4: Elemental abundance derived by Clementine UVIS-NIR using the method described by Evans et al. (2009), and also Evans and Lena (2010).

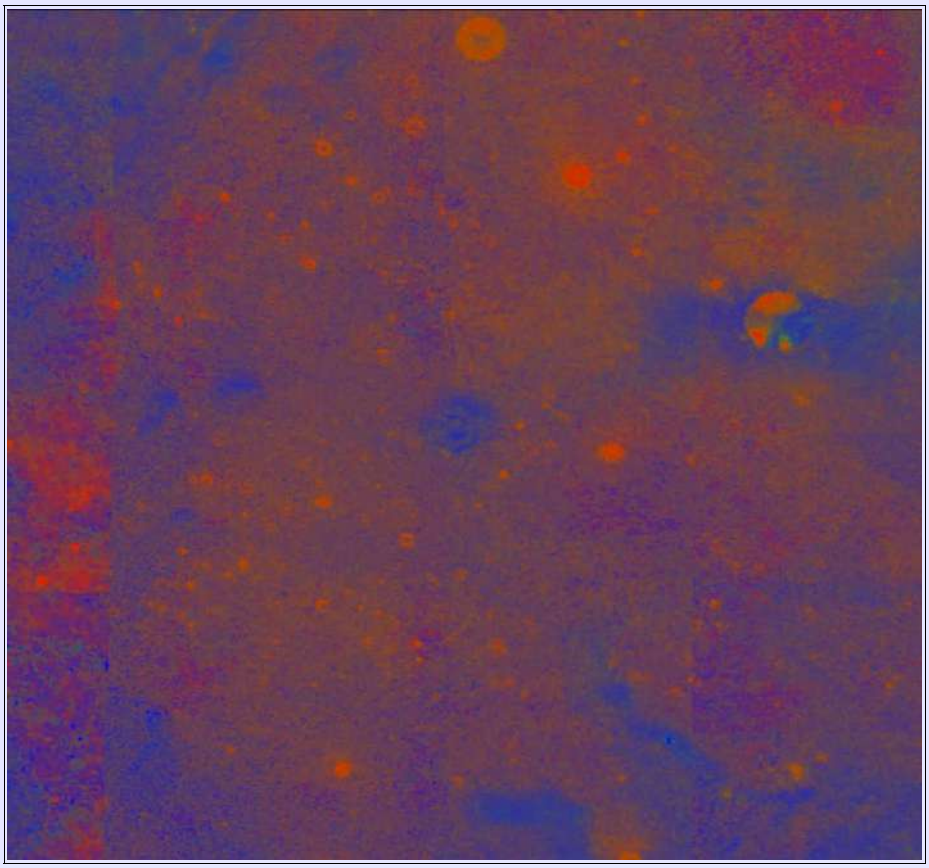

Figure 5: Petrographic map.

The concentric crater Marth lies on the summit of a raised soil, which has an average slope of 0.62°, like the intrusive domes of class In2 (Lena et al., 2013). It is the second example of a dome with a concentric crater on the summit. Another dome is Archytas 1 which is interpreted as an intrusive done of class In1 (Fig. 6).

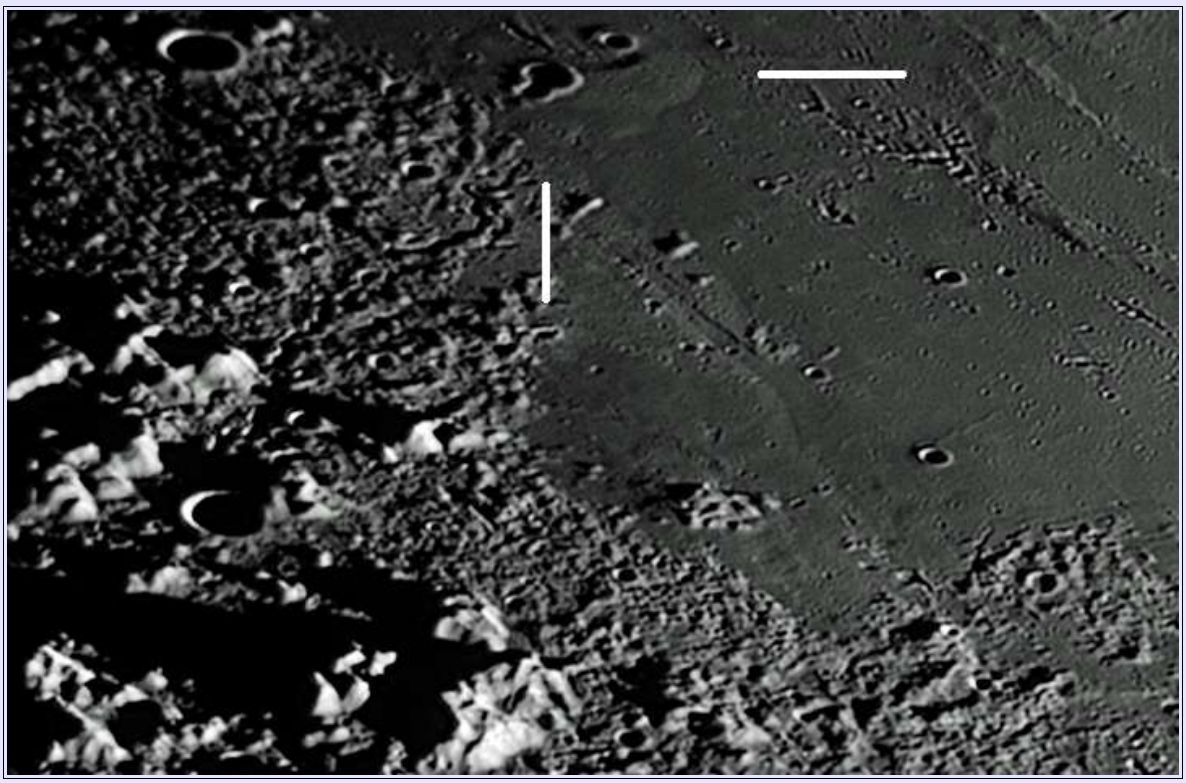

Figure 6: Mare Frigoris including the dome Archytas 1. Image taken on February 17 2024 at 18:04 UT by Luigi Morrone, C14 telescope (Schmidt Cassegrain 355 mm f/11).

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13. Wood C.A., 1978. Lunar Concentric Craters, Lunar Planetary Science Conference IX, 1264- 1266.

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LUNAR GEOLOGICAL CHANGE DETECTION PROGRAMME by Tony Cook.

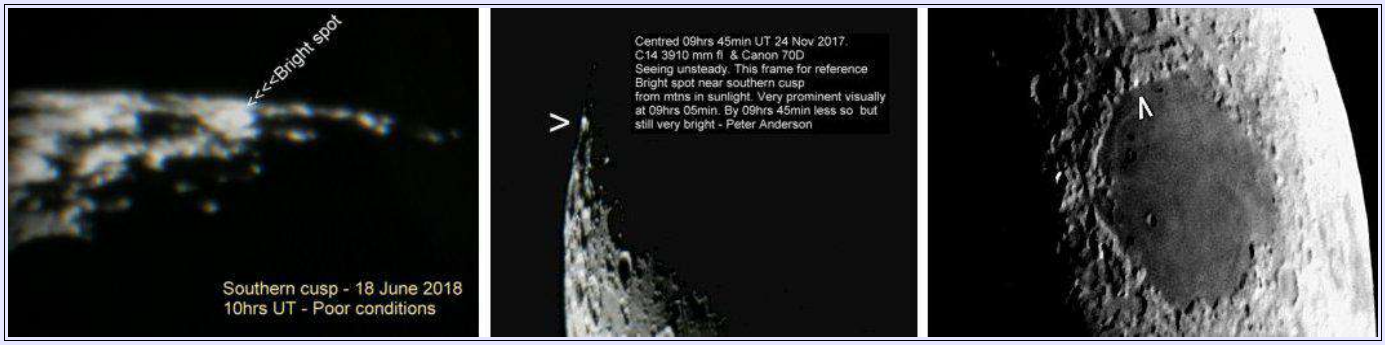

Figure 1. Images provided by Peter Anderson (BAA). **(Left)** A very bright spot seen close to the lunar south pole. The date is given in the image and north is towards the bottom. **(Centre)** Very bright spot seen close to the lunar south pole at the date and UT mentioned in the image. North is towards the right. **(Left)** A very bright spot seen on the NW shore of Mare Crisium. This image was taken on 1980 Jun 17. North is towards the top.

TLP Reports Received

No new TLP or impact flash reports have been received for the months of May-June. Concerning the very bright rim of Barrow crater seen on 2024 May 15 by Trevor Smith, Peter Anderson has emailed in some images (See Fig 1) which illustrate similar very bright sunward facing slopes that grab an observer's attention. His text is below:

"I also throw in a pretty useless image from 18th June 2018, and one more from many years ago showing a feature that got me really excited at the time - a very bright peak on the wall of the Mare Crisium. Again clearly a bright mountain face in the morning sunlight.- Quoting from something I later wrote: *"On 20th March 1980 using my then new 16" reflector, I felt that I had observed a likely TLP in the form of an anomalously bright headland on the Mare Crisium - the same headland referenced in your December 2021 Lunar Section circular at page 27."* The attached image from 17th June 1980 shows this feature at a subsequent lunation not quite as bright but still prominent."

The Mare Crisium bright spot effect is definitely well known about and most have been removed from the TLP database. It is highly prominent at low magnifications where it looks very much star like. The actual surface feature is a small ray crater on the inner slope of Mare Crisium. The brightness is dependent upon illumination and viewing (topocentric libration) directions. The south pole bright spot also shows up in past TLP reports, and again we learn to ignore these unless it exhibits short time scale changes in brightness.

Routine reports received for April included: Mário Rui Abade (Portugal – BAA) imaged: earthshine. Paul Abel (Waxahachie, TX, USA – BAA) observed the total solar eclipse. Alberto Anunziato (Argentina – SLA) observed: Alphonsus, Archimedes, Copernicus, Mons Hadley, Plato and Promontorium Laplace. Bob Bowen (Scarborough and Newtown, UK – NAS) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Copernicus, eastern Mare Orientale, and several features. Anthony Cook (Newtown and Mundesley, UK – ALPO/BAA) imaged: earthshine in the SWIR and several features in colour. Walter Elias (Argentina – AEA) imaged: Albategnius, Copernicus and Mare Crisium. Dave Finnigan (Halesowen, UK – BAA) imaged: Balmer, Humboldt, Langrenus and Oken. Marcus Hall (Idabel, OK, USA - Aberystwyth University) imaged the solar eclipse. Rik Hill (Tucson, AZ, USA – ALPO/BAA) imaged: Lamont. Phil Mading (Manchester, UK – BAA) imaged: Ptolemaeus, Rimma Ariadaeus, Rima Hadley and several features. Luigi Morrone (Italy – BAA) imaged: Atlas, Gutenberg and Janssen. Trevor Smith (Codnor, UK – BAA) observed: Aristarchus, Atlas, Censorinus, Grimaldi, Macrobius, Proclus and Theophilus. Franco Taccogna (Italy – UAI) imaged: Herodotus.

Note that we I have included some BAA pooled observations in with this report. I have also included May observations received below. During academic term time, I fell behind by one month in reporting observations. The less hectic Summer enables us to catch up.

Routine reports received for May included: Mário Rui Abade (Portugal – BAA) imaged: several features. Bob Bowen (Ynyslas, UK – NAS) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Clavius, Copernicus, Gassendi, Plato, Schiller and several features. Walter Elias (Argentina – AEA) imaged: Aristarchus and Copernicus. Dave Finnigan (Halesowen, UK – BAA) imaged: several features. Les Fry (West Wales, UK – NAS) imaged: the eastern limb, earthshine, and several features. Bill Leatherbarrow (Sheffield, UK – BAA) imaged: Diophantus, Mare Humorum, Ramsden, Sinus Iridum and Tycho. Jean Marc Lechopier (Tenerife – UAI) observed: Stofler. Lars Lindhard (Denmark – BAA) imaged: Hypatia. Bob and Sophie Stuart (Rhayader, UK – NAS/BAA) imaged: Aristarchus, Bessarion, Copernicus, Finsch, Gassendi, Hainzel, Kepler, Longomontanus, Prinz, Proclus, Ramsden, Schiller and Sinus Iridum. Franco Taccogna (Italy – IAI) imaged: Promontorium Agarum, and several features. Aldo Tonon (Italy – UAI) imaged: earthshine. Alexander Vandenbohede (Belgium – BAA) imaged: Fracatorius, Mare Australe, Mare Undarum and Theophilus. Luigi Zanatta (Italy – UAI) imaged: earthshine, and several features..

Note that we I have included some BAA pooled observations in with this report.

Analysis of Routine Reports Received (April)

Earthshine: On 2024 Apr 10 UT 20:02 Mário Rui Abade imaged earthshine during the following lunar schedule request to monitor the Moon's night side for impact flashes.

Look out for sporadic impact flashes in earthshine. Any observations should be reported to: a t c @ a b e r . a c . uk

Figure 2. The earth lit Moon orientated with north towards the top as imaged by Mário Rui Abade (BAA) on 2024 Apr 10 UT 20:02. **(Left)** a truncated and rotated view of the original image that also included Jupiter nearby (not shown here). **(Right)** A contrast enhanced version.

Although Mário was not taking video to detect impact flashes, his image (Fig 2) does illustrate how straight forward it is to go about hunting for impact flashes in the earthshine. If you have the capability to capture views of earthshine, at video frame rates of at least 10 frames per sec, and can detect the limb of the earth lit Moon and see at least some of the brighter features on the night side of the Moon, then you have the capability to monitor the Moon for impact flashes. One basically just takes video, at the times given in the predictions, then feeds the AVI video into either Lunarscan or ALFI (email me and I'll send you the software for Lunarscan) or even look for flashes directly at the telescope in real time using FDS. Then if you send me (or if you are in the Americas, send to Brian Cudnik) copies of possible detected impact flashes then these can be compared against other people's observations to make sure that the flashes are not stand-alone cosmic ray events mimicking real impact flashes. Although an Italian Moon Mission, LUMIO, will look for flashes, it won't be launched for at

least another three years. It is therefore very important that we set up a ground network of dedicated amateur impact flash observers so as to get a team in place before the mission starts monitoring impacts on the far side. Nearside Earth based observation and far side LUMIO observations will be useful in determining the near and far side impact flux ratio. Anybody interested in taking part in this space based: amateur programme should contact me, or if you are in the USA, Canada the please contact ALPO's Brian Cudnik, see: https://alpo-astronomy.org/lunarupload/lunimpacts.htm

Atlas: On 2024 Apr 14 UT 21:40-21:50 Trevor Smith visually observed this crater under similar illumination to the following report:

On 1965 Oct 30 at 23:30-23:50UT Fehring and Garris (Parasmus, NJ, USA, using a 2.4" refractor x88, seeing very good) saw a fuzzy area -- variations in shape and distinctness, seen in an area east of Atlas crater. A drawing was made. It was noted that no other area had a similar effect. Cameron 1978 catalog ID=909 and weight=3. ALPO/BAA weight=3.

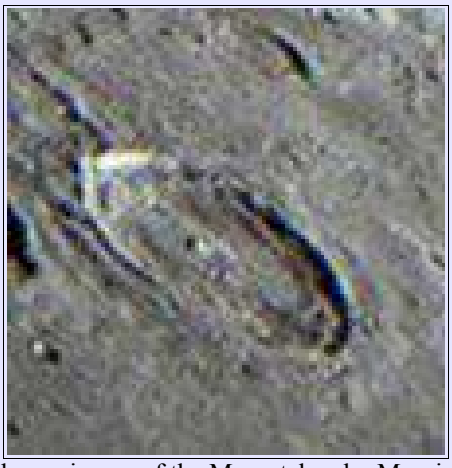

Figure. 3. Atlas from a small section of a larger image of the Moon taken by Maurice Collins on 2020 Jul 26 UT 07:15-07:24, orientated with north towards the top.

Trevor, using a 9" Newtonian under Antoniadi III-IV seeing conditions observed but could not see a fuzzy area. Indeed, everywhere he looked in and around Atlas and its vicinity looked sharp and normal. Observing ceased at 21:50UT due to cloud. A similar illumination image can be seen in Fig 3 and again this has no fuzzy area either. So, we shall keep the ALPO/BAA weight at 3 for now.

Alphonsus: On 2024 Apr 16 UT 19:09 Phil Masding (BAA) imaged the Ptolemaeus region and this included Alphonsus within just a few minutes of the similar illumination (±0.5˚) to the following TLP report:

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

Although the topocentric libration was not the same, in terms of illumination, Fig 4 is not far off what Sartory, Moore and Mosely would have seen back in 1966 if the appearance had been normal. We shall keep the weight at 4 for now as three independent observations were made back in 1966, but at least we have a good context image that Phil has supplied. We have discussed this TLP report before, with a similar illumination observation, back in the 2013 Jan newsletter.

Figure 4. Alphonsus as imaged by Phil Masding (BAA) on 2024 Apr 16 UT 19:09 and orientated with north towards the top.

Copernicus: On 2024 Apr 17 UT 22:58 Walter Elias (AEA) imaged this crater a matter of a few min outside the repeat illumination window for the following report:

Copernicus 1939 Mar 29 UT 19:00-19:15 Observed by Wilkins (Kent, England, 6" reflector) "C.P. diffuse light spot, faint glow s as tho in a luminous mist (3h before SR) Some indication of E.terraces, then vanished." NASA catalog weight=4. NASA catalog ID #447. ALPO/BAA weight=3.

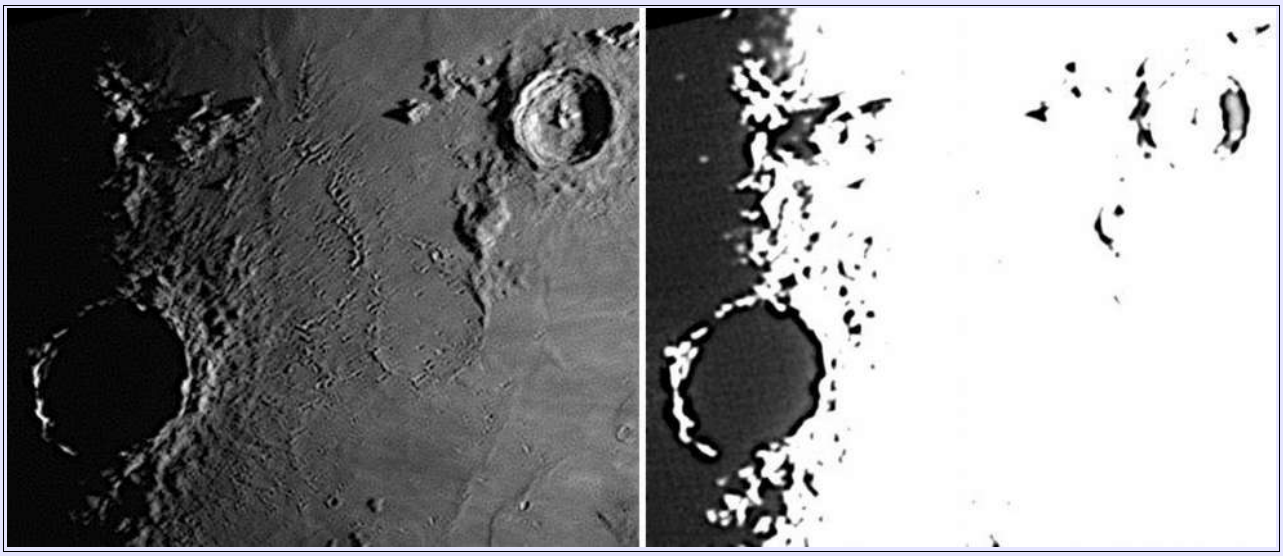

Figure 5. Copernicus as imaged by Walter Elias (AEA) on 2024 Apr 17 UT 22:58 and orientated with north towards the top. **(Left)** Walter's Original image. **(Right)** Contrast stretched to bring out any interior detail in the shadow.

Walter's image (Fig 5 – Left) was taken when the solar altitude at the centre of Copernicus was +0.3˚ and you can just about see in the enhanced version (Fig 5 – Right) a faint hint of possible inner slopes detail maybe lit up by scattered light off the illuminated rim – though it could also be an artefact of processing. But there is clearly no sign of the central peak. Wilkins' observation was made when the solar altitude lay in the range +0.4 to +0.5˚ (i.e. slightly higher than in Fig 5) and what was unusual was that the effect appeared and then disappeared? We have covered this TLP before in the 2014 Feb newsletter. For now we shall leave the weight as it is at 3.

Archimedes, Censorinus, Mons La Hire and Langrenus, Proclus: On 2024 Apr 18 UT 06:55-07:01 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole Moon under similar illumination the following 7 past TLP reports:

Archimedes 1973 Jan 13 UT 19:06-19:40 Observed by Theiss (51N, 9.67E, 75mm refractor) "Yellow to green colours at wall of Archimedes, became stronger until 19:09UT, constant brightness until 19:10UT and disappeared at 19:16UT" Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALPO/BAA weight=1.

Censorinus 1973 Jan 13 UT 20:02-20:14 Observed by Leitzinger (48.25N, 11.5E, 60mm refractor) "Censorinus Extraordinarily bright, pure white" Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALP:O/BAA weight=1.

Langrenus. On 1993 Jan 02 at UT 17:42 A. Dollfus (Meudon, France, 1m aperture telescope used) detected evidence for a dust cloud in Langrenus crater using CCD polarimetry. The ALPO/BAA weight=5.

Messier and Messier A. On 1968 May 07 at UT 03:00-03:40 Kelsey (Riverside, CA, USA, 8" reflector) observed Messier and Messier A and noted the following: "The ray-tail halo (in N. ray) showed a possible enhancement in blue filter at 1st obs. per. but not seen at 0330. Later enhancement was indicated in red filter but not apparent at 0600h. The red enhancement is very unusual; but has been suspected on a few previous occasions. Not seen vis. (confirm. of Jean?)" The Cameron 1978 catalog ID= and weight=5. The ALPO/BAA weight=3.

Mons La Hire 1887 Feb 02 UT 20:00? Observed by Klein (Cologne, Germany, 6" refractor) "Intense yellow streak that cast shadows around neighbouring features". NASA catalog weight=4. NASA catalog ID #255. ALPO/BAA weight=3.

Proclus 1973 Jan 13 UT 19:30-19:35 Observed by Krojer (48.25N, 11.5E, 60mm refractor) "North East wall of Proclus extraordinarily bright, observation interrupted by fog." Ref: Hilbrecht & Kuveler (1984) Moon & Planets 30, pp53-61. ALPO/BAA weight=1.

Proclus 1973 Jan 13 UT 20:50 Observed by Schnuchel (13.25E, 52.5N, 7x50 binoculars?) "Proclus Brighter than Langrenus". Ref: Hilbrecht & Kuveler Moon & Planets (1984) Vol 30, pp53-61. ALPO/BAA weight=1.

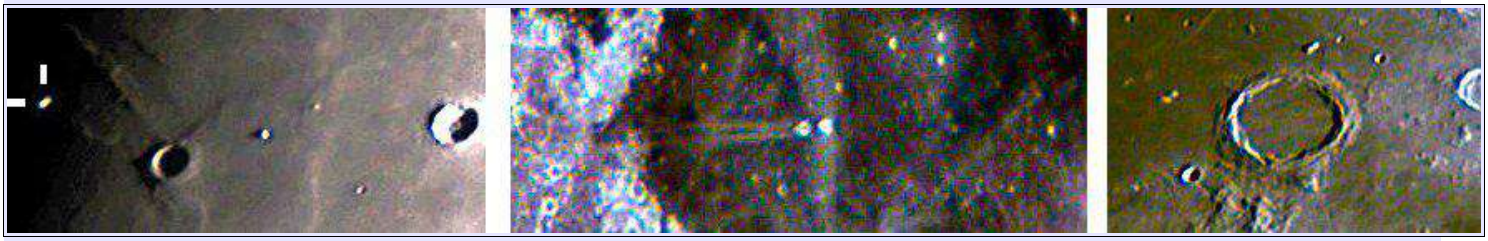

Figure 6. Sub-sections of a whole Moon image obtained by Maurice Collins (ALPO/BAA/RASNZ) obtained on 2024 Apr 18 UT 06:55-07:01 and orientated with north towards the top**. (Left)** Mons La Hire as indicated by the tick marks. The image has been colour normalized and had its colour saturation increased to 3.0 on GIMP. **(Centre)** Messier and Messier A – the image has been colour normalized and had its colour saturation increased to 5.0. **(Right)** Archimedes crater – this has been colour normalized and had its colour saturation increased to 5.0 using GIMP.

It is somewhat unusual to find so many repeat illumination events occurring during the same observing session, though four are from the same day: 1973 Jan 13.

For the Mon La Hire report from 1887, Klein was using a refractor and found a yellow streak that cast shadows apparently around neighbouring features. This description is very different to most TLP reports. I suppose that it could be due to chromatic aberration, but there is no mention of the effect elsewhere on the terminator. The only issue with this report is that Cameron has estimated it for 20:00 UT, being a typical time that she considers that Klein would have been observing at. The repeat illumination image, Fig 6 (Left) does not cast any light on a possible explanation, so we shall leave the weight at 3.

For the Messier report from 1968, the observer at least appears to have been using a Moon Blink device, which

is relatively sensitive to true red/blue colours, and theoretically immune to atmospheric spectral dispersion effects. Fig 6 (Centre) which has been enhanced to bring out colour, shows no obvious sign or red or blue in the comet like tail of Messier. We shall therefore leave the weight at 3. However at least we have a good colour image of what the surface should have looked like at this stage of illumination.

The Archimedes report from 1973 is the first of four from the Hilbrecht and Kuveler paper from the Earth, Moon and Planets journal. However, don't assume that everything appearing in a refereed journal is always scientifically accurate. Winnie Cameron was always sceptical of the TLP reports listed in that paper as nearly all were made with small sized instruments, and the observers concerned were not experienced lunar observers (according to her). However, giving them the benefit of the doubt and investigating each one on an individual bases seems a good strategy. Interestingly the colour enhanced version of the repeat illumination image, Fig 6 (Right) does show some yellow, maybe even green, but also orange on the rim, however we are into the noise levels of the camera being used in this enhancement and colours show up on other features too, which probably are not all natural surface colours. It is very unlikely that Theiss would have been able to see colours other than just maybe the blue tinge of some crater slopes which are due to non-geologically recent surface disturbances from landslides, dust removal on steep gradients etc. We have covered repeat illumination events of this TLP before in the 2017 Jan newsletter. I will leave the ALPO/BAA weight at 1 for now.

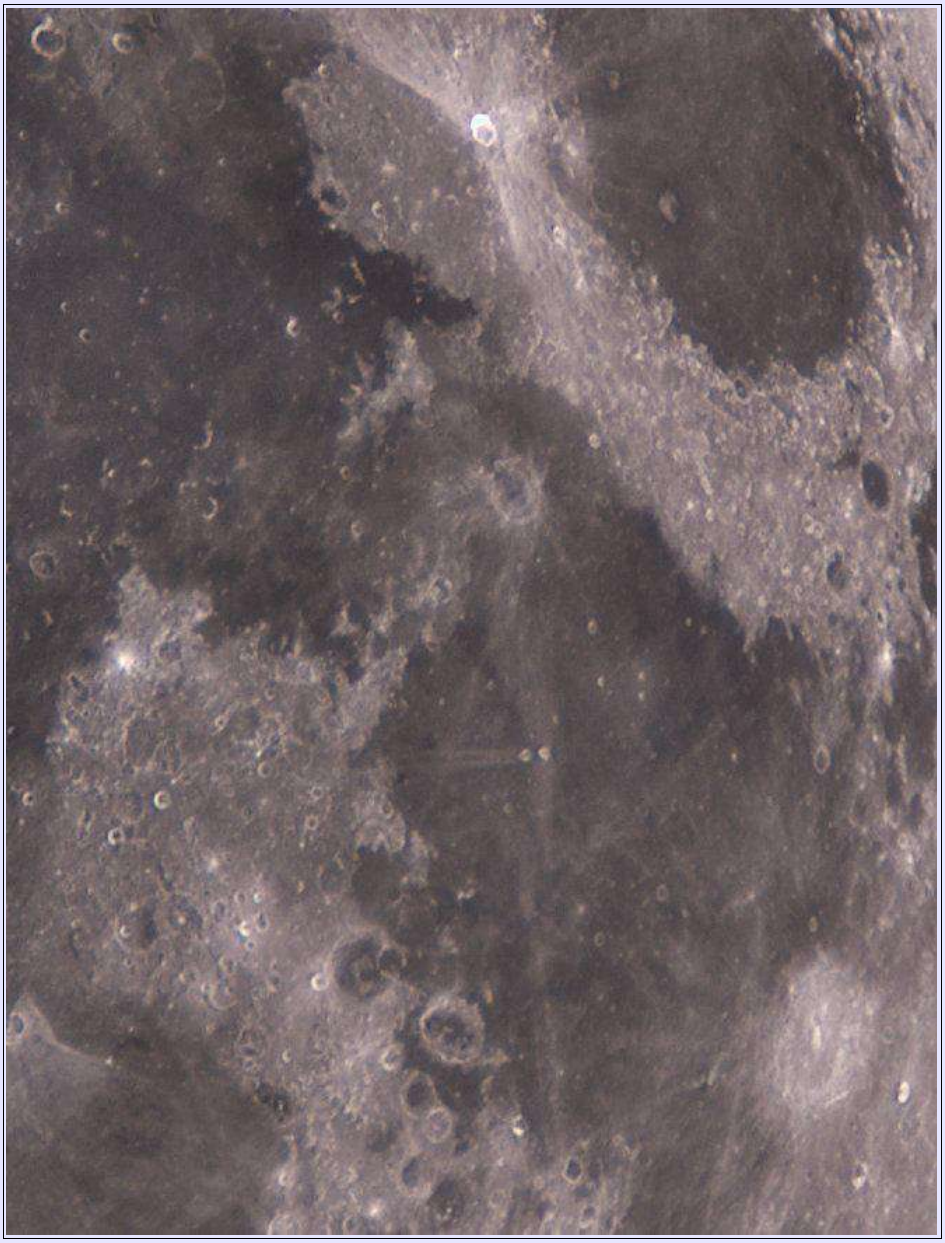

Figure 7. Section of a whole Moon image obtained by Maurice Collins (ALPO/BAA/RASNZ) on 2024 Apr 18 UT 06:55-07:01 and orientated with north towards the top.

Three of the Hilbrecht and Kuveler TLP reports from 1973 Jan 13 refer to the brightness of Censorinus and Proclus and by way of comparison Langrenus. Fig 7 neatly covers all three craters in the same image, and it has been possible to measure their peak digital number DN values and determine which is actually the brightest. Proclus has a peak brightness of DN=246, followed by Censorinus with a DN=240, followed by the central peak of Langrenus with DN=211.So whether Proclus or Censorinus can be regarded as extra-ordinarily bright in this 2024 apparition I doubt, as they are often quite bright and sometimes equal, depending upon which parts you measure. So we will keep the weights of these two 1973 TLP as they are, but for the 1973 Langrenus one, yes I would not be surprised if Proclus is definitely a lot brighter than Langrenus at this lunar phase – therefore we shall lower the weight of the Schnuchel TLP to 0 and effectively remove it from the ALPO/BAA database, after all the observation was made originally with mere binoculars!

Lastly concerning the Langrenus TLP, which is often regarded as a gold standard as a paper because it was published in the highly rated refereed planetary science journal: Icarus, by renowned astronomer Dolfus and involved polarimetry. Well as you can see the white light image that Dolfus used, for one of the three Langrenus TLP (1993 Jan 02), it is extremely poor quality (Fig 8 – Right) compared to modern amateur images (Fig 8 – Left). This begs the question on the reliability of the polarimetry data if seeing conditions can affect the white light image so much. I shall therefore lower the weight from 5 to 4. We have discussed this report before under similar illumination in the 2017 Jan newsletter.

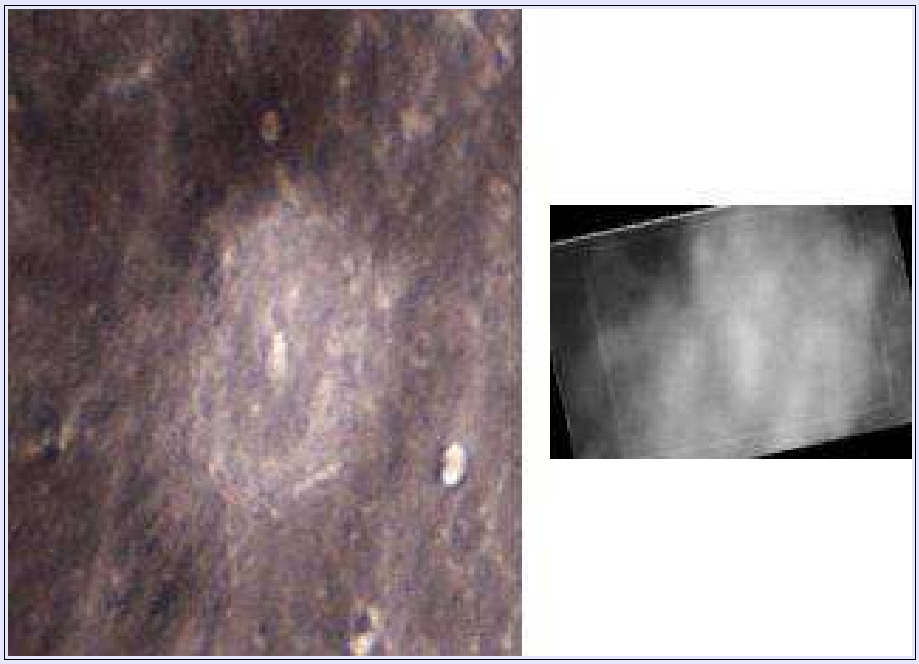

Figure 8. Langrenus crater with north towards the top. **(Left)** Image by Maurice Collins taken on 2024 Apr 18 UT 06:55-07:01. **(Right)** Image from Fig 3 of the paper: Audouin Dolfus (2000) Langrenus: Transient Illuminations on the Moon, Icarus, 146, p430-443 (Academic Press), taken with a 1m aperture telescope at Meudon observatory on 1993 Jan 03 UT 17.7.

Archimedes: On 2024 Apr 19 UT 02:05-02:20 Alberto Anunziato (SLA) observed/sketched (Fig 9) this crater under similar illumination to the following report:

Archimedes 1971 Aug 01 UT 22:00(?) (19:00 originally given probably local time) Miranda (Plaui, Brazil, 4" refractor, x80) observed two grooves going from east to west, broadening towards the west, across Archimedes. A drawing was supplied. Apparently this was the first time that this was ever seen. Cameron suggests rays? and also says that in fact a similar phenomenon reported before in nearly the same position (Apollo 15 watch?). The Cameron 1978 catalog ID=1303 and weight=2. The ALPO/BAA weight=1.

Alberto comments that there appears to be two light bands that run from west to east and seem to end near the thin shadow of the east wall. These bands are not seen very clearly, being of little contrast, except for the southern most part. Comparing Alberto's description with the Miranda description, they seem fairly similar. Therefore I will remove this from the ALPO/BAA database by assigning a weight of 0.

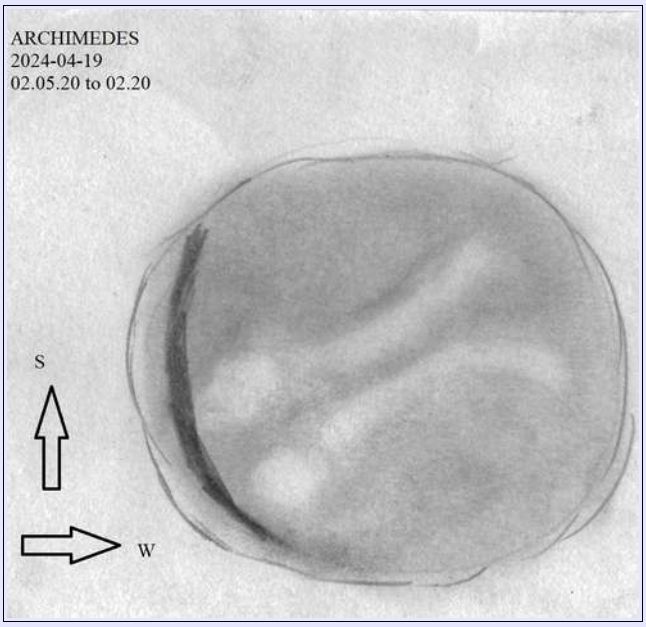

Figure 9. Archimedes as sketched by Alberto Anunziato (SLA). Date, UT and sketch orientation are given above.

Herodotus: On 2024 Apr 20 UT 21:41 Franco Taccogna (UAI) imaged this crater for the following Lunar Schedule request:

BAA Request: Some astronomers have occasionally reported seeing a pseudo peak on the floor of this crater. However there is no central peak! Please therefore image or sketch the floor, looking for anything near the centre of the crater resembling a light spot, or some highland emerging from the shadow. All reports should be emailed to: a t c @ a b e r . a c . u k

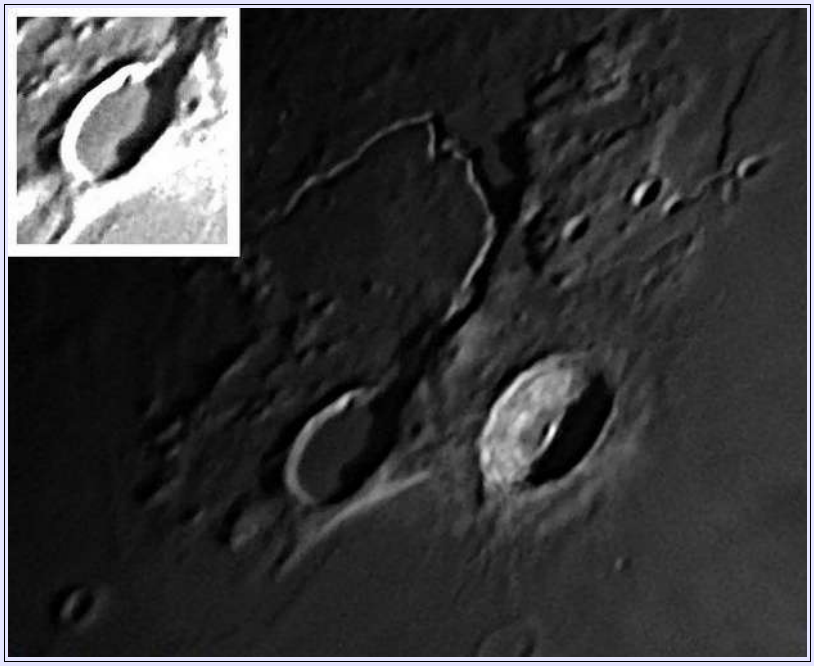

Figure 10. Aristarchus and Herodotus as imaged by Franco Taccogna (UAI) on 2024 Apr 20 UT 21:4. North is towards the top. The insert on the top left is a contrast stretched view intended to bring out detail on the floor of Herodotus.

As you can see from Franco's excellent image (Fig 10), which shows a wealth of detail in Aristarchus and its surrounds, the floor of Herodotus fails to show any sign of a central light spot or pseudo peak. We shall keep on looking as it has certainly appeared visually around similar colongitudes, but its appearance is quite rare and we

do not fully understand why this is so.

Full Moon: On 2024 Apr 23 UT 22:26 Bob Bowen imaged the during Full Moon, when we are interested in the brightnesses of different features on the Moon.

Figure 11. The Full Moon as imaged by Bob Bowen on 2024 Apr 23 UT 22:26 and orientated with north towards the top.

Although the Moon was a bit on the low side, it is still possible to take some brightness measurements from Fig 11, and these have been ordered from faintest to brightest according to their digital number (DN) value:

Plato floor (DN=96), Kepler (DN=136), Copernicus (DN=151), Tycho (DN=166), Censorinus (DN=173), Bright spot near Hell (DN=174), Aristarchus (DN=182), Proclus (DN=192)

So here Proclus appears to be the brightest feature on the Moon, out of all of these craters. Aristarchus may look the brightest in the relative sense with respect to the dark surrounding mare, but in an absolute sense, Proclus was the most reflective.

Analysis of Routine Reports Received (May)

Earthshine: On 2024 May 09 UAI members Aldo Tonon and Luigi Zanatta took up the following Lunar Schedule request:

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. Any images should be emailed to: a t c @ a b e r . a c . u k

Figure 12. UAI images of lunar earthshine, taken on 2024 May 09, with north approximately off to the right. **(Left)** Image by Luigi Zanatta taken at 19:37UT. **(Centre)** Image taken by Aldo Tonon at 19:48UT. **(Right)** Image by Luigi Zanatta taken at 19:51UT.

There is no sign of any bright or light arcs on the SW, W, NW earth lit limb, in Fig 12, as one would expect from any forward scattering of sunlight from the lunar far side via dust particles. There is a faint hazy arc on the northern earth lit limb but this is simply lighter highland north of Sinus Frigoris. We shall keep on looking as Prof Hoffmann sounded pretty convinced that this could happen, when I spoke to him at Riga in 2017. But in order for this to happen you probably need a fairly big impact just over the limb on the lunar far side.

Promontorium Agarum: On 2024 May 12 UT 20:42 Franco Taccogna (UAI) imaged this area for the following Lunar Schedule request:

BAA Request: Images and sketches needed of this feature. Use a telescope of at least 6" aperture and a magnification of 300-350x. Any sketches, visual descriptions, or images taken, should be emailed to: a t c @ a b e r . a c. u k .

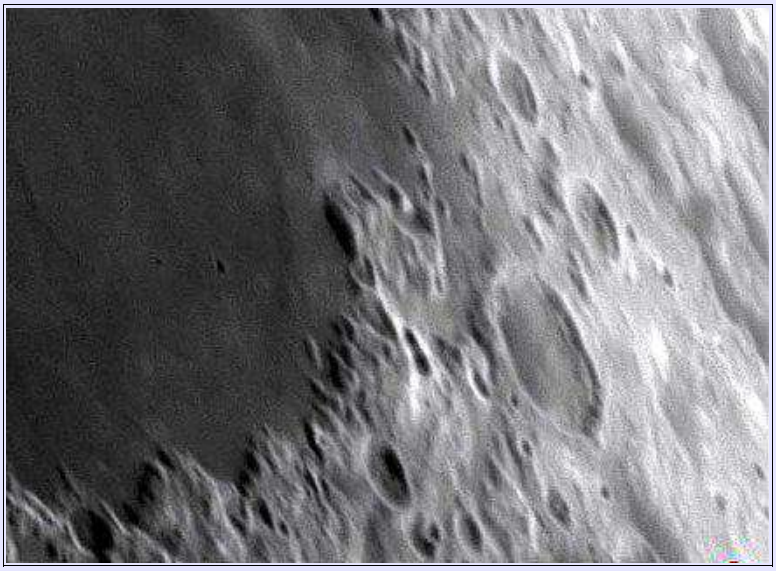

Figure 13. Mare Agarum as imaged by Franco Tacogna (UAI) on 2024 May 12 UT 20:42. North is towards the top.

This lunar schedule request is at a similar colongitude to a Patrick Moore TLP report from 1995 Feb 05, when using his 15" Newtonian, under Antoniadi II seeing (good), he noted an obscuration, lack of detail, despite the Moon being high up in the sky from his observing site. We have covered a repeat illumination observation of this TLP in the 2019 Nov newsletter. Franco's image (Fig 13) does not show any lack of detail, therefore we shall keep the weight of Patrick Moore's observation at 3 for now.

Theophilus: On 2024 May 13 UT 21:27 Lars Lindhard (BAA) imaged the Moon through a camera phone, held up to the eyepiece, under both similar illumination and similar topocentric libration (both to within ±1.0˚) to the following report:

Theophilus 1970 Apr 12 UT 00:25 Observed by Collier (Montreal, Canada, 6" reflector?, x180) "Sharp E. inside wall flashes; c.p. lighter than floor. Pink on peak & illum. wall. Drawing. (Apollo 13 watch)." NASA catalog weight=2. NASA catalog ID #1240. ALPO/BAA weight=2.

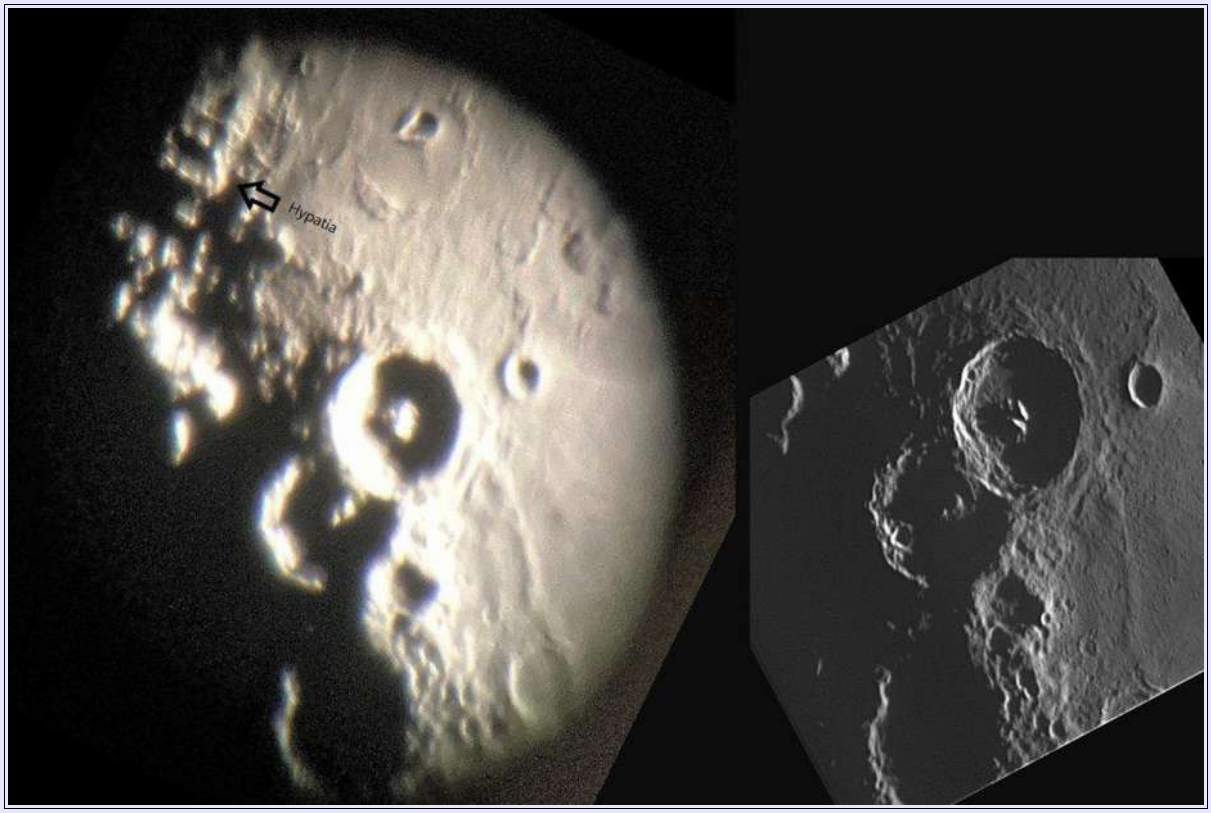

Figure 14. The Theophilus area with north towards the top. **(Left)** as imaged in colour by Lars Lindhard (BAA) on 2024 May 13 UT 21:27 using a camera phone. An arrow points to Hypatia with a pearl necklace type of effect of sunlit peaks. North is towards the top left. **(Right)** As imaged by Brendan Shaw (BAA) on 2004 May 24 UT 21:14.

Although Lars imaged the area because they saw visually an interesting pearl-neckless type of effect around the rim of Hypatia (See Fig 14 - Left), and had not seen this before, I am guessing that this is probably normal as other images of the rim of Hypatia, at different illuminations, show it to have rounded hummocky hills in its rim. Of greater interest is that the view of Theophilus was pretty much identical, to within ±1.0˚, in terms of illumination and viewing angle to what Collier saw back in 1970. Basically this means that if an explanation to what Collier saw was due to specular reflection from natural mineral facets, internal refractive effects from volcanic/impact melt glass beads on the surface, then the effect would show up again. It clearly does not, so this cannot be the cause of what Collier saw. A couple of things we can agree on from Fig 14 (left). Firstly the inside east wall is nice and sharp, and the central peak is definitely brighter than the floor – much of which is in shadow anyway. There is no sign of pink in the central peak area or the illuminated wall on the west, but I suppose that chromatic aberration or atmospheric spectral dispersion could explain that for the 1970 observation – alas the observer does not state whether they checked other nearby features. Just for comparison I have included a similar illumination monochrome image by Brendan Shaw, taken back in 2004 – see Fig 14 (Right). Looking at the original Cameron catalog data cards, it seems that the location of the flashes is ambiguous – cannot easily tell from the description? We shall leave the weight of this TLP report at 2 for now.

Poisson: On 2024 May 15 UT 21:39 Les Fry imaged the whole Moon at a time when the illumination for the following report was similar:

On 1982 Aug 26 at UT 21:00 Arsyukhin (Moscow, Russia, 3" reflector) found that Poisson appeared hazy. The Cameron 2006 catalog ID=181 and weight=3. The ALPO/BAA weight=1.

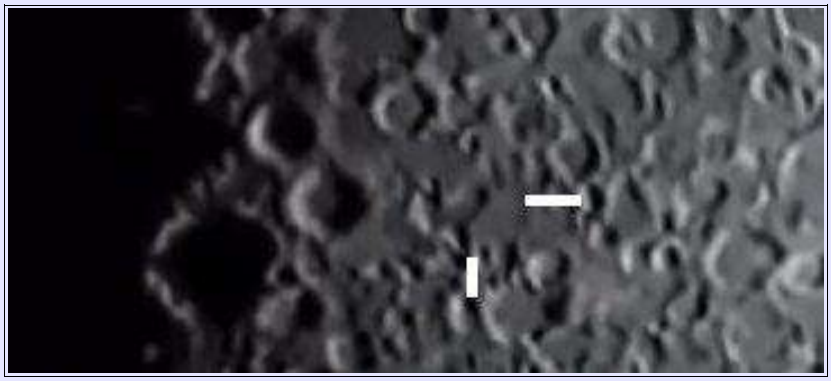

Figure 15. Poisson, highlighted by tick marks from a whole Moon image obtained by Les Fry on 2024 May 15 UT 21:39.

As you can see in Fig 15, Poisson is not a particularly well defined crater, so maybe it is not surprising that Arsyukhin found it hazy as the telescope used was quite a small aperture. We have covered similar illumination images before in the 2013 Apr newsletter. We shall leave the weight at 1 for now.

Stofler: On 2024 May 16 UT 22:30-23:00 Jean Marc Lechopier observed this crater visually with a 15cm Skywatcher, about a day after the following Lunar Observation Request:

BAA Request: Images or sketches of this crater needed. We are trying to see if a curious grey band is visible across the crater floor as seen by T. Smith on 2020 Nov 22. Any sized scope can be used from 5" or upwards. All images should be sent to: a t c @ a b e r . a c . u k

Jean-Luc comments*: "Although an observation was requested on 15/05/2004, I transcribe my observation made on 16/05/2024. At magnifications of 200x and 300x, at the best times of seeing, numerous craters are visible in the Stofler floor; in particular a trio placed to the north. In the south-east area of the Stofler slab you can see a beautiful mountain massif on the north-west side of which a crater is easily visible. Three dark grey regions immediately jump out at you. The first, certainly the object of the requested observation, cuts diametrically through Stofler for almost its entire diameter in an east-west direction to stop against the massif previously indicated. It contrasts very well with Stofler's brightness. It is several kilometres wide and is much darker in the central part of Stofler, which is almost interrupted. It has irregularities in shape and in the intensity of grey but on a large scale it is homogeneous. To the north-west of the bottom of Stofler, against the wall, you can see another grey area a little less contrasted than the previous one, semi-circular in shape, rather small but similar in width to the large central grey band. In the opposite direction you can see another dark grey band of long shape, shorter than the central band and stopping against the mountain massif. It is the least contrasted of the three grey areas. The three grey bands/areas are very easily visible."* I think therefore that we can remove this from the Lunar Observation request web site.

Messier: On 2024 May 17 UT 21:22 Mário Rui Abade (BAA) imaged a large section of the Moon in colour under similar illumination to the following report:

Messier and Messier A. On 1968 May 07 at UT 03:00-03:40 Kelsey (Riverside, CA, USA, 8" reflector) observed Messier and Messier A and noted the following: "The ray-tail halo (in N. ray) showed a possible enhancement in blue filter at 1st obs. per. but not seen at 0330. Later enhancement was indicated in red filter but not apparent at 0600h. The red enhancement is very unusual; but has been suspected on a few previous occasions. Not seen vis. (confirm. of Jean?)" The Cameron 1978 catalog ID= and weight=5. The ALPO/BAA weight=3.

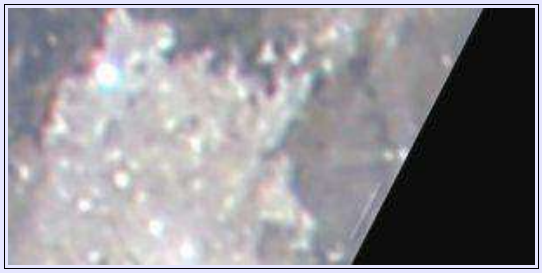

Figure 16. Messier, from a larger colour enhanced image by Mário Rui Abade (BAA) , taken on 2024 May 17 UT 21:22. The image has been truncated from the original and rotated so that north is towards the top.

Although right on the edge of Mário's image (Fig 16), we can just make out Messier, Messier A and the comet-like tail. Like in the 2024 Apr 18 image above (Fig 6 – Centre) , there is no obvious colour to the tail area. We shall therefore leave the weight as it is for now.

Proclus: On 2024 May 19 UT 07:26-07:31 Maurice Collins (ALPO/BAA/RASNZ) imaged the whole Moon and part of this included Proclus under similar illumination to the following report:

On 1988 Jul 25 at UT03:15 H. Davis (Madison, WI, USA) stated that Proclus was normal apart from a "slightly darker area in SW (Ast) SE (IUE) corner." The Cameron 2006 catalog ID=334 and the weight=0. The ALPO/BAA weight=1.

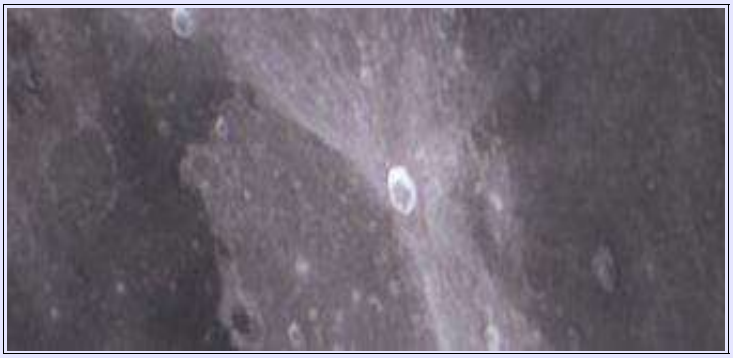

Figure 17. Proclus, from a larger image mosaic of the Moon taken by Maurice Collins (ALPO/BAA/RASNZ)

Although Proclus appears quite small in Maurice's image (Fig 17), the resolution is just good enough to confirm that there is a dark area on the south east IAU floor (SW Astronomical directions used in the 1960's and early 1970's). We will therefore lower the weight to 0 and effectively remove it from the ALPO/BAA TLP catalog.

Aristarchus: On 2024 May 19 at UT 21:17 and 21:20 Bob and Sophie Stuart imaged this crater under similar illumination to two past TLP reports:

Aristarchus 1989 Jul 15 UT 02:00-04:20 Observed by Manske, Weier, Curtis, Keyes, Yanna, Norman, Knutson, Sullivan, Eichman and Radi (Carl Fosmark Jr. Memorial Observatory, Madison, WI, USA, SCT C11) "Manske initially observed a reddish tinge on the SE rim of Aristarchus. The colour was present in different eyepieces. Two other pinkish tinge areas were seen on the SE and NE rims. 4 of the observers did not see colour. Independent confirmation was made by Don Spain (KY) and Smith in LA. Full details can be found on the following web site: http://www.ltpresearch.org/ltpreports/LTP19890715.htm " An ALPO report. ALPO/BAA weight=1.

On 1969 May 28 at UT 02:18 Delano (Taunton? MA, USA, 12.5" reflector, x300, seeing=fair and transparency=good) through the red filter at 02:18UT saw a bright area on the west wall of Aristarchus crater become 2x brighter than normal then faded back to normal in < 1 min duration. The spot was 8km centred on sigma=0.682 and eta=0.397. No events seen at Kepler (Apollo 10 watch). The Cameron 1978 catalog ID=1149 and weight=4. ALPO/BAA weight=3.

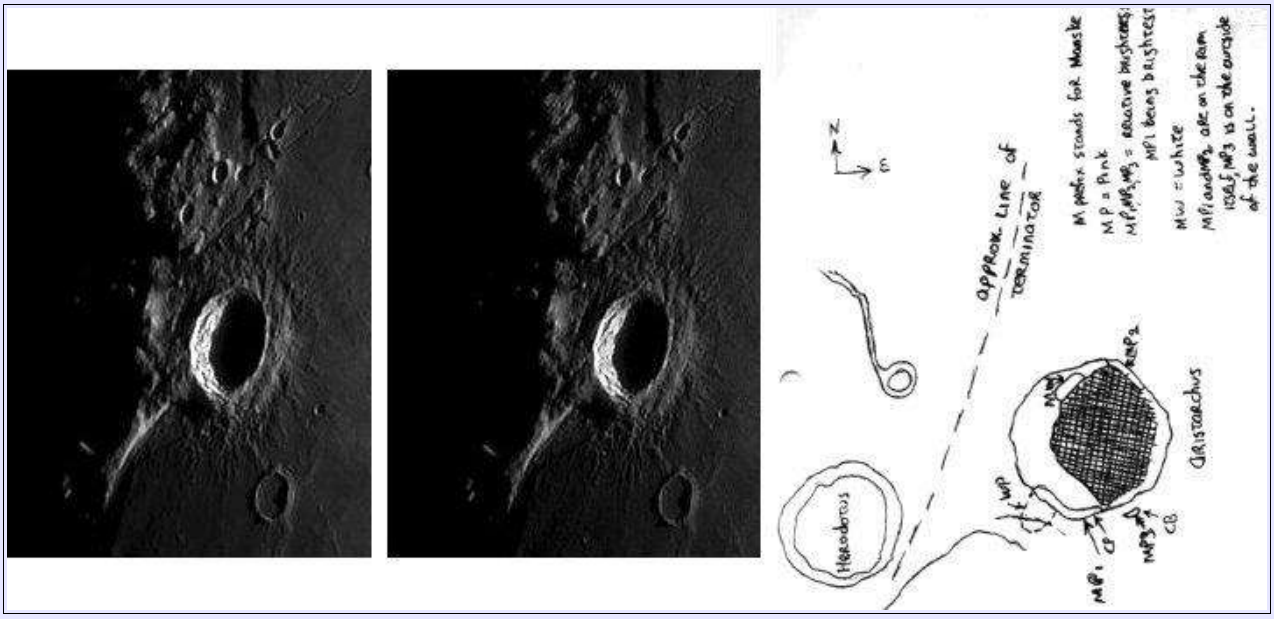

Figure 18. Aristarchus orientated with north towards the top. **(Left)** As imaged by Bob and Sophie Stuart (BAA/NAS) on 2024 May 19 UT 21:17. **(Centre)** As imaged by Bob and Sophie Stuart (BAA/NAS) on 2024 May 19 UT 21:20. **(Right)** A sketch made by Bob Manske (ALS) from 1989 Jul 14 UT

Bob and Sophie's imaging efforts (Fig 18 – Left and Centre) reveal highly detailed views of what Aristarchus should have looked like in 1969 and 1989 under similar illumination – ignoring libration viewing angle effects. For comparison with the 1989 report, I have included Robert Manske's sketch (Fig 18 – Right). He observed a pinkish tinge in the area labelled MP1. This is actually on the SW, so the TLP description on-line is wrong and will be corrected. Other pinkish spots, albeit sequentially less bright were spotted at MP2, MP3, MP4. MP2 is an oddity as I cannot see this in the Fig 18 (Left and Centre) modern day images. A white spot was seen on the NW inner rim at MW and a green-blue tinge was seen at location designated CB. Using Fig 18 (Left and Centre) images, although not in colour, we can deduce that since the areas where MP2, MP3 and CB lie do not have especially contrasty edges, they should not be likely to produce much colour from atmospheric spectral dispersion or chromatic aberration. In view of this, and the fact that colour was seen by several observers, I shall raise the ALPO/BAA weight from 1 to 2.

For the 1969 report, there maybe is a slightly bright spot on the inner NW rim slopes, just next to the shadow (it is possibly designated MW in Fig 18 – Right) – I wonder if this is what Delano saw? Bob and Sofie's imaging (Fig 18 (Left and Centre) do not show any variations in brightness during the 3 min time interval. We shall lower the weight of the 1969 report from 3 to 2 as the spot exists, and potentially seeing conditions could cause the variations in brightness.

Aristarchus: On 2024 May 20 UT 21:01 Bob Bowen (NAS) imaged the whole Moon and captured Aristarchus under similar illumination to the following report:

On 1975 Feb 23 at UT 18:00-00:24 P.W. Foley (Kent, UK, 12 inch reflector, seeing Good), noticed that Aristarchus was a slate-grey tinged with blue, and abnormally bright, fading at UT 18:47, and decreased activity at UT20:45 after a cloudy period. Blue was seen on the northern wall at UT19:00, but at 19:10 no colour, but instead an obscuration. All normal from UT 21:04-21:46 according to Foley. At UT19:00 G. Amery (Reading, UK, 10 inch reflector) noted shadowy grey near the shadow under the south wall, indistinct small area, no colour. At UT 20:00 activity increased. Colour negative fr. 150-300x till 21:10 (Hunt, Cambridge, UK, 2.5" refractor, seeing Poor-Very good). Negative fr. 20:20-21:00 in bad seeing, and very good seeing at 200x all negative (colour blink filters). From 23:45-00:20UT (Fitton, Lancashire, UK, 8" reflector). Turner of Sussex, UK with an 8" reflector, observed as well. (confirm. of activity earlier & neg. later). Cameron 1978 catalog ID=1397 and weight=5. ALPO/BAA weight=3.

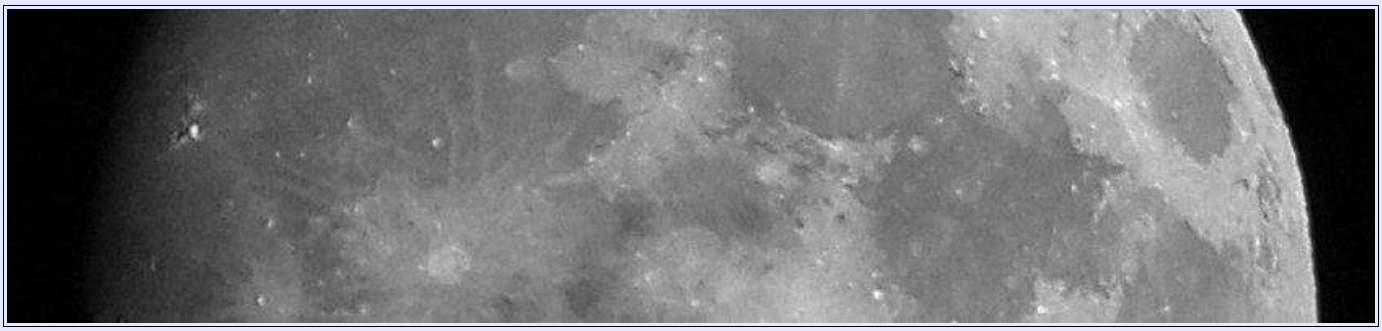

Figure 19. Part of the image of the Moon by Bob Bowen (NAS), taken on 2024 May 20 UT 21:01 from Ynyslas, Wales, using a Canon EOS 7D Mk2, Canon EOS 75 - 200 f2.8 L-Series lens, Canon EOS 2x Magnifier. ISO 200, 1/250 sec, f6.3, 400mm. North is towards the top.

Bob's image (Fig 19) shows a relatively very bright Aristarchus, seemingly in good agreement with the Foley TLP report. However, it appears like this because it has sunward facing slope and is seen against a dark mare background that in not far from the dark terminator. In terms of absolute brightness, represented by digital number (DN) values, Aristarchus comes out at DN=238 and Proclus on the eastern side of the Moon is DN=245 - not that much difference. So there was nothing unusual when Peter Foley claimed Aristarchus was abnormally bright, as he was referring to its contrasty appearance. Alas, Bob's image does not have the resolution to investigate the other characteristics of the 1975 TLP. We shall therefore leave the weight at 3.

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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Many thanks to all contributors. Items for the August circular should reach the Director or Editor by the 20th July 2024 at the addresses show below.

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