From the Direct

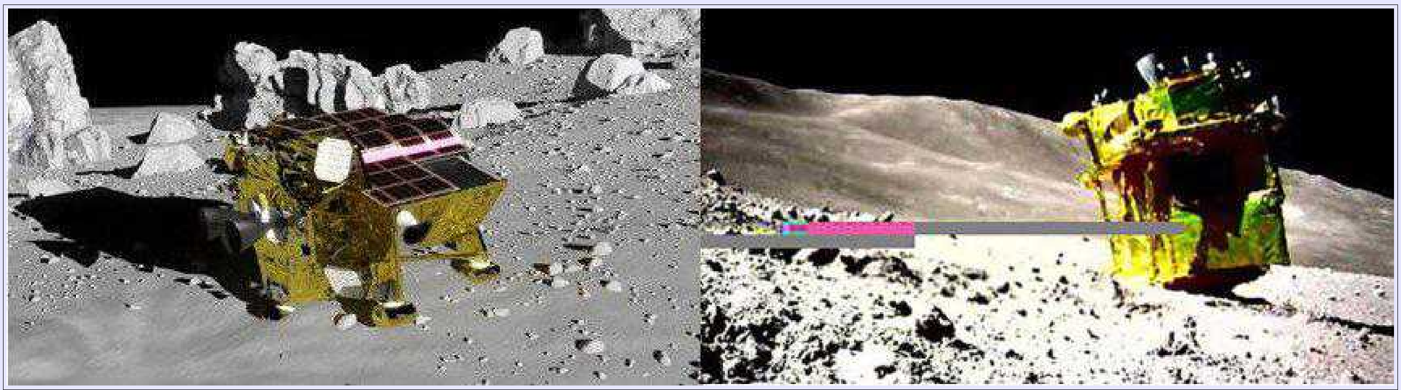


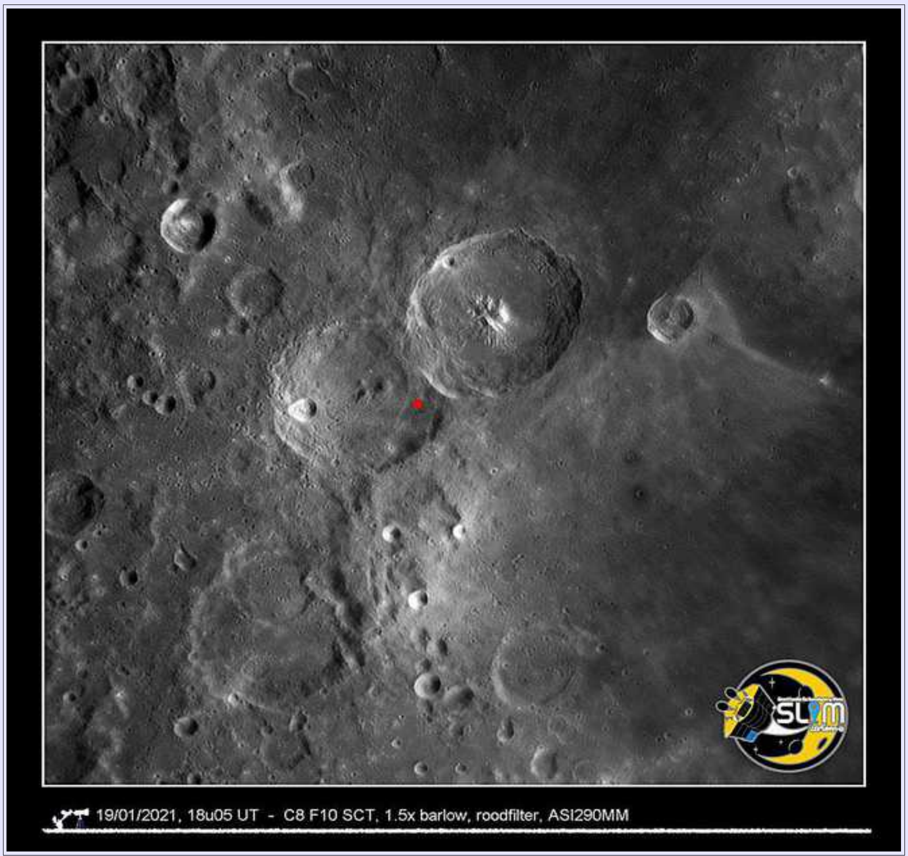
Figure 1. Japan's SLIM lander on the lunar surface on 2024 Jan 19. (Left) An artist's impression of the "planned" post landing configuration for the SLIM lander. (Right) An actual image of the SLIM on the lunar surface (a JAXA image). The horizontal bars are data drop outs.

"Any Landing that you can walk away from is a good one" is a saying used often by aviators, or rather test pilots. This rings very true for the month of January when the US Peregrine 1 lander suffered a fuel leak problem, never reached the Moon and eventually fell back to Earth. The Japanese SLIM lander did actually manage to land however, but as you can see from above, not quite in the orientation that mission planners had intended, and they had to wait for the Sun to shine on its other side to replenish its batteries. It adds to the common saying that about half of all Moon missions fail – but this will undoubtedly improve as has happened with Mars missions. The next lunar mission will be the US IM-1 lander mission, which is scheduled for launch in mid-February at the earliest and will aim for the south pole region, but as lighting is critical, any delays could easily knock the launch into the next month.

Other news, the crewed Artemis 2 has now been postponed till late 2025. There was an on-line NASA & space community meeting as to what science could be done from the cabin window. The cabin window restriction was because no, or few, remote sensing instruments will be placed on the exterior of the craft. My impression from the meeting was that much better observations could be made from existing lower altitude lunar orbiters, however they may still look for and attempt to video impact flashes, horizon glow, and also get the astronauts to record natural surface colour that they can see with their eyes.

I was very pleased to see that Alexander Vandenbohede managed to image the SLIM landing site (below image) as close as 2h45m after the spacecraft touched down. You clearly cannot see the lander because it was obviously way too small, and anyway Alexander has placed a red dot there to show you its location. But we at least have what planetary scientists call a "Context Image" of what the wider area looked like illumination wise on this historic moment for the Japanese space agency. An even wider context image of the Moon was obtained by Aldo Tonon (UAI), some 20 min before touch down. Both could be useful if in the future someone wanted to make an animation zooming in from the view of the Moon, right down to surface views from SLIM, though we would probably need one or two further levels of resolution higher than Alexander's image in order to achieve this.

Lastly I am delighted to announce a couple of pieces of archive news. Firstly Lesley Mosely, Rob Moseley's partner has very kindly given the lunar section copies of his sketches (see p.7). Barry will have more to say about this later. Secondly the BAA is making available to interested researchers, initially section directors, digital copies of Sir Patrick Moore's observations, from his estate.



Cyrillus crater and SLIM landing site as imaged by Alexander Vandenbohede .

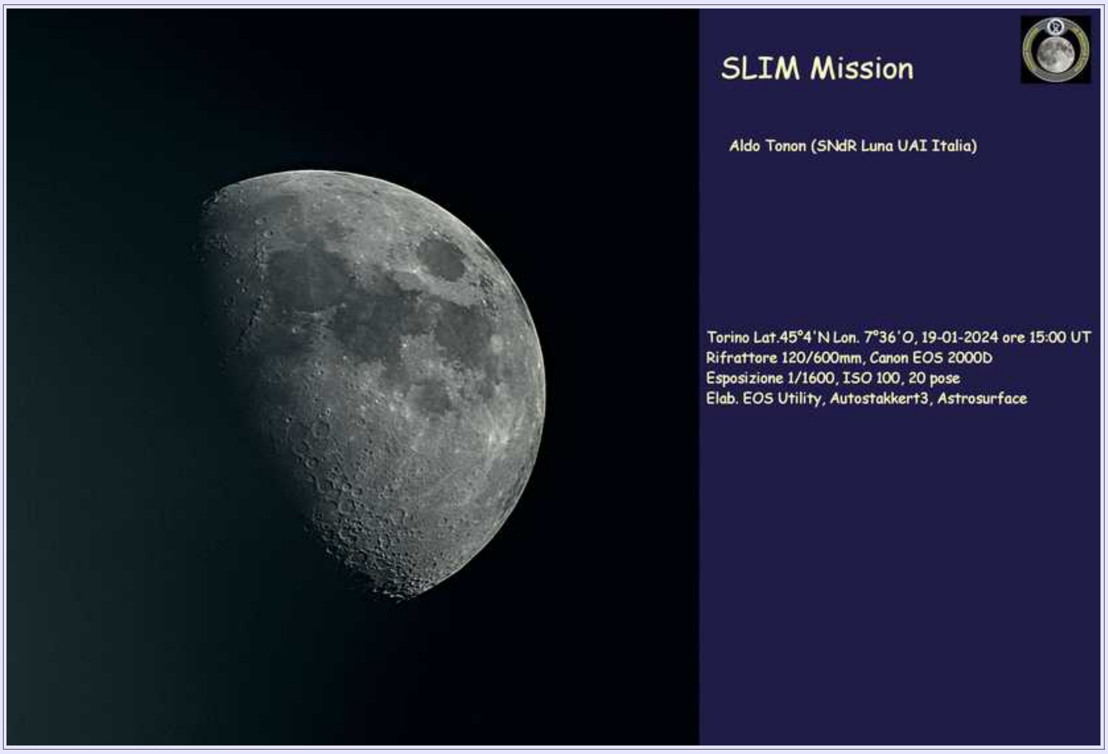


Image of the Moon by Aldo Tonon (UAI)

Lunar Occultations February 2024 by Tim Haymes.

Reports:

January was a good month for Lunar Occultations. On night 22/23 observers follow a number of stars being covered (DD) at 92% illumination. Flamsteed 136 Tauri (ZC890 = HIP28500) at magnitude 4.6 was occulted first during a sequence of four, timed by video.

<u>ZC 890</u>

Fl 136 Tau had previously been recorded as an “occultation double”.

An alert was posted to the UK occultations groups.io to observe it at high frame rate. Simon Kidd (SK) responded with a light curve recorded at 237fps (Fig-1). Tim Haymes (TH) recorded the same event at a lower rate of 200 fps.(Fig-2)

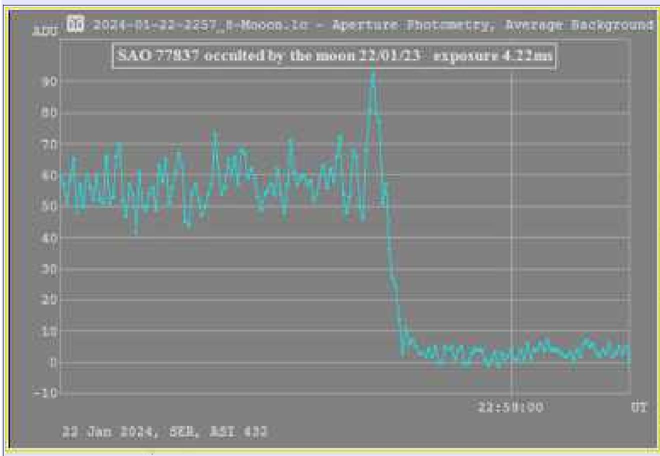


Fig.1 S Kidd

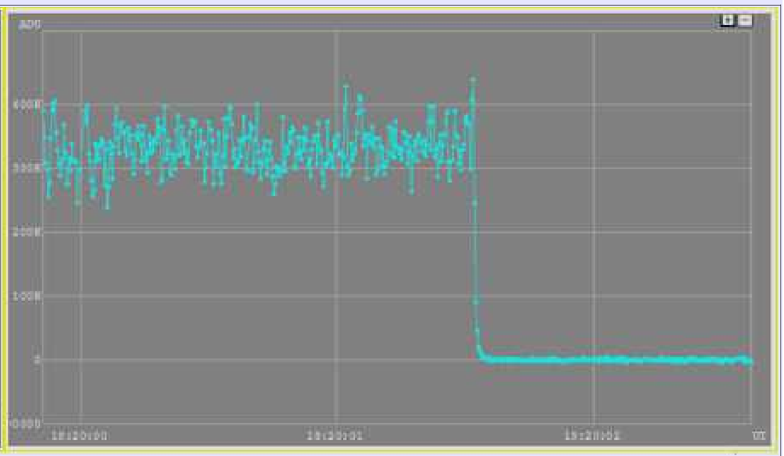


Fig.2 T Haymes

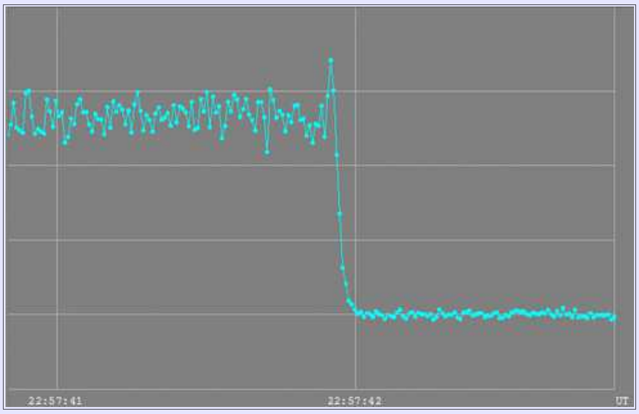
Fig-1 shows a strong diffraction fringe at the start of disappearance, and a small inflection near the 50% level which could be an indication of a second component. Fig-2 is a smooth light curve. SK used a C14 while TH used a C11. The C14 has better signal-to-noise ratio assisted by the ASI 432m camera which has improved noise characteristics compared to TH with QHY 174m.

Observers used SharpCap software, recorded as SER, with the video analysed with Tangra.

Conclusion: The possibility of a double star cannot be confirmed this time.

<u>ZC 909</u>

This was occulted at 2257UT (Oxfordshire). Occult4 indicated a double and TH recorded the DD at 100 fps. A slight inflection can be seen in the light curve but no step-event, and a conclusion cannot be drawn.



What frame rate is suitable for high resolution photometry of Lunar Occultations?

If 1000 fps was possible, this should the aim, but noise in the signal will be high. A small separation (0.1 arcsec) should produce a step in the light curve at 200fps. Any time separation will depend on the limb contact angle, and the position angle of the companion.

The general advice is to use a fast rate, but not so fast as to compromise sensitive. CMOS USB3 has more control over exposure rate and is not limited to 25fps. Analogue video frame rate of 25 frames/s or 50 fields/sec can still produce good results on double stars. – Tim Haymes

Pleaides Challenge!

A challenge to count which stars you can observe by eye or camera with your telescope on Feb 16/17 or sketch the Moon among the star field. Note down the approximate time you sighted the event (to say +/- 10s) and the approximate position angle on the dark limb. Accurate time is not a requirement. Send your observations to the Lunar Section. We will publish a list of successful observations in a future circular – weather and enthusiasm permitting). An extended list to mag 9.5 is provided. Use this to identify the stars you see.

Occultation predictions for 2024 February (Times at other locations will +/- a few minutes)
Oxford: E. Longitude -001 18 47, Latitude 51 55 40
To magnitude ca v7.5

day yy	mmm	d	Time h	m	s	Ph	Star No	Sp D*	Mag v	Mag r	% ill	Elon	Sun Alt	Moon Alt	Az	CA o	Notes
24	Feb	1	6	44	19.1	R	1917	pG5	7.2	6.7	66-	109	-10	23	212	79S	
24	Feb	2	5	23	2.2	R	2017	kK1	6.4	5.8	57-	98		23	180	81N	
24	Feb	2	5	25	28.4	R	158333	kG6	7.2	6.7	57-	98		23	180	31N	
24	Feb	3	6	12	35.9	R	158880	cF2	7.5	7.3	47-	86		18	181	65N	
24	Feb	3	6	50	18.4	R	2129	K0	7.4	6.8	47-	86	-8	18	190	32N	
24	Feb	5	6	17	45.4	R	184563	pM0	7.9	7.0	27-	63		8	159	48N	
24	Feb	11	18	14	16.2	D	3421	cM3	4.9	4.1	5+	25	-10	9	245	45N	Chi Aqr
24	Feb	11	18	46	41.1	D	146619	K2	8.2	7.5	5+	25		5	251	37N	
24	Feb	11	19	5	38.9	D	146629	K5	7.6	6.9	5+	25		2	255	33N	
24	Feb	14	18	16	28.4	D	92700	G5	7.6	7.1	30+	66	-10	45	220	57S	
24	Feb	14	22	1	53.7	D	299	M2	6.0	5.1	31+	68		15	273	71S	12 Ari
24	Feb	15	17	51	56.6	D	415	cK1	5.8	5.2	40+	79	-6	56	196	88S	40 Ari
24	Feb	15	18	2	32.6	D	93106	K5	7.9	7.1	40+	79	-7	55	201	9N	
24	Feb	15	19	4	48.5	R	415	cK1	5.8	5.2	41+	79		50	224	-69S	40 Ari
24	Feb	16	19	16	10.4	D	76156	pA0	6.9	6.9	52+	92		59	211	63N	HL 25
24	Feb	16	20	54	57.4	DD	556	pB8	5.4	5.5	52+	93		48	244	40N	
24	Feb	18	21	26	27.3	D	868	SA0	7.5	7.5	73+	117		61	223	71S	
24	Feb	19	0	25	3.5	D	77604	K0	7.0	6.2	73+	118		36	270	37S	
24	Feb	19	0	45	11.4	D	77621	M3	7.5	6.6	74+	118		33	274	78S	
24	Feb	19	0	58	25.5	D	77619	F2	7.1	6.9	74+	118		31	276	27S	
24	Feb	19	1	9	53.0	D	885	wG7	5.6	5.1	74+	118		30	279	18N	
24	Feb	19	1	53	18.0	DD	890	cA0	4.6	4.6	74+	119		23	286	73S	136 Tau
24	Feb	19	2	48	34.5	RB	890	cA0	4.6	4.6	74+	119		15	295	-80S	136 Tau
24	Feb	19	2	50	56.9	D	77724	B1	7.0	7.0	74+	119		15	296	72N	
24	Feb	19	17	49	23.7	DD	1008	A0	5.3	5.3	80+	127	-4	50	109	42N	49 Aur
24	Feb	19	19	45	42.3	D	78580	SA2	7.3	7.2	81+	128		63	148	82S	
24	Feb	19	23	37	55.6	D	1035	cK3	6.7	6.0	82+	129		51	248	86N	
24	Feb	21	1	30	40.7	D	1169	K5	5.3	4.5	89+	141		41	260	77S	76 Gem
24	Feb	21	18	10	33.6	D	80165	F2	7.5	7.3	93+	150	-7	34	94	79N	
24	Feb	23	1	57	47.2	D	98567	A3	7.5	7.4	98+	164		45	237	66N	
24	Feb	24	4	32	13.5	D	1504	M1	5.4	4.6	100+	175		26	259	60N	37 Leo
24	Feb	29	5	34	32.3	R	1986	F3	7.1	6.9	81-	129		19	214	63N	

Pleiades passage Feb 16/17. Extended list.

The 1st quarter moon will pass South of M45. An extended list (unabridged) is appended here to magnitude ca 9.5

y	m	day d	Time h	m	s	P	Star No	Sp D	Mag v	Mag r V	% ill	Elon	Sun Alt	Moon Alt	Az	CA o	PA o	
24	Feb	16	18	58	8.4	D	76141	kG5	9.8	9.5	52+	92		60	204	57N	45	
24	Feb	16	19	13	0.4	D	76144	pG0	8.5	8.1	52+	92		59	210	40N	27	
24	Feb	16	19	16	10.4	D	76156	pA0	6.9	6.9	52+	92		59	211	63N	50	HL 25
24	Feb	16	19	25	52.8	D	76168	kG0	8.7	8.4	52+	92		58	215	74N	61	
24	Feb	16	19	38	44.7	D X	4884	kF8	9.4	9.2	52+	92		57	220	85N	72	
24	Feb	16	19	39	34.5	D	76178	pG0	9.5	9.3	52+	92		56	220	52S	115	
24	Feb	16	20	12	23.8	D	76196	pA0	8.2	8.0	52+	92		53	231	34S	133	

24	Feb	16	20	22	7.1	D X	67351k	9.6	8.8	52+	92	52	235	87N	75
24	Feb	16	20	49	23.4	D	76222pA3	8.4	8.2	52+	92	48	242	84N	72
24	Feb	16	20	54	57.4	DD	556pB8	5.4	5.5S	52+	93	48	244	40N	28
24	Feb	16	21	3	15.7	D	76230kK2	9.1	8.2	52+	93	46	246	89N	76
24	Feb	16	21	13	41.6	D	76233kF8	9.5	9.3	52+	93	45	249	58N	45
24	Feb	16	21	20	11.1	D	76238pF8	9.1	8.9	52+	93	44	250	69N	57
24	Feb	16	21	21	27.0	D	76243pA2	8.1	8.0	52+	93	44	251	79N	67
24	Feb	16	21	30	8.2	D X	67478	9.4	8.5	52+	93	42	252	29S	139
24	Feb	16	21	42	52.9	RB	556pB8	5.4	5.5S	52+	93	41	256	-44N	304
24	Feb	16	22	4	38.2	D	76265kA3	9.4	9.2v	53+	93	38	260	76N	64
24	Feb	16	22	20	46.4	D	76274 G5	9.0	8.4	53+	93	35	263	52S	116
24	Feb	16	22	45	40.7	D X	5032 K2	9.4	8.6	53+	93	32	269	51N	39
24	Feb	17	0	7	0.3	D	76321 K0	8.4	7.9	53+	94	20	283	45S	123
24	Feb	17	0	36	4.8	D	76336 K2	8.4	7.6	54+	94	16	289	89S	79
24	Feb	17	1	34	52.7	D	76366 K0	7.4	6.8	54+	95	8	299	78S	90

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 and is explained in Occult4 Help.

New doubles are being discovered in occultation recordings, particular close doubles not detectable by other measurement techniques. For example, 245 doubles have been discovered while observing asteroidal occultations. The separations are usually small and in the range 10-100 mas. Please send double star occultation reports to the LS.

---------§---------

Telescopes for Lunar Observation I - Alexander Vandenbohede.

Alexander comments: *I would like to respond to the question asked in the last LSC to send in images of our favourite observation equipment. I always use a 1978 made Celestron C8 in combination with an ASI290MM, 1.5x barlow and (in most cases) a red filter.*

Telescope for Lunar Observation II – John Axtell

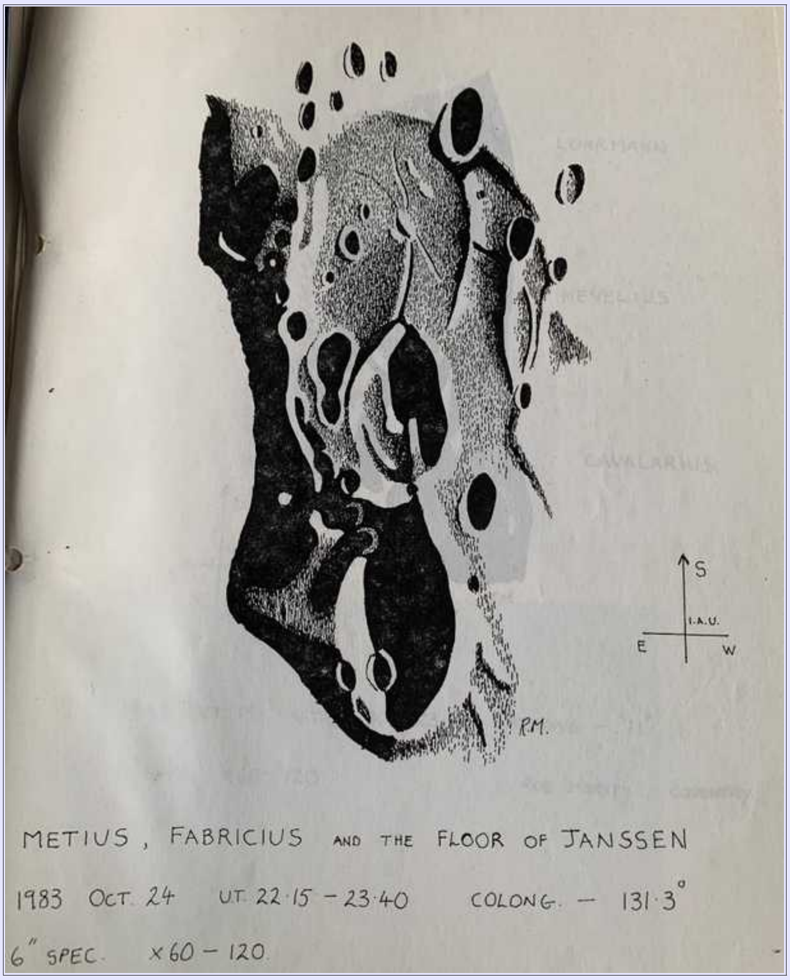
Obsession Classic 15" Dobsonian scope

Ed Comments: Images from both instruments are shown later in this LSC and illustrate fine results are obtainable with two different types of telescope. Fuller notes on John's setup are included with his lunar image below. Note however that the image of his Dob does not include the tracking system he mentions. So the score so far is Reflectors 2 Refractors Nil.

Rob Moseley Drawing Archive.

Denis Buczynski mentioned in his obituary for Rob Moseley* that Rob's Lunar drawings were being scanned and would be available for viewing and use in the future, with the aim of encouraging observers to take up the pen and pencil and resurrect the lost art of drawing. The Lunar Section has now been fortunate enough to acquire digital copies of these drawings courtesy Lesley Moseley, and it is indeed hoped that these will be a suitable legacy, which others who share Rob's passion for the Moon will be able to benefit from and derive inspiration. As you will know Rob was Editor of The New Moon for some time (as was Denis) and it is well worth dipping in to the Lunar Section publications** to see not only examples of Rob's drawings but also read his views on observing and recording as well as his insightful analysis of topographic features. The contributors to these publications in the 1980's include many key figures in the amateur study of the Moon – a veritable Who's Who, and the quality of the The New Moon is a tribute both to them and to Rob's enthusiasm and skill.

If you are researching an area of the Moon, out of interest, or with a view to producing an article of short piece for the LSC or Journal then please bear in mind that Rob's drawings are now available for study, as well as a treasure trove of other drawings from past generations of observers. An example of one of Rob's drawings is shown below to illustrate the amount of detail that can be recorded in drawings made at the eyepiece. I am sure that these drawings will be a valuable contribution to future research efforts by section members!



Drawing from the Rob Moseley archive reproduced courtesy of Lesley Moseley.

*BAA Journal – Volume 132 Number 04 – August 2022

**https://britastro.org/document_folder/baa-document-store/sections/lunar-section/the-new-moon-1982-2010

The Jansen region and the Gardner 'Megadome'
By Bill Leatherbarrow.

The crater Jansen is less well known and much smaller than the similarly named Janssen. Whereas the latter is a gigantic ruin of a crater located in the crowded southern uplands of the Moon, Jansen is a modest (23km) flooded crater near the NE edge of the Mare Tranquillitatis. However, its relative anonymity is more than offset by the geological richness of the surrounding terrain. I had a good view on the morning of 2 December 2023, when the region was close to the evening terminator and the low light emphasised topographic features that are hard to discern under a higher sun.

Jansen region, 2023 December 2, 06.36 UT, OMC300 Mak-Cass (Bill Leatherbarrow)

Jansen is towards the bottom-left of the image above. Towards the top-left is the 30km crater Vitruvius, with the smaller Gardner (18km) at the terminator to its right. There are many conventional volcanic domes on the mare surface, particularly in the bottom-right quarter of the picture. But between Jansen and Vitruvius there is a whole raft of further features suggestive of much past volcanic and tectonic activity. There is a fine set of wrinkle ridges (Dorsa Barlow) running north from Jansen towards Gardner. The surface of the mare contains several pancake-like ghost craters, flooded by lavas. One of these just to the north of Jansen (Jansen R) appears to have been flooded by lavas fed via a sinous rille (Rima Jansen) snaking down from Dorsa Barlow. Under these lighting conditions at least, the mare to the NW of Jansen R appears to host a gigantic swell which is discernible (I think) on QuickMap imagery and elevation profiles. I had not noticed this before and it does not show up readily on images I have taken previously, but I imagine that Raf Lena and Barry are aware of it.

But the star of the volcanic show is to be found right on the terminator just below Gardner – a gigantic (circa 70km) rough-surfaced dome rising above the mare lavas. This has been informally named by Chuck Wood 'the Gardner megadome'. At its summit is a large rimless caldera from which a channel appears to spill down onto the mare to the south. It reminds me very much of the Mons Gruithuisen domes on the edge of the Mare Imbrium. No doubt Barry will have more to say about the geological delights of this area!

Rima Jansen and Jansen R.
By Barry Fitz-Gerald.

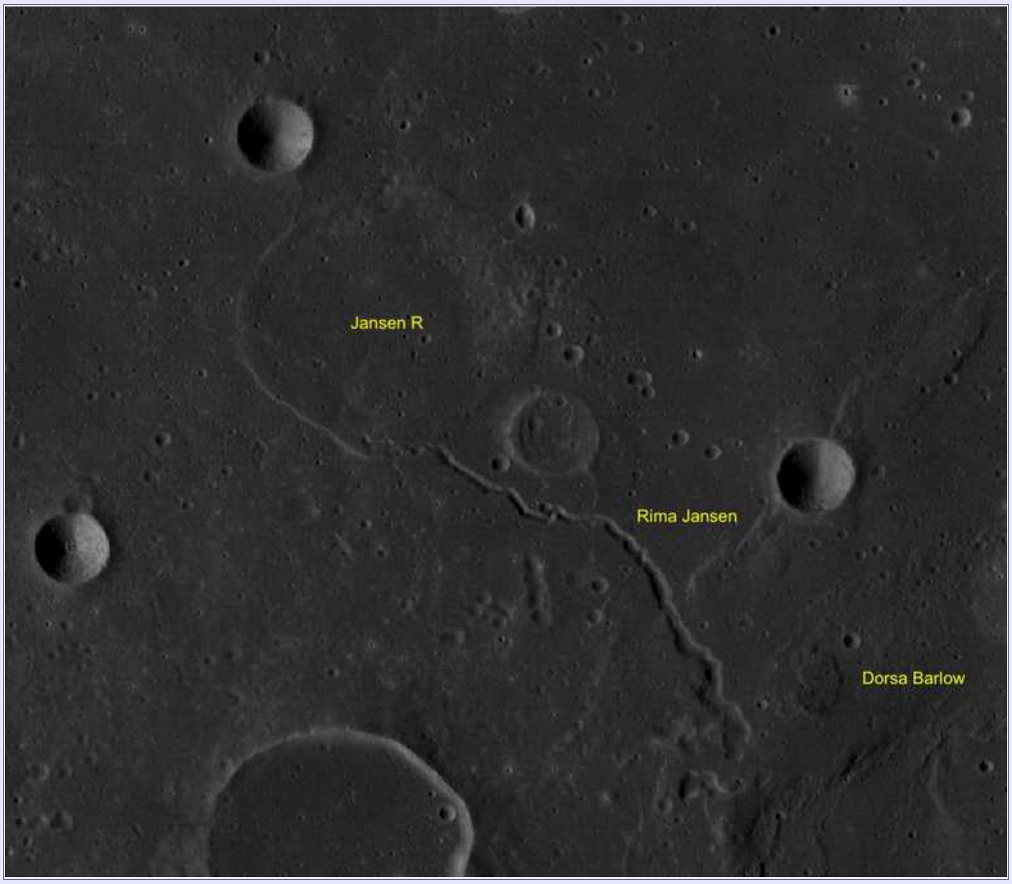


Fig.1

I could not resist a closer look at this area after reading Bill's comments in the above article. There is too much to see here to give but the briefest of remarks, but I was taken with the possible relationship between the filling of Jansen R and the sinuous rille Rima Jansen. Specifically, could this ghost crater have been filled with lavas erupted along Rima Jansen? The first thing of note as Bill pointed out is the origin of the rille in a vent on Dorsa Barlow which takes the form of an irregular elongate pit on the summit of this wrinkle ridge (Fig.1). This really does confirm the hypothesis that many wrinkle ridges are more than just tectonic features formed as the crust contracted, but actually host their own volcanic activity. Dorsa Barlow has numerous volcanic features associated with it including other collapse pits and dome like features so is a particularly good example.

After emerging from the vent Rima Jansen heads NW to Jansen R, where it crossed the southern rim of this ghost crater and appears to terminate, possibly supporting the idea that the lavas flowing through it filled the crater, but a delve into the NAC imagery tells a different and somewhat surprising story.

Figs.2 and 3 shows an LRO image of the southern rim of Jansen R, with the rim represented by the curving scarp crossing the frame, and just inside the southern rim you can see the terminal section of Rima Jansen, but notice that it appears to terminate almost up against the southern rim rather than emptying into the crater itself. We must bear in mind that the surface here, including Jansen R is far from being flat but is as Bill pointed out, contorted into swells and hollows as a result of crustal deformation. Lowering of the mare surface has also taken place as the mare lavas cooled and contracted, or still molten lavas beneath migrated elsewhere – but the upshot is that present slope gradients cannot be used to interpret the course taken by lavas flowing within Rima Jansen or any other sinuous rilles hereabouts.

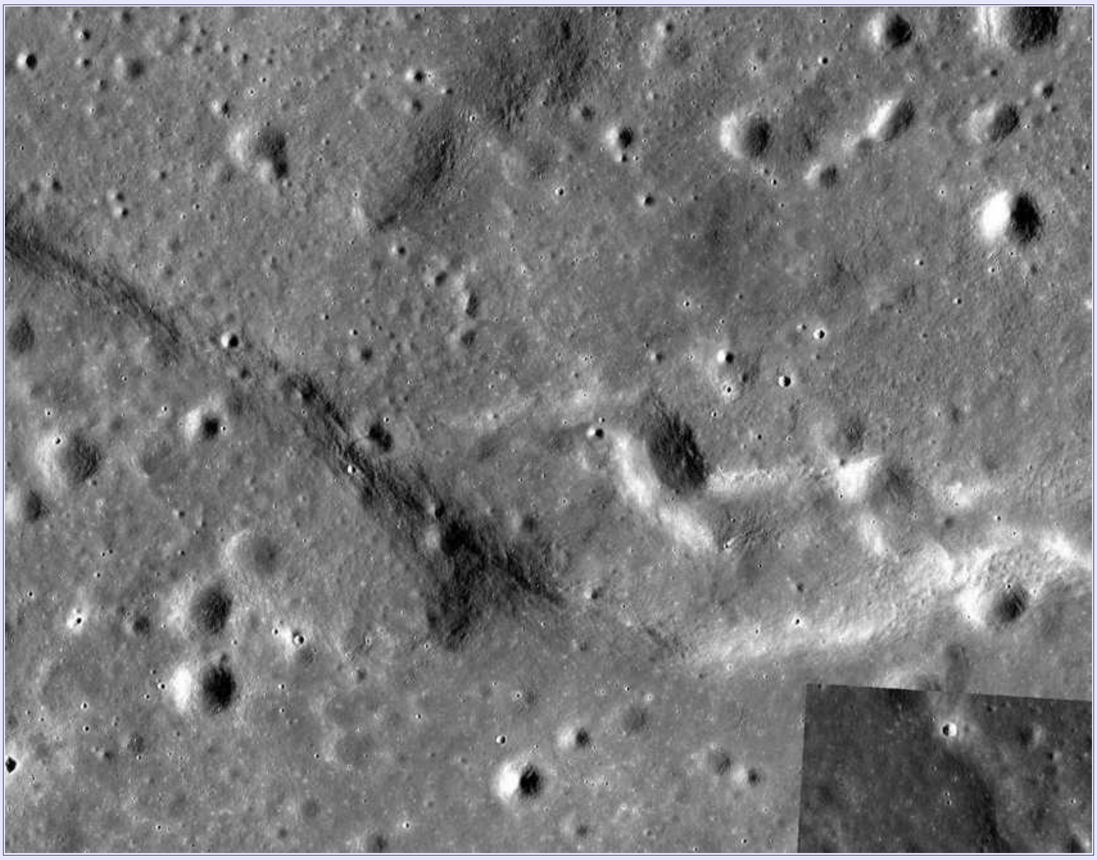


Fig.2

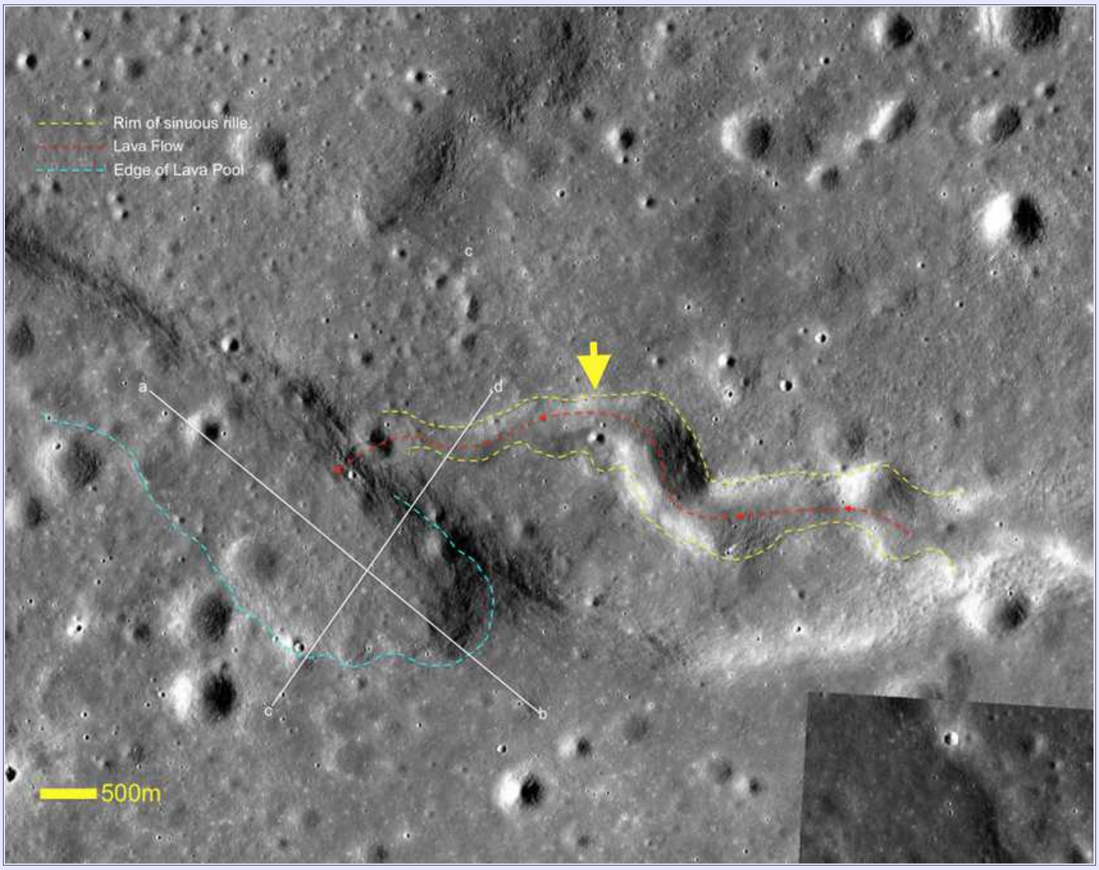


Fig.3

Returning to the imagery, Fig.3 shows the course of the final part of Rima Jansen within Jansen R, with the rims marked with a yellow dashed line. Where it appears to terminate at the southern rim of Jansen R there is a prominent step (Fig.6) which I initially thought was an impact crater, but revised my opinion and now believe it to be a platform or step cut into the crater edge by lavas flowing out of Rima Jansen, (indicated by the red dashed line) down the outer rim and onto the mare surface beneath. So in effect this is analogous to a waterfall, but in this case it would have been a 'lavafall', which cascaded down the slope and eroded the rock beneath to form a step. The drop down from the bed of the rille to the mare surface is about 120m and the slope is about 10°, not exactly precipitous, but bearing in mind the hyper fluidity of lunar basalt lavas, this was probably sufficient to produce a highly erosive flow that could cut back into the rock along the edge of the crater resulting in the step we see.

Immediately beneath where this 'lavafall' was, the mare surface is lower than adjacent terrain, and this might be where the lavas cascading down from within Jansen R pooled and formed the same sort of feature we see at the bottom of terrestrial waterfalls. This possible pool is outlined with the blue dashed line in Fig.3 and the 2 cross sections shown in Figs 4 and 5 show that this is some 80-100m deep and opens towards the NW.

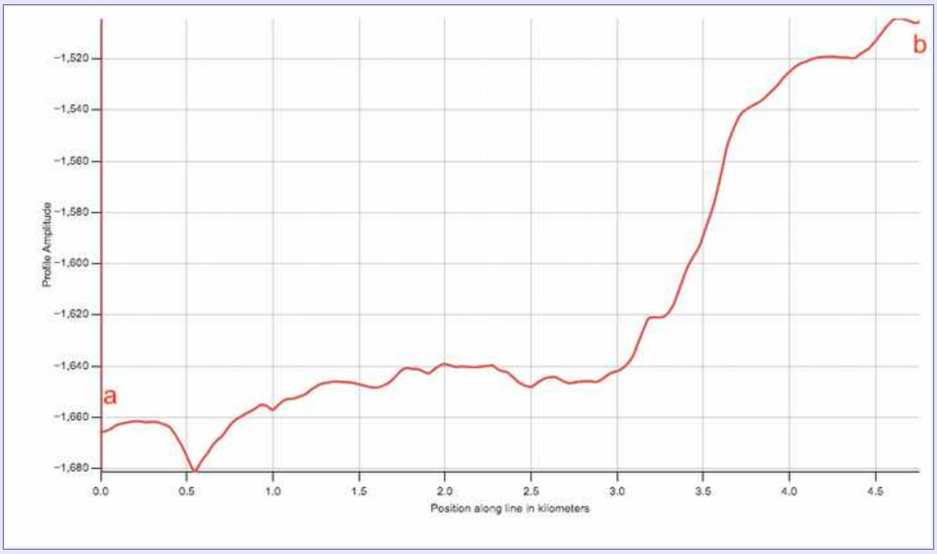


Fig.4 Profile along line a-b in Fig.3

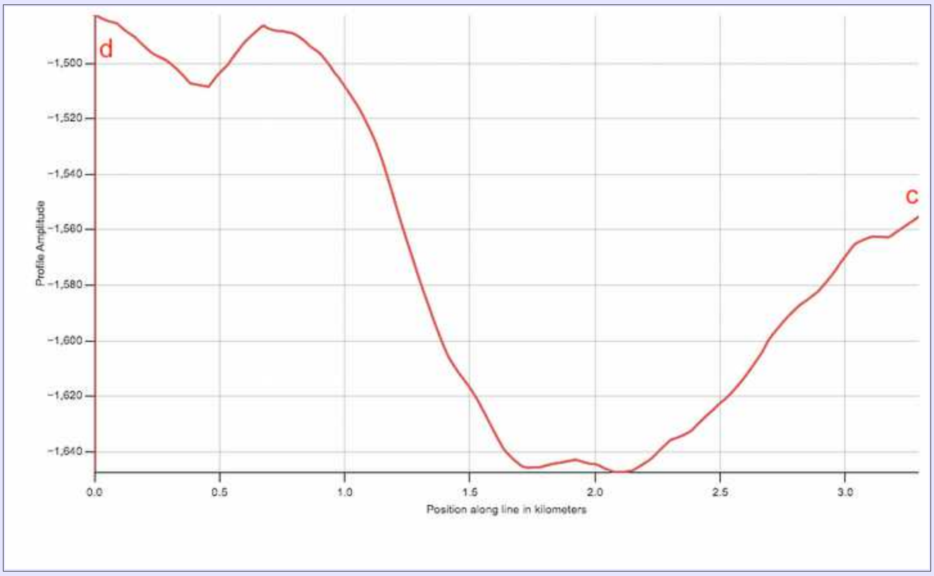


Fig.5 Profile along line c-d in Fig.3

If this interpretation is correct, the lava flowing along Rima Jansen flowed down over the southern rim of Jansen R, onto the mare surface and pooled there before flowing away along the mare surface, possibly in a broad front towards the NW, but clearly not in the form of another sinuous rille. But with regard to Bill's original point about these lavas filling the crater – is there any evidence for this? The yellow arrow in Fig.3 points to a gap in the northern rim of the rille which opens out onto a shallow depression, and it is possible that lavas escaped the rille channel via this low point and spread out to the north. But I suspect that this would have been insufficient in volume to fill the entire crater, and that the mare filling we see originated in an earlier phase, when the general level of the mare lavas was much higher, and the crater probably completely submerged.

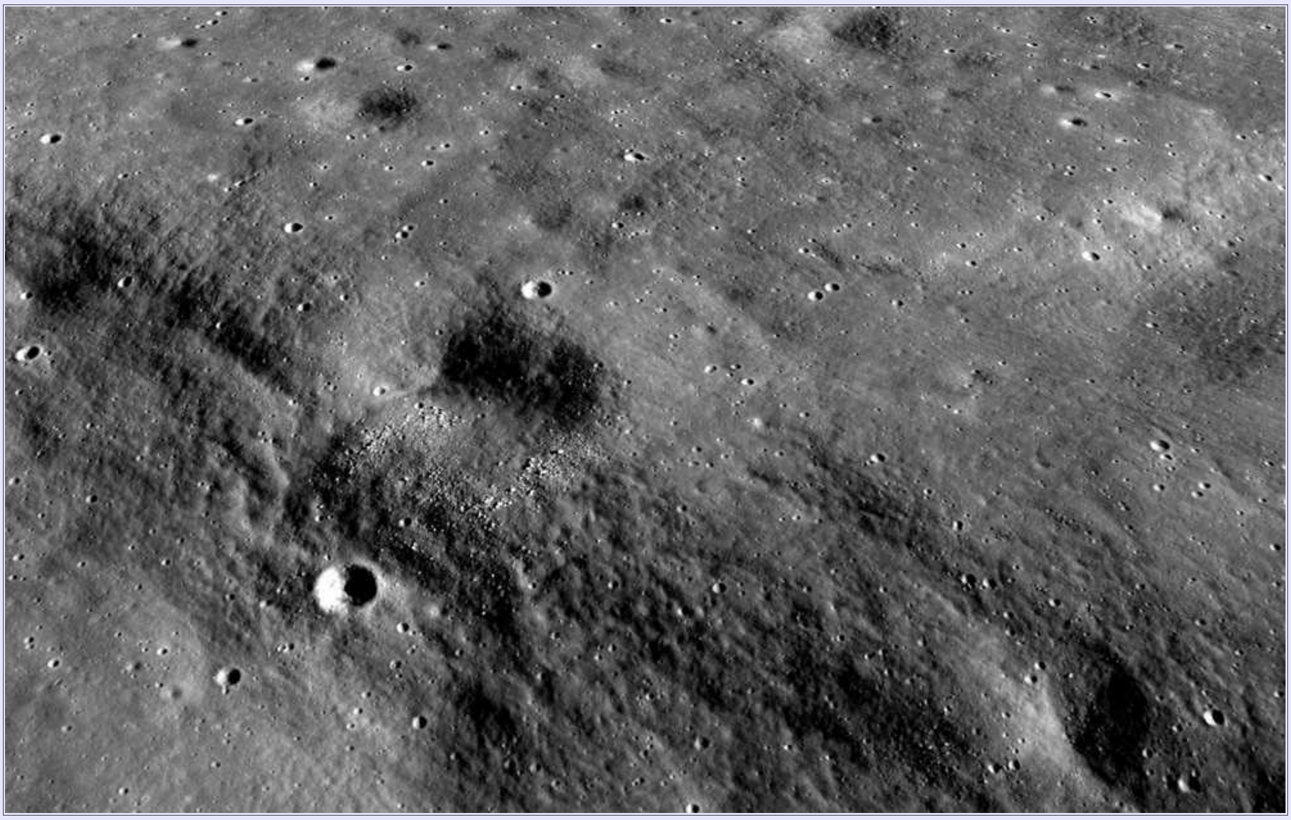
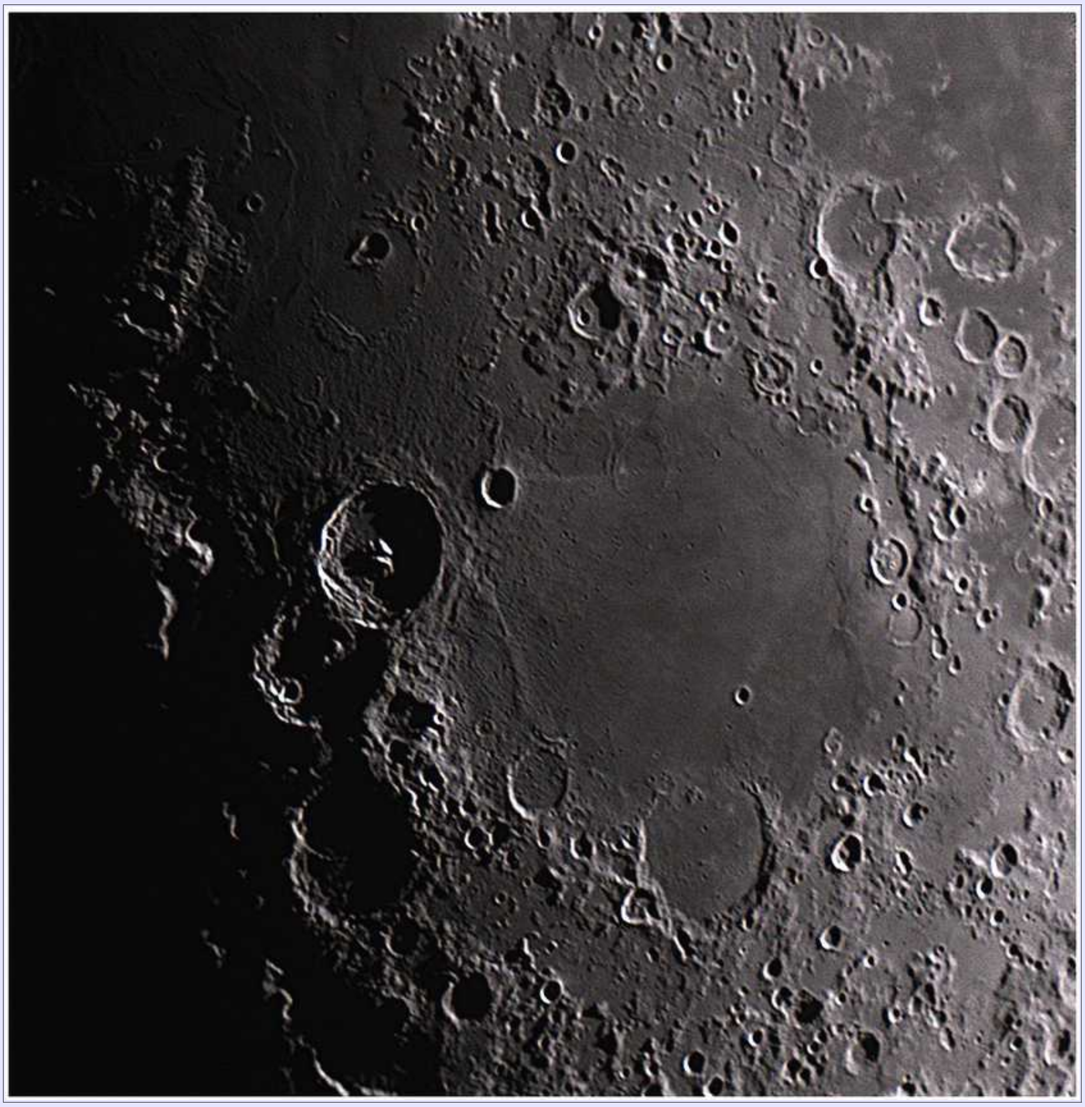


Fig.6 NAC view of the step cut in to the rim of Jansen R as lava flowed from Rima Jansen (which enters the frame at top right) down onto the mare surface at bottom left. The crater immediately beneath the step is about 50m in diameter.

Leading on from this, it may puzzle you as to how the lavas forming the rille managed to climb up and over the rim of Jansen R, which is about 100m higher than the surrounding mare surface, in the first place. The answer might be related to *when* the lavas in Rima Jansen were flowing, which may have been when the mare surface stood at a much higher level and the rim of the crater was actually submerged beneath the surface. In this scenario the rille would have formed on a solid crust of mare material *floating* on a subsurface layer of still molten material. As this molten layer either cooled and contracted or migrated elsewhere, the level of the crust dropped, taking the rille with it, and as it did so the flowing lava cut downwards into the gradually exposed crater rim. So the lavas did not climb up and over the rim, they simply cut down into it. This sort of scenario can explain many cases where rilles appear to cross elevated terrain along their courses. Crustal contraction at a later stage produced wrinkle ridges that cut across the south-easter section of Jansen R and slightly muddied the waters, but this likely occurred after the active volcanism ceased or significantly waned.

---------§---------

First Lunar Image with my upgraded 15" Dobsonian! By John Axtell.



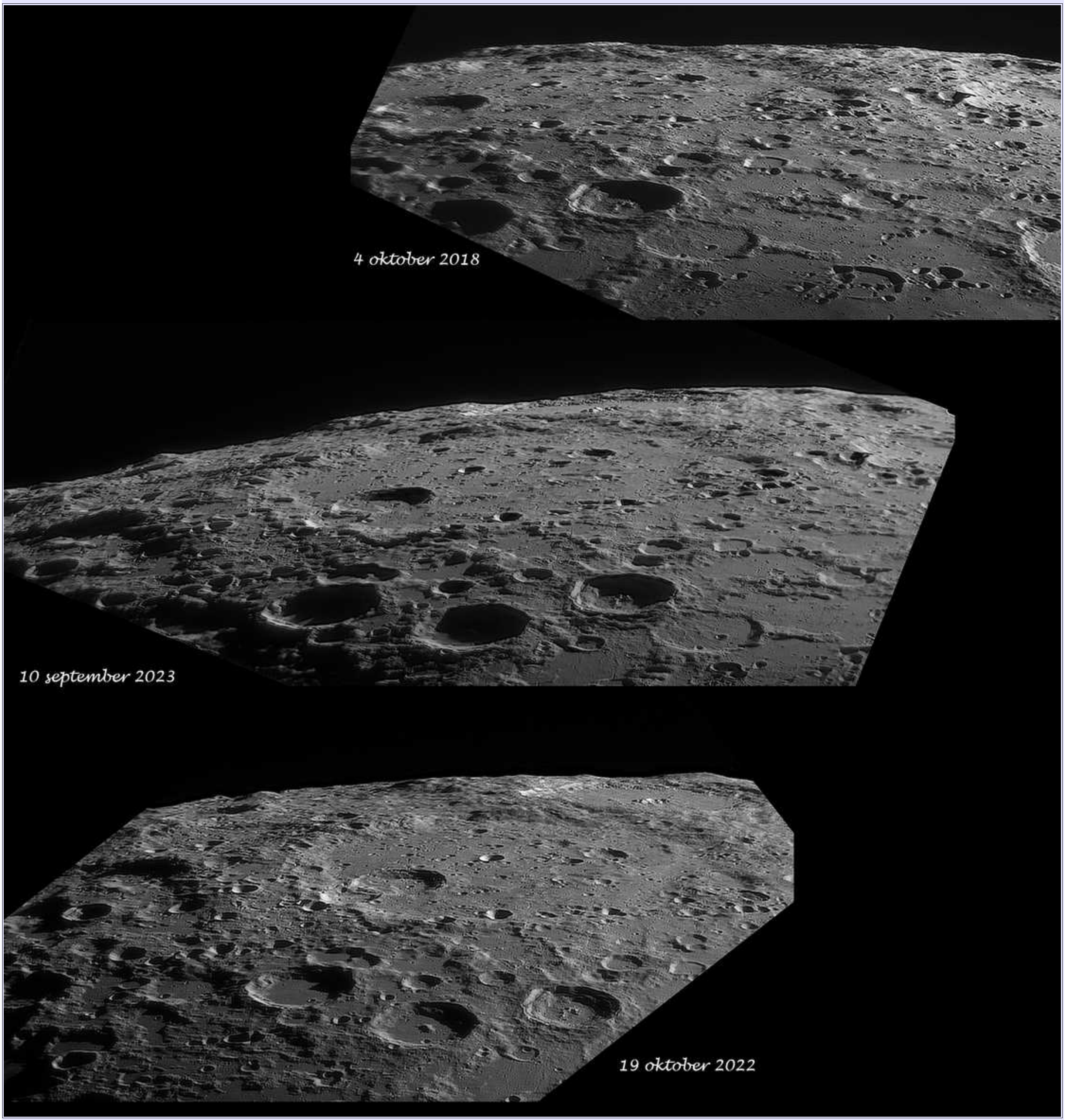
John Comments: *You might recall that I have submitted some images in the past and that I mentioned that I hoped to get my 15" Dobsonian fitted with drives which would greatly improve my ability to use it for Lunar imaging. This has now been done and I attach my very first image taken using it in its upgraded form. The scope is a 19 year old Obsession Classic 15" f4.5. It has now been fitted with ScopeDog drives, together with a ScopeDog eFinder (not that I need that for the Moon! Emoji) The eFinder uses my previous planetary camera, a ZWO ASI110 MC-S and I have replaced that for lunar and planetary work with another ZWO, an ASI224MC. ScopeDog utilises a Nexus Pro with WiFi and the GoTo operation is controlled using Sky Safari on either my iPhone or Samsung tablet. At my request the developer of ScopeDog, Keith Venables, included Lunar tracking rate as an option and it works fine. Well it should after all, as he told me it's the same tracking code routines (in Python) as used by the European Southern Observatory!*

The image, as you can see, includes that wonderful trio of Theophilus, Cyrillus and Catharina with Mare Nectaris alongside. I think the framing provides quiet a pleasing view. It was taken from my semi-rural back garden on 16th January 2024 at 17.58 hrs. It results from the best 15% of 2,000 frames; captured in SharpCap and processed with AutoStakkert, Registax plus light processing in FastStone Image Viewer. No barlow or filter was used, and with such a big aperture I was able to keep the exposure right down to 0.0320 ms with an actual frame rate of 36/sec I'm really looking forward to using this upgraded scope again on the Moon when the current spate of stormy weather has passed.

Not bad for a wooden Alt Az scope!

Observations and Drawings.

Libration effects in the Bailly and Hausen region.



Images by Leo Aerts with dates and times as shown, and taken with a Celestron C14, ed filter and ASI 290MM camera.

Leo's images beautifully demonstrates the effect of libration on the visibility of features on the Moon's southern limb including the region around Bailly and Hausen. The three prominent craters in the foreground are Zucchius, Bettinus and Kircher with Bailly being the larger shallower crater beyond. Hausen is visible beyond Bailly in the two lower images.

Apollo 11 and 16 landing sites.

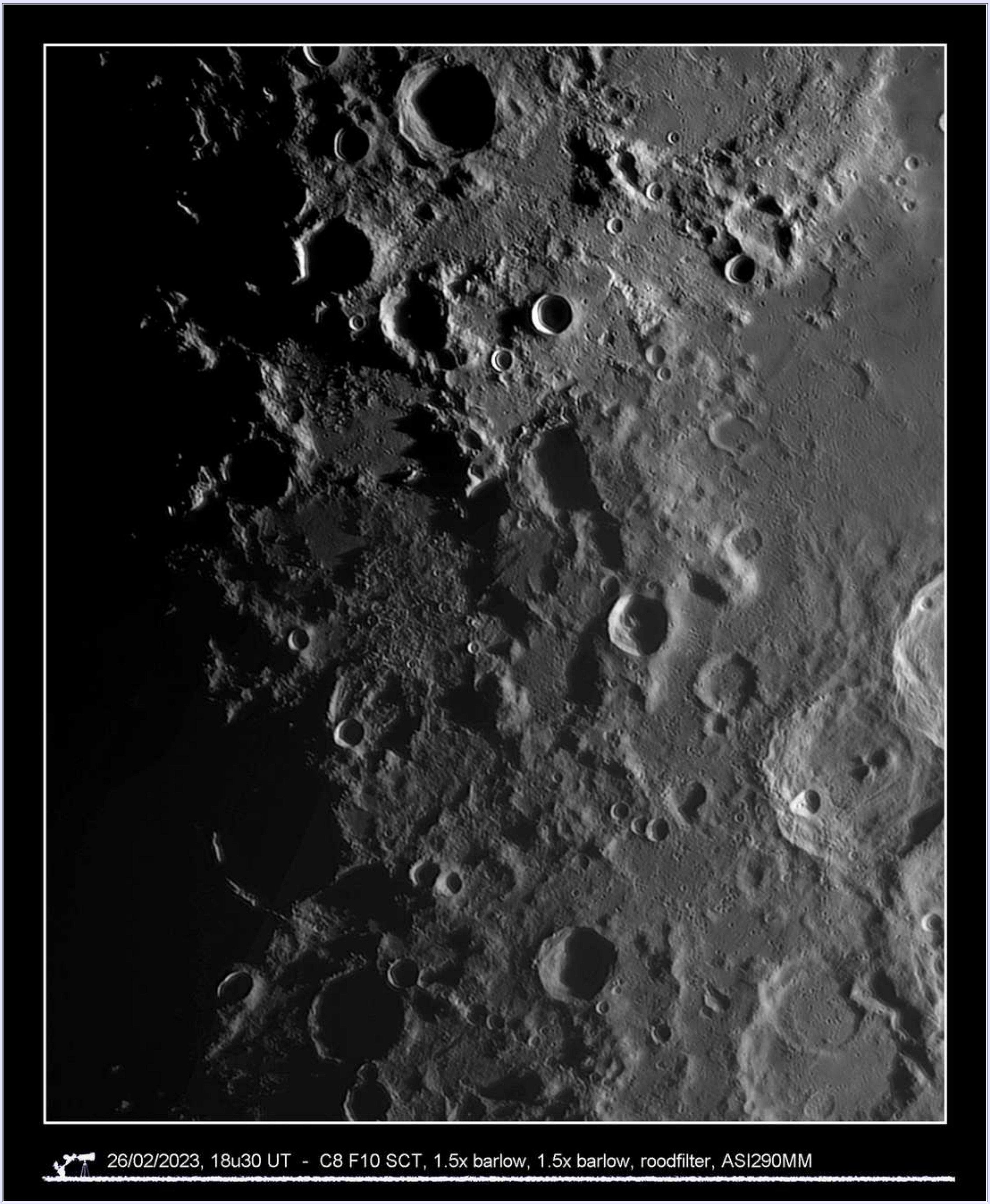


Image by Alexander Vandenbohede with details of time/date and equipment as shown.

Alexander Comments: *The Apollo 16 site was positioned close to the terminator (sun height of only 3°) and it shows nicely the different formations that the mission targeted to sample.*

Montes Recti.

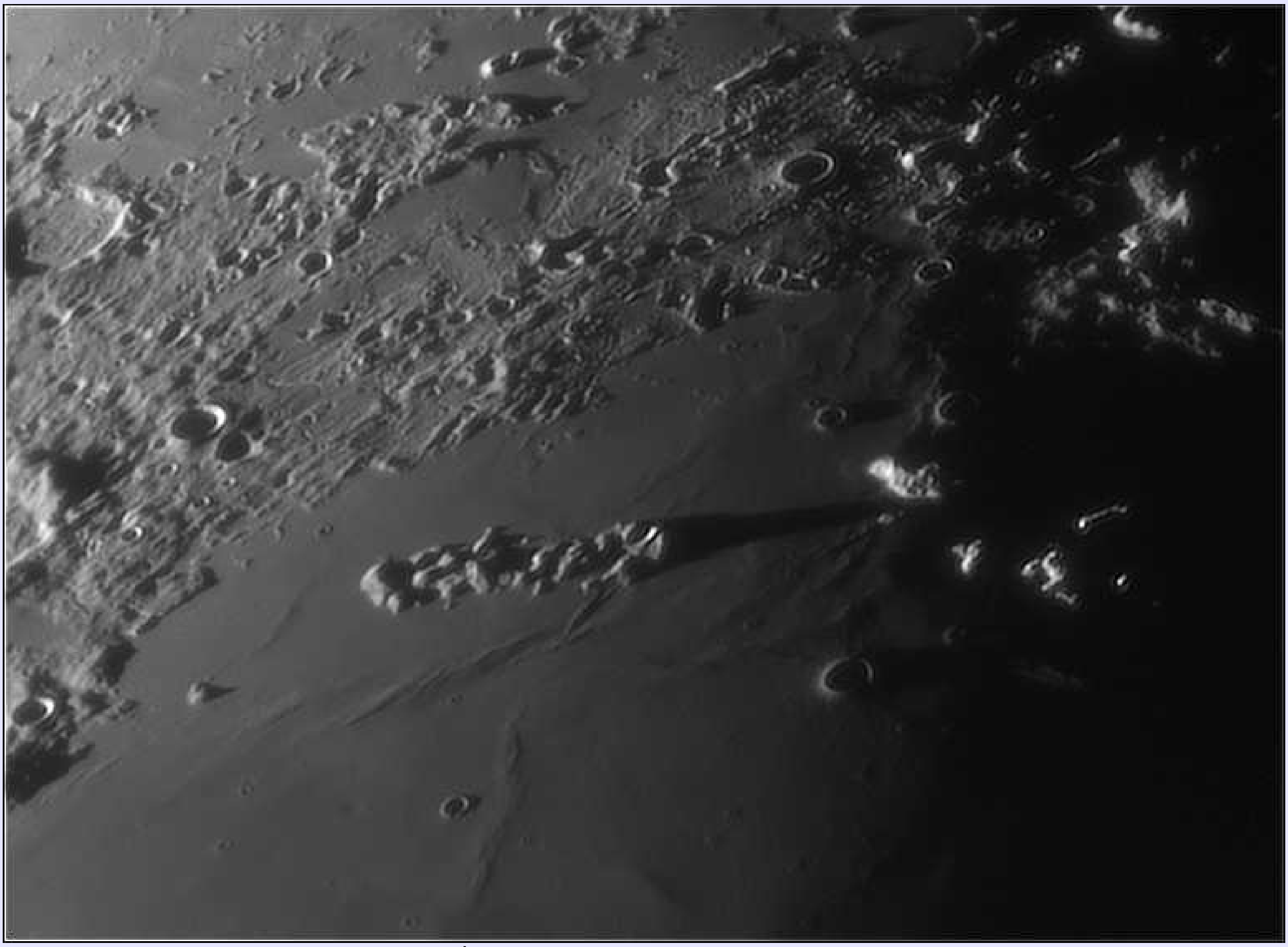


Image by William Leatherbarrow taken on 6th December 2023 with a OMC300 Mak-Cass and ASI290MM camera and 742nm IR pass filter. Seeing average (Antoniadi III).

Geological Notes: Some of the peaks of Montes Recti reach up to 1500-2000m above the mare surface, and the 85km long range representing an unsubmerged part of one of the Imbrium Basin rings. Other elements of this now largely submerged ring include Montes Teneriffe, Pico, Spitzbergen and La Hire. The gravity signature of the ring also passes beneath Promontorium Heraclides and Promontorium Laplace either side of Sinu Iridum, so it is possible that these two features may also represent part of that ring. Outside this ring the lunar crust is moderately thick at around about 30kms, but inside this ring the crust thins dramatically as we enter the deep part of the basin proper. All of these mountain ranges are composed of highland material dredged up during the basin forming impact, so probably composed of anorthosite and dominated by the mineral plagioclase feldspar.

Not visible in this image, but probably detectable under slightly different illumination is what looks like a tide mark running around the base of the range. This feature may be a result of thrust faulting which was produced by compressional forces acting within the basin as its central part subsided, but it is possible that the level of the mare lavas may have originally been much higher, and lowering of its level left behind a genuine tide mark, representing a former high lava mark as it were.

The area to the north of Montes Recti forming the edge of the Imbrium Basin is an extremely busy volcanic area with numerous short sinuous rilles , and the Floor Fracture Crater LaCondamine which is just clipped off along the left edge of the frame.

Gassendi and Mare Humorum.

Image by Chris Longthorn taken on 24th November. Equipment used: StellaLyra 200mm F/8 Ritchey Chretian **Classical Cassegrain and a ZWO ASI 224MC camera at prime focus.**

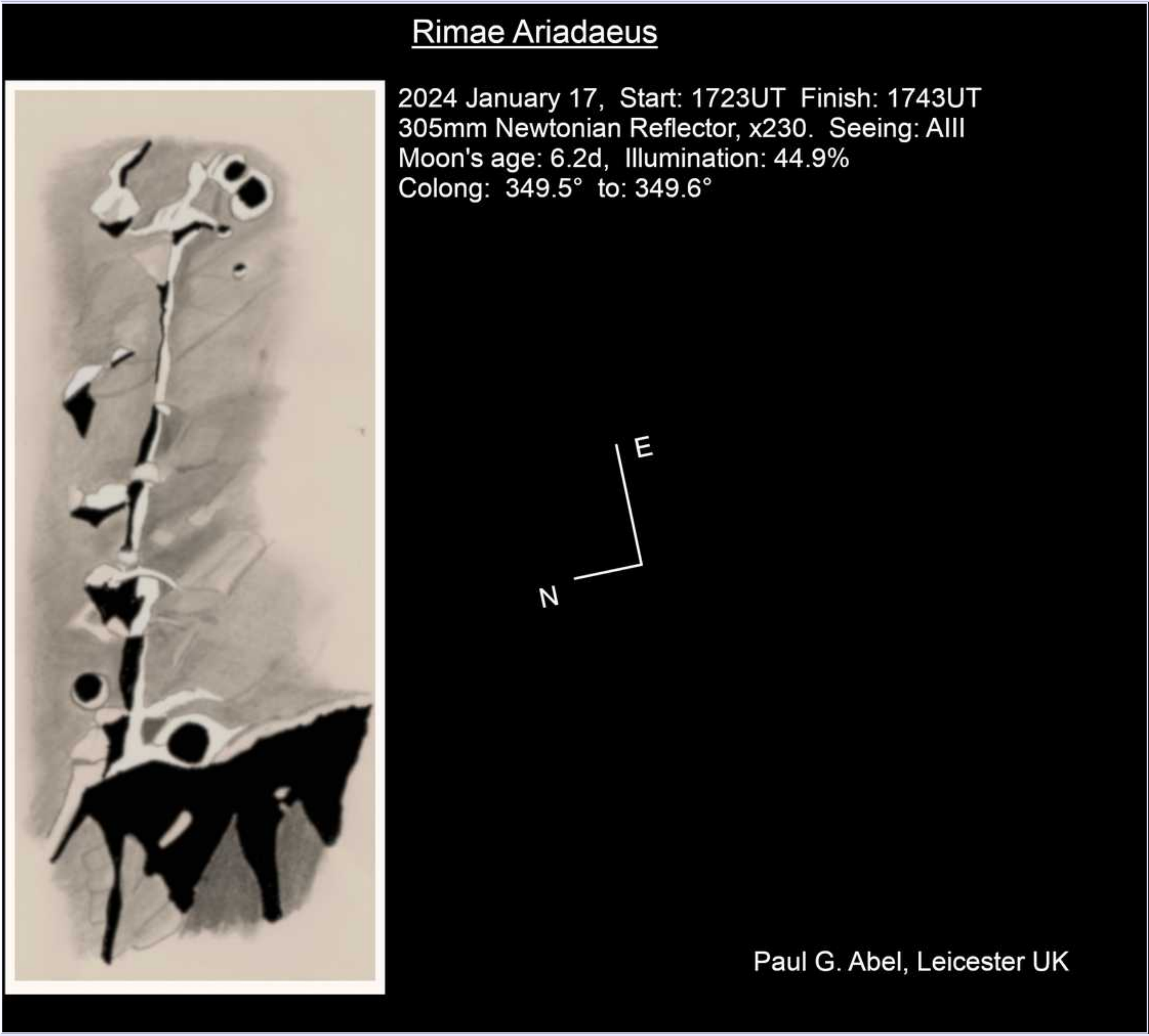
Geological Note: The timing of this image allowed Chris to capture some unusual terrain to the north of Mersenius, that shows up with a rather 'pimply' texture, located just on the terminator. This is actually part of quite an extensive tract of similar terrain extending west towards Rima Sirsalis and where the surface is broken up into a multitude of small rounded hills with an absence of smooth plains which are extensively developed in the surrounding areas. This area is near to the Sirsalis magnetic anomaly, and I wonder if what we are seeing here is a form of the 'Chaotic Terrain' that is hypothesised to form antipodal to some of the larger impact basins, a process also implicated in the formation of magnetic anomalies. The antipodal part of the moon is home to Mare Moscoviense and the Freundlich Sharonov Basin – which could be suspects if this sort of process is involved. Whatever the nature of this terrain it appears to be overlain by deposits from Mare Orientale, so is clearly older, whilst the Unified Geological Map available on the Quickmap site label it as being Nectarian in age.

Krafft, Catena Krafft and Cardanus.

Image by David Finnigan with details of time/date and equipment as shown.

Geological Notes: This image shows some features that are by and large quite invisible. Firstly, you can see that Cardanus lies on a ever so subtle swell in the lunar surface – with the presence of Rima Cardanus and a less conspicuous one that runs towards the eastern rim of Cardanus itself suggesting an episode of uplift over quite a large area. There is however nothing convincing in the gravity data to indicate the subterranean presence of a body of magma that could be responsible. In fact the crustal thickness here is somewhat greater than the areas immediately surrounding, so maybe volcanism is not involved. Another interesting feature is the small somewhat angular structure just outside Cardanus's rim in the 1 o'clock position. This appears to be a tabular slab of mare material that may have become grounded, rather like an iceberg as the surrounding mare subsided, but this bit snagged on a bit of elevated terrain below. Catena Krafft really should be Catena Cardanus as it is a crater chain that originated during the impact that formed Cardanus. Hidden in the shadows beyond is another crater chain, largely covered by ejecta, but which extends north from the northern rim of Cardanus on a converging course with Catena Krafft, with both merging up agains the northern inner wall of Krafft. Telescopically it would be extremely difficult if not impossible to unpick this configuration, but it is obvious from the more overhead spacecraft data images.

Rimae Ariadaeus.



Drawing by Paul Abel with details of time/date and equipment as shown.

Observing notes by Paul: *The Rimae Ariadaeus is a splendid rille some 300km in length and about 5km wide. We had fair conditions (although very cold) and at x230 (and sometimes x319) a number of features could be seen. Of particular interest was the feature half way-up; under this angle of illumination, it did have the appearance of a 'bridge', indeed a number of times the rille seems to be spanned by 'bridges' at a number of places. This illusion is probably created by the brilliant white material contrasting against the dark shadow filled rille, the but the one in the middle was very impressive!*

To the NW, just beyond the crater Silberschlag, the lands were starting to emerge from shadow, this was also quite striking.

Licetus

Image by K.C Pau taken on the 19th December 2023 with 250mm f/6 Newtonian reflector + 2.5X barlow + QHYCCD 290M camera

Geological Notes. Licetus is the large circular crater deep in shadows with only a crescent of the western rim illuminated. It partially overlaps the peculiar elongate crater Heraclitus to the south, with its parallel eastern and western rims being quite obvious, and the highest summits of the elongate central peak just catching the first rays of the sun. The crater just below centre of frame is Cuvier, with the younger sharp rimmed Faraday C to the north. This piece of real estate is in the southern highlands, just to the NE of Clavius, but Licetus and probably Cuvier appear to harbour mare like deposits if not on their floors then almost certainly beneath.

The Gardner Megadome.

Image by Mark Radice with details of time/date and equipment as shown.

Geological Notes: This image neatly dovetails with Bill Leatherbarrow's note on this megadome earlier in this issue. Here we have the 'megadome' occupying the centre of the frame, and you can see what might be a large summit crater with a channel from it heading south onto the mare surface – I am not 100% convinced, but that is one interpretation. Despite being reasonably conspicuous, the late Paul Spudis suggested that the feature was possibly a parasitics feature of a proposed much larger (560km diam.) Cauchy Shield located to the south and occupying a large part of northern Mare Tranquillitatis. The Gardner complex is similar in some ways to Mons Rumker, being composed of a number of smaller overlapping shields, with possible vents and collapse pits also being present. The GRAIL data also shows a conspicuous gravity anomaly beneath, indicating something along the lines of a laccolith type volcanic body, which in all likelihood provided the lavas that erupted to form the shield. The crater Vitruvius has been affected by this volcanism, it is shallower than it should be and the floor bulges upwards centrally. The crater floor itself appears to be dominated by volcanic like deposits, and the morphology is suggestive of numerous drained lava ponds and lakes that may been present, possibly when the nearby shield was volcanically active.

*Spudis,P.D et.al. (2012) Large shield volcanoes on the Moon. Journal of Geophysical Research: Planets, Vol. 118, 1063–1081.

Wallace.

Image by Maurice Collins and taken on the 24th December 2023 at 0859UT with his (new) Sky Watcher Espirit 80ED f/5 APO triplet on a IOptron CEM26 mount.

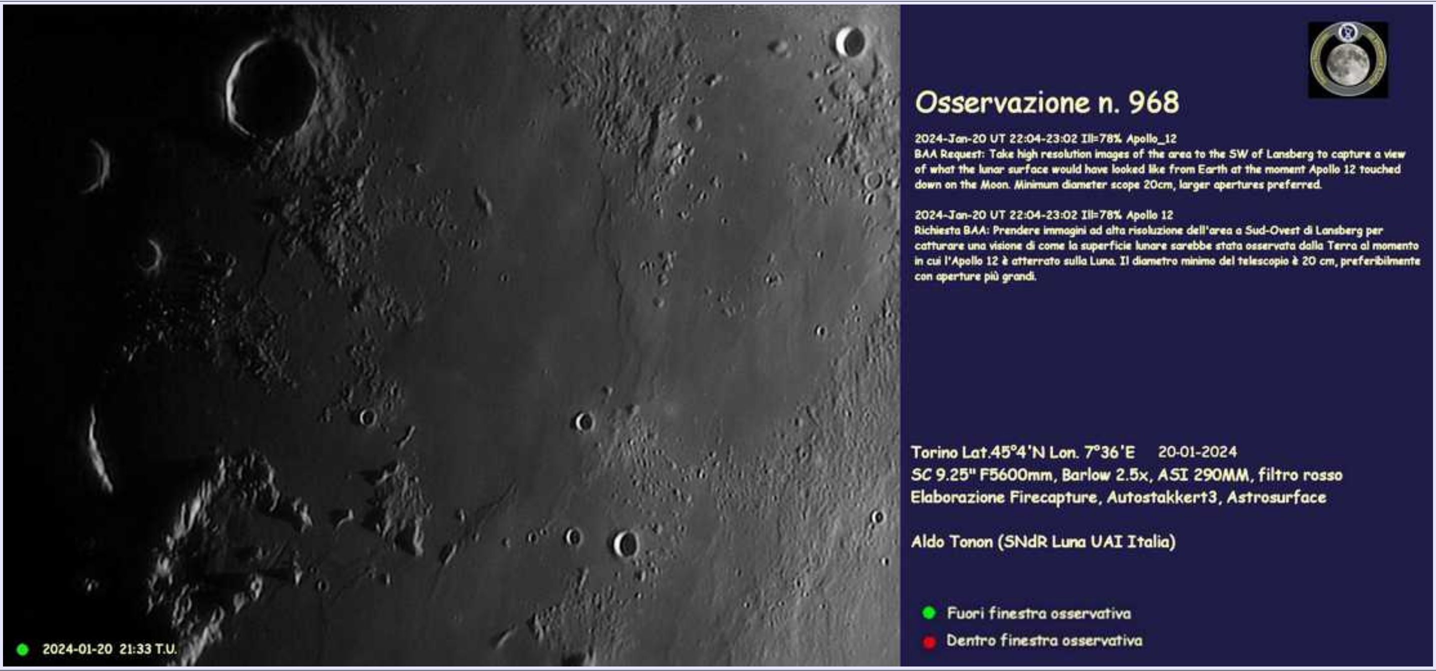
(Not) Geological Notes: The submerged crater Wallace located to the NE of Eratosthenes is named after the naturalist and co-discoverer of evolution by natural selection, Alfred Russel Wallace (1823-1913). I was interested to read in an excellent recent biography* that Wallace, who lived the final years of his life in Broadstone, Dorset was a keen amateur astronomer. He clearly owned a telescope, and is described in the book as lamenting the clouds rolling in just as he was preparing to observe Mars at opposition in 1894! But this polymath did not restrict himself to observation but wrote extensively on man's place in the universe, corresponded with Agnes Mary Clerke, the astronomical historian and had wrote extensively on the life on Mars debate, an issue being vigorously championed at the time by Percival Lowell. He was not convinced in the least bit by Lowell's observations and correctly deduced that the planets low mass would prevent the retention of a habitable atmosphere. His main objection however appears to be the central role he attributed to man in the universe, believing that humanity occupied a key central position both physically and spiritually which would therefore preclude intelligent life elsewhere. Maybe a whacky idea now, but he was speculating well before the discovery of the expanding universe and our peripheral position, in probably all respects. But if ever anyone deserved a crater named after him it would be this autodidactic genius.

*Radical by Nature: The Revolutionary life of Alfred Russel Wallace by James T. Costa, Princeton University Press in March 2023

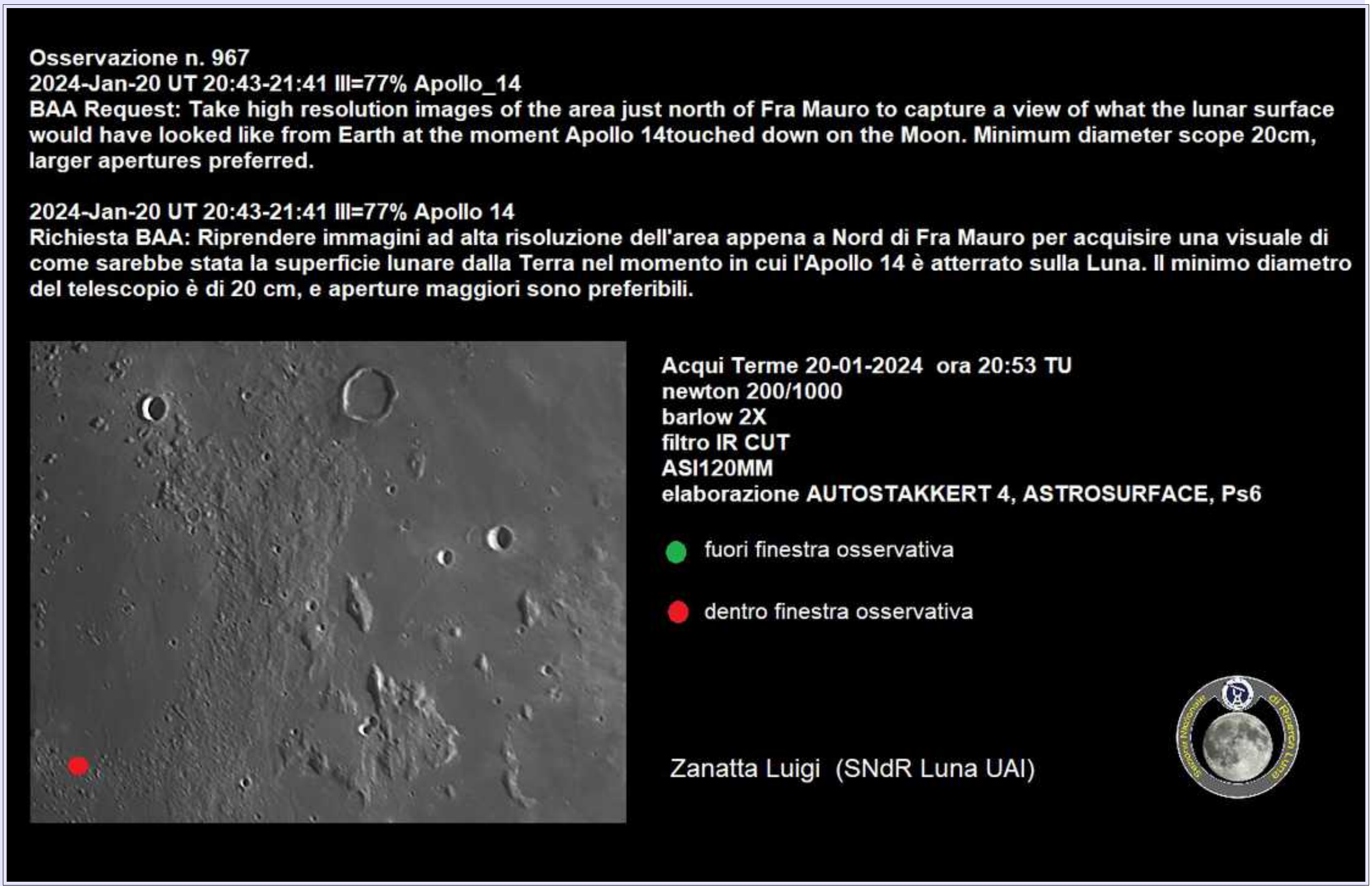
Waxing Moon.

Image by Robert Bowen and taken on 5th November 2022 at 2233UT with a Canon 7D Mk2 DSLR, attached to a SkyWatcher ST80, 400mm f5, fitted with a 2x TelePlus Teleconverter and green Moon Filter.

Apollo Landing sites imaged by UAI Italia members.



Apollo 12 landing site by Aldo Tonon.



Apollo 14 landing site by Luigi Zanata.

Apollo 14 landing site by Valerio Fontani.

Mare Nectaris

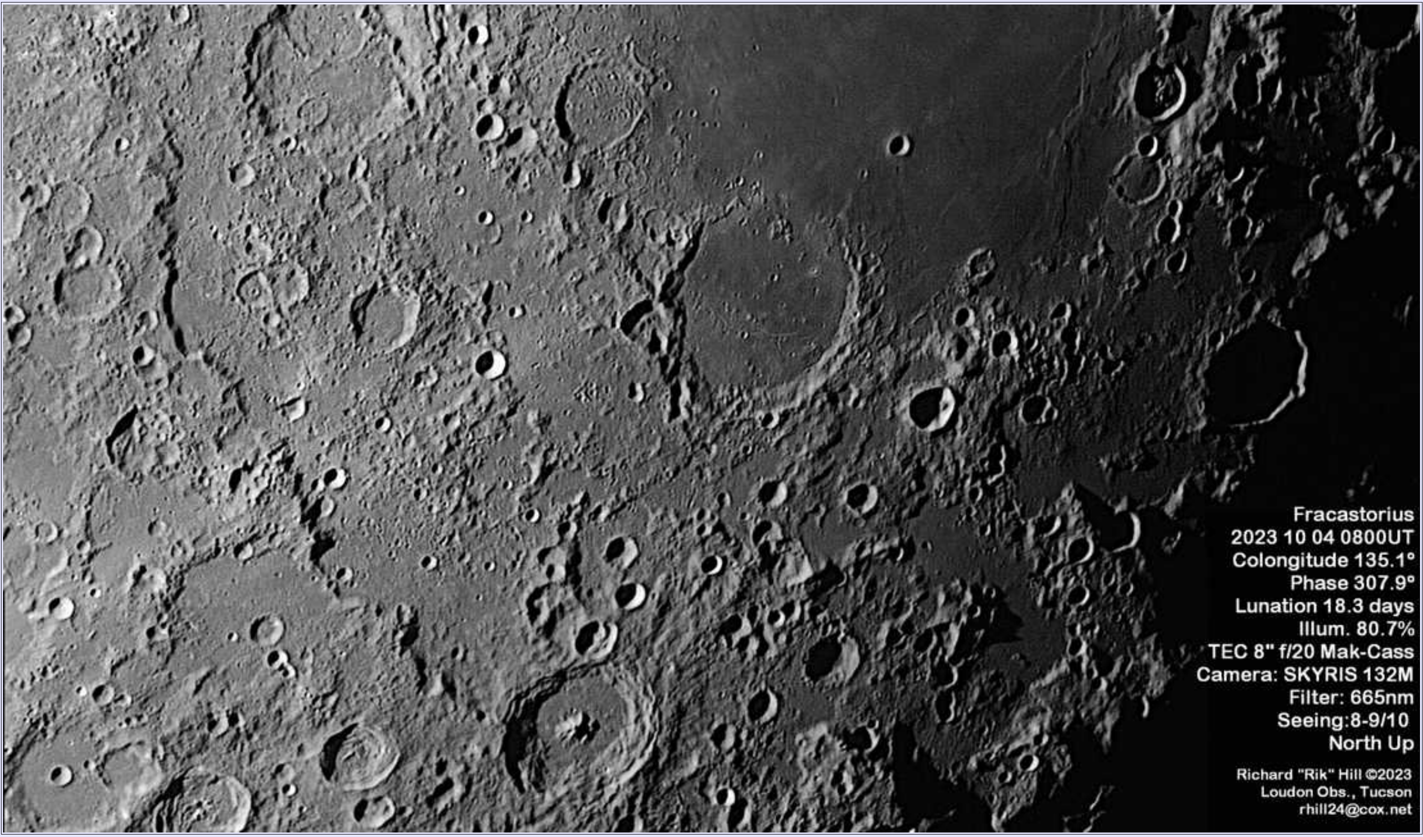


Image and text by Rik Hill

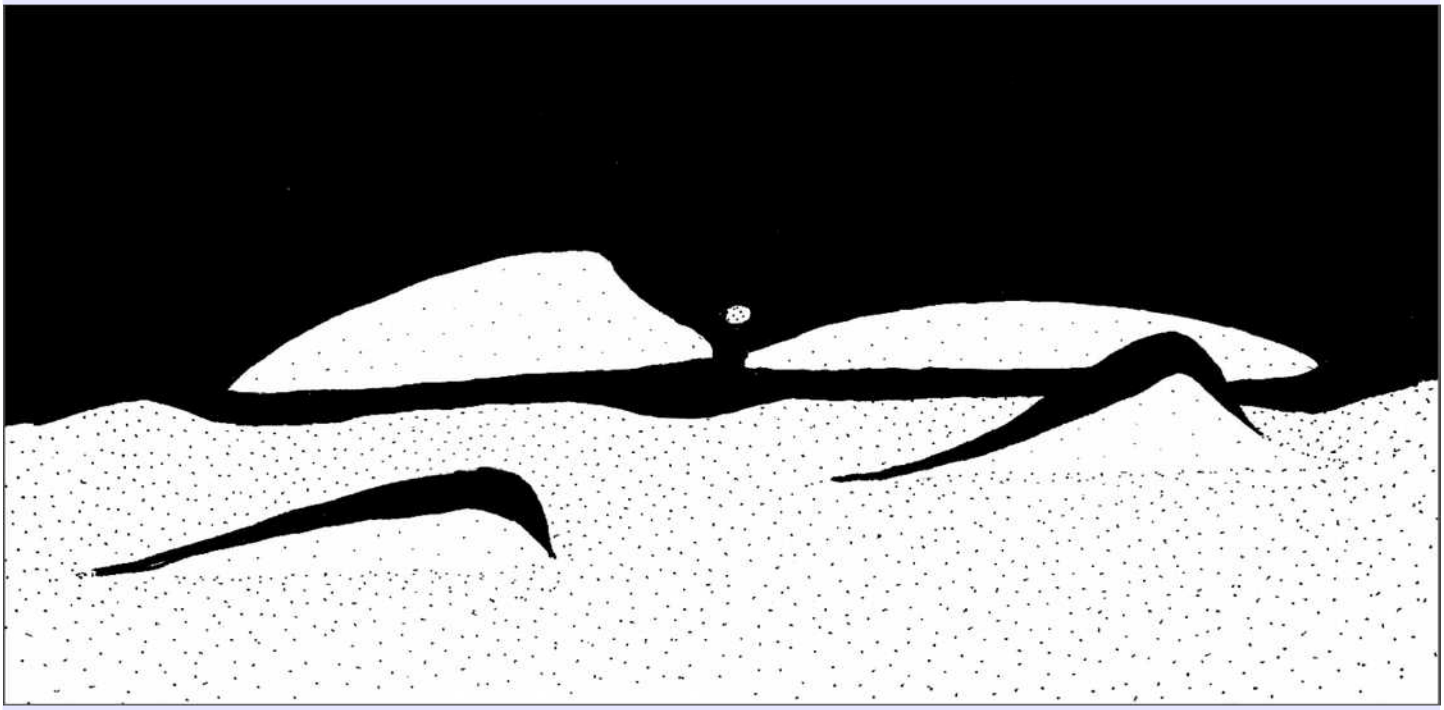
On the south shore of Mare Nectaris can be found a number of lunar treasures to occupy and evening of pleasant observing. The first thing a newcomer might notice is the great U shaped feature that is Fracastorius (128 km diam.). If your telescope is large enough, magnification high enough and the lighting right, you will notice a faint smile on the floor of this partially submerged crater, a rima with a bend in the middle. There is more to the rima than seen here but you will need a good sized telescope and just the right lighting to see it all.On the south shore of Fracastorius is a curious feature called Fracastorius Y. Prior to spacecraft, this was the subject of much speculation as to its nature. Today we can see in LROC Quick Map that it is the merge of 3 craters with post-impact modification. In fact, from this feature up to the crater just north of it, Fracastorius D on the east (left) side of Fracastorius, there are a lot of curious forms. To the upper left from Fracastorius can be seen a smaller version of this crater, Beaumont (54 km).Both craters are flooded with their north walls breached by magma from the Nectaris impact some 3.8-3.9 billion years ago.

Moving south across this rugged landscape (selenoscape?) we come to a notable crater near the bottom of this image, Piccolomini (90 km) with beautifully terraced walls save on the south side where there was apparently a collapse. Notice that it sits at the south end of a scarp, the outer wall of the M. Nectaris impact, called Rupes Altai. It is an impressive 495 km long cliff that runs from Piccolomini north to just west of the crater Catharina (104 km).

There are many other features to explore in this region like the hoof-print crater north of Piccolomini, or the two craters that share a straight wall between them just south of Catharina, or the interesting ejecta cluttered floor of Pons. (I'll let you find that last one for yourself!)

This image is made from two 1800 frame AVIs stacked with AVIStack2, merged with MS-Ice and finally processed with GIMP and Irfanview.

Lunar South Polar drawings by Dietmar Büttner.



Lunar South Pole Region, Mountains M5, M4, M1, M3
2023 Feb 5, 20:28 - 21:05 UT
Refr. 100/900, 128x, Seeing AIII
Topocentric Libration: Long. -0.9°, Lat. -6.1°
Sun: Col. 189.2°, Lat. -1.6°
Lunation No. 1239
Note the shadow of M3 on M4.
Observation two hours after Full Moon.
South is up.
Dietmar Büttner, Chemnitz, Germany.

Southern Cusp
2022 July 25, 02:50 - 02:58 UT
Refr. 100/900, 100x, Seeing AIII
Topocentric Libration: Long. +3.1°, Lat. -3.0°
Sun: Col. 227.7°, Lat. +1.5°
Lunation No. 1232
The very thin cusp is broken into many sunlit dots and small sunlit patches.
Observation 3.6 days before New Moon. Bright morning twilight.
South is up.
Dietmar Büttner, Chemnitz, Germany.

Rupes Recta.

This image of Rupes Recta was submitted by James Dawson and Richard Severn of the Nottingham Astronomical Society and was taken at 18:11 on the 19th January 2024 with an iPhone held against a 12.4mm Plossl on a Celestron C14, giving a magnification of x315. The Moon was 9 days old, with 67% illumination. This magnification allowed Birt A to be easily resolved, along with a number of smaller craterlets, Rima Birt, Thebit D and the Staghorn and Thebit S beyond that.

James and Richard commented that: *"This was the first opening of the observatory to members of 2024, and despite the forecast looking good the day before, there was a thin layer of cloud and an intermittently very gusty wind from the south west. As the cloud thickened the contrast of the Straight Wall fluctuated and it became intermittently less sharply defined, though the seeing remained remarkably stable. Many of the visitors had not observed the Straight Wall before and were fascinated by the concept of how a fault line could be so easily visible from Earth. This image was useful to show others and point out the various features to look for when it was their turn at the eyepiece. The image was also useful to talk about the likely chronology of events Ancient Thebit, Birt and the Straight Wall. We were impressed with the relative clarity of the image we captured using a single exposure technique holding a smart phone at the eyepiece."*

Lunar domes (part LXXII): Oppenheimer and pyroclastic material.

By Raffaello Lena

Oppenheimer is a 200 km diameter pre-Nectarian floor-fractured impact crater on the lunar far side (Figure 1). The DMDs (Dark Matter Deposits) located around volcanic vents approximately coincide with the fractures on the crater floor. At least seven separate sub-deposits are present across the crater. No lunar domes are found in Oppenheimer crater.

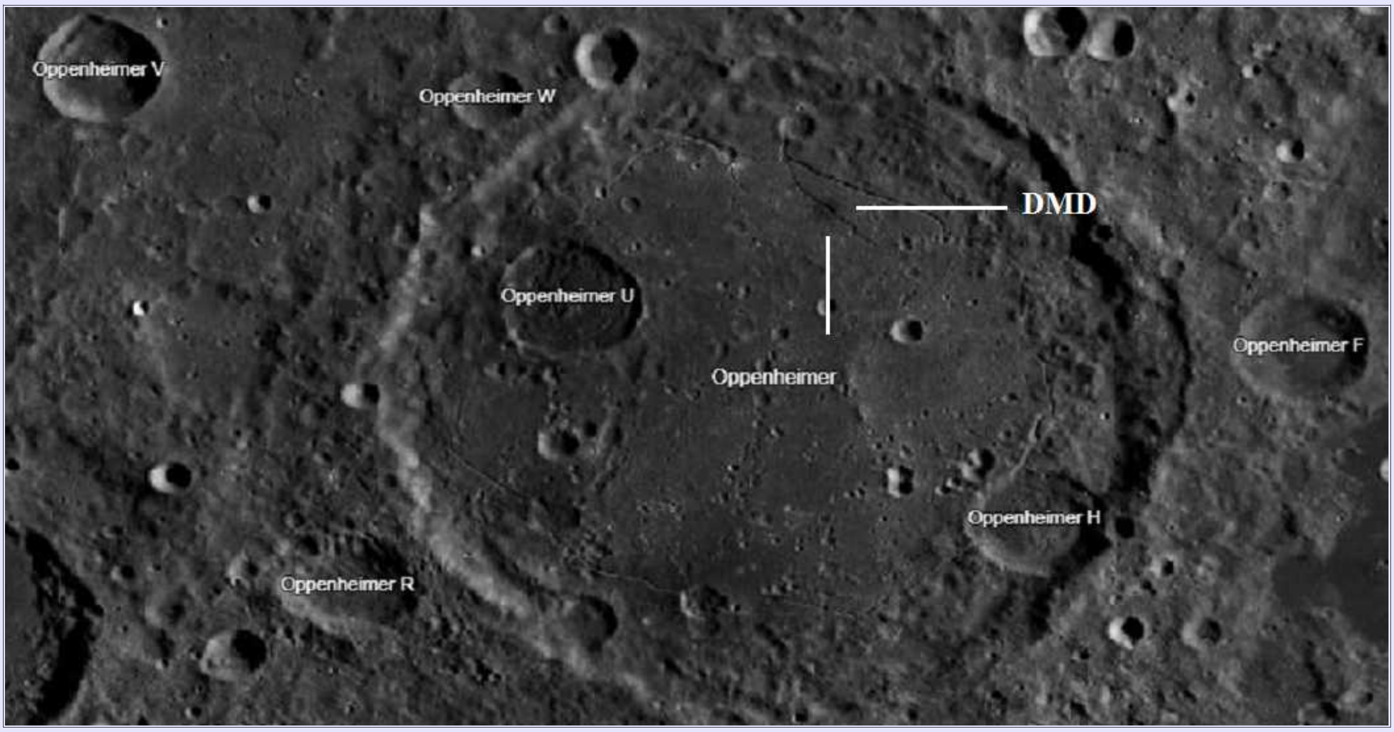


Figure 1: Oppenheimer and pyroclastic material.

Albedo

In this note I will examine the northern deposit (Fig. 1). The concentric nature of the deposit suggests that this is the likely source for at least some of the dark mantle material (Fig. 2).
The Color map is obtained as described by Sato et al. (2014).

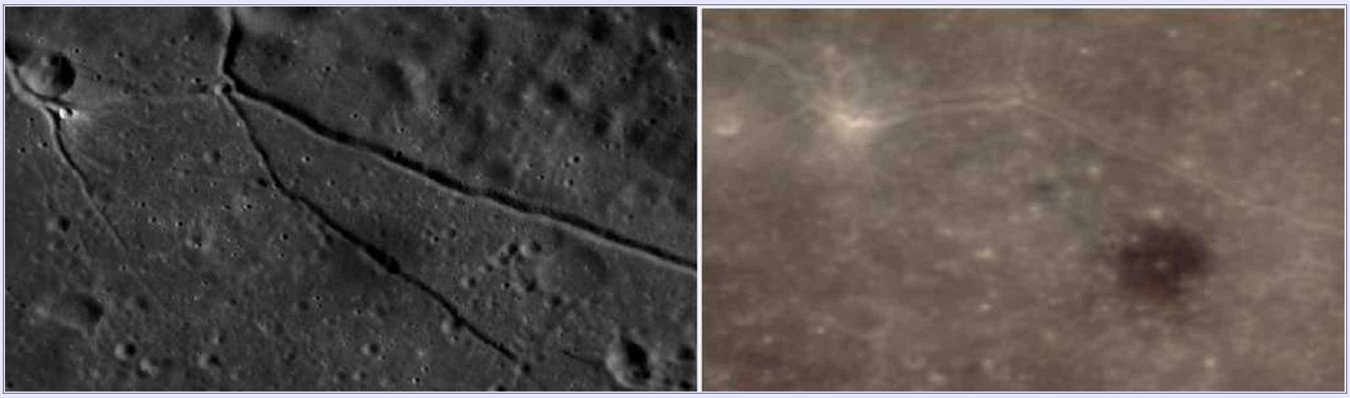


Figure 2: Oppenheimer northern DMD. Colour mosaic is comprised of the 689nm (Red Channel), 415nm (Green Channel), and 321nm (Blue Channel). Colour map described in Sato et al., 2014.

In the Clementine colour ratio composite image (Fig. 3), this deposit appears orange, suggesting low titanium abundance.

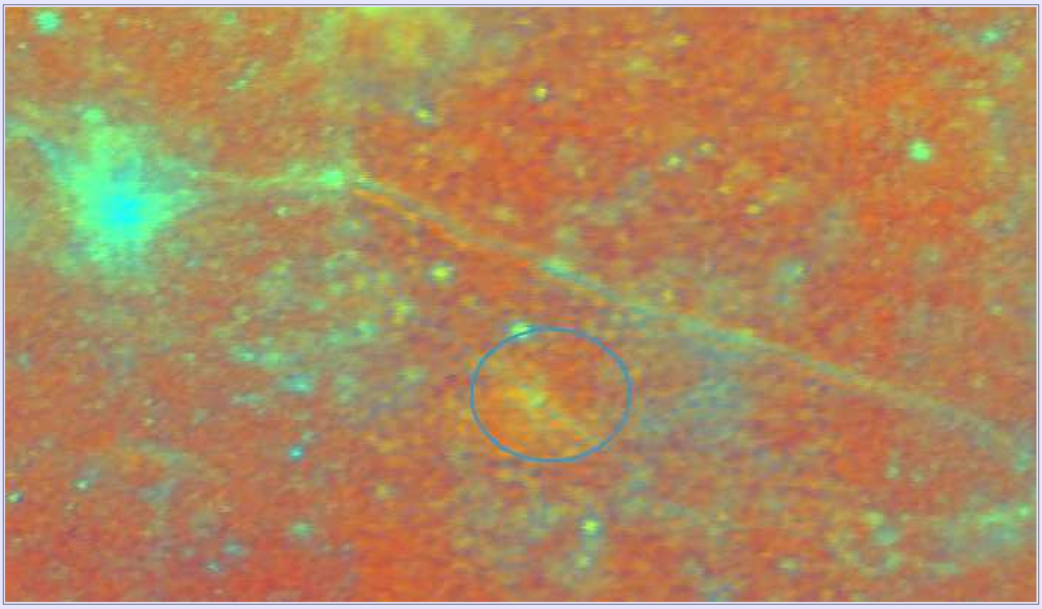


Figure 3: Clementine colour ratio image. Channel Ratio Red = 750nm/415nm Green = 750nm/950nm Blue = 415nm/750nm.

Thus the examined pyroclastic deposit may be a late-stage volcanic deposit formed by the release of volatiles (Gustafson et al., 2012).

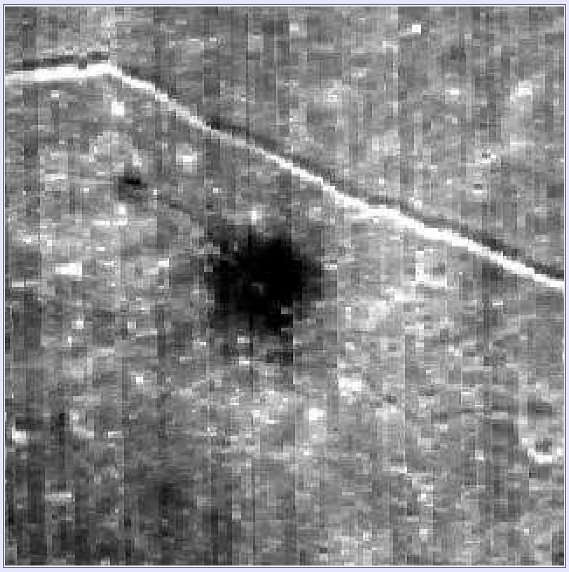
Spectral data

In this study I used the approach described by Besse et al. (2014) based on the M^3 spectral data of recognized DMDs including mineralogical evidence indicative of the presence of volcanic glasses. Pyroxenes have two absorption bands, one centred near 1000nm and another near 2000nm; these band centres move to longer wavelengths as Ca and Fe substitute for Mg. Olivine has a complex absorption band centred beyond 1050nm that moves as Fe substitutes for Mg (Besse et al., 2014 and references therein). Significant amounts of olivine in lunar volcanic deposits will broaden the pyroxene absorption at 1000nm and shift it to longer wavelengths, while the 2000nm band remains fixed. Because olivine lacks a band at 2000nm, the 1000nm absorption in olivine-rich lunar deposits will be strengthened relative to the 2000nm band.

The presence of Fe-rich volcanic glasses in lunar soils causes broad and shallow absorption bands because of the amorphous structure of the glasses (Besse et al., 2014). The 1000nm band centre of lunar glass is generally shifted to longer wavelengths when compared to pyroxene, and the 2000nm band centre to shorter wavelengths. Thus, the 1000 and 2000nm band centre positions of lunar glasses will typically appear close together than those of pyroxenes.

M^3 Spectral data

From the M^3 observations, the DMD exhibits different mineralogy. The change in position and shape of the absorption is also consistent with the presence of volcanic glass. These results are confirmed by the spectra reported in Fig. 4. The 1000 and 2000nm band locations are shifted to longer and shorter wavelengths, respectively, and attributed to volcanic glass contribution.



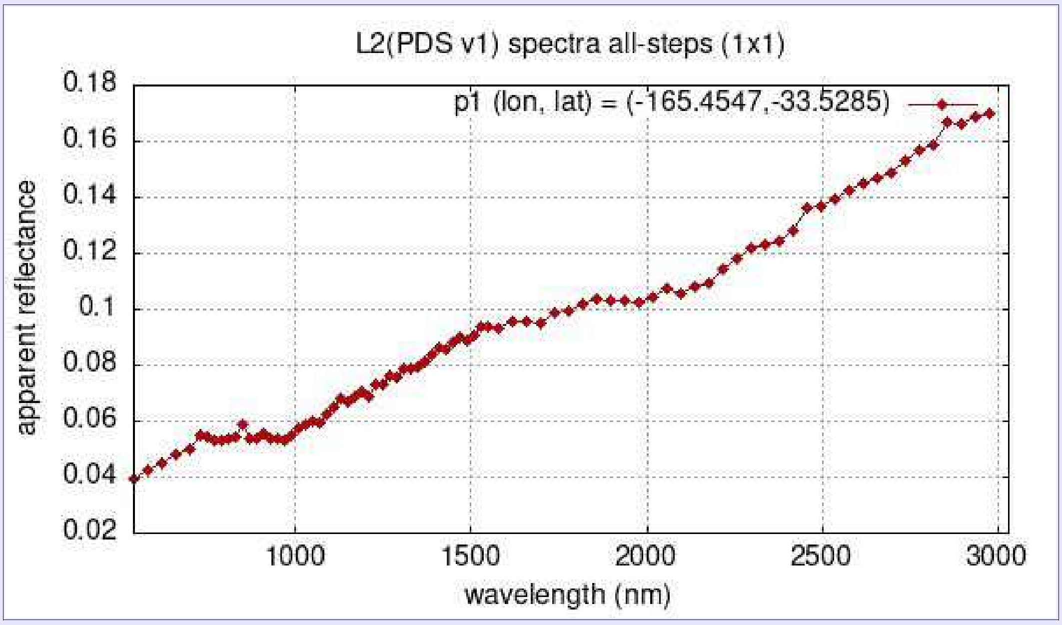


Figure 4: (top) The DMD of Oppenheimer. (Bottom) Spectrum of the DMD.

As shown in Fig. 4, the 1000nm band is wide suggesting that a component such as volcanic glass or olivine may be present (Besse et al., 2014; Lena et al., 2013). Table 1 displays the absorption bands centre derived for the sampled regions.

Feature	1000nm band	2000nm band
DMD north	1109	2010

Table 1: Absorption bands centre for the DMD pyroclastic deposit. The presence of volcanic glass in a spectrum is considered to be the strongest evidence in support of a pyroclastic origin.

Although the wider and shifted 1000nm absorptions could also be attributed to the presence of olivine in some of these deposits, the shift to shorter wavelengths of the 2000nm absorptions and the relative strength of the 2000nm band are indicative of the presence of volcanic glasses signature (Besse et al., 2014). The continuum-removed spectra of the N deposit (Figure 5) shows 1000nm band minimum positions at ~1100nm in the dark unit. The 2000nm band position is located at 2010 nm. The continuum is approximated by a straight line fit between 750 and 1,620 nm.

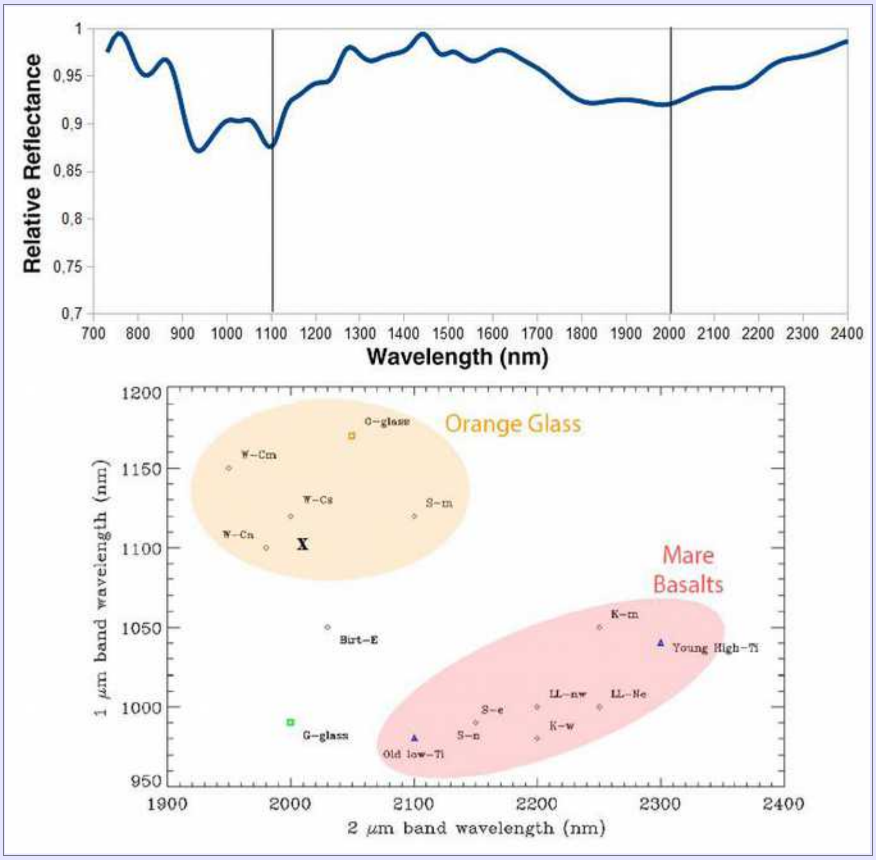


Figure 5: Continuum-removed spectrum from Figure 4. Note the broad 1000nm absorption band. Orbital period OP2C1. The vertical lines display the 1100nm and 2010nm bands center. (bottom) Diagram of the band position at 1000 and 200nm. Adapted by the work of Besse et al. (2014).

Contribution of Volcanic Glasses

A cluster of possible DMDs with band positions very close to the orange glass is used as a criterion to characterize them as DMDs (Fig. 5). Based on this diagram the examined deposit is plotted in the orange glasses population (indicated with the symbol X).

The spectrum shown in Fig. 5 shows another band at 930nm, typical of low-calcium pyroxene-bearing units.

Geologic events

The plausible interpretation is that lava melt tracked up a fault in this region, bowed up the surface, and fractured it. In a subsequent phase, an explosive activity occurred, originating the pyroclastic deposit spectrally characterized by the presence of volcanic glasses of the type orange glass.

Mineralogical Composition

Based on the spectral data the pyroclastic deposit has been identified including the presence of volcanic glasses signatures (Fig. 5).

For this study I have also derived abundance maps in wt% of FeO, clinopyroxene, orthopyroxene and TiO_2 content created from topographically-corrected Mineral Mapper reflectance data acquired by the JAXA SELENE/Kaguya (Fig. 6).

The deposit shows an enhanced abundance of orthopyroxene (from 20.0 wt % to 38.0 wt %) and a lower abundance of clinopyroxene if compared with nearby mare units. Furthermore the lower clinopyroxene content is detected in the deposit suggesting the presence, in the examined region, of volcanic products of different composition (Fig. 7).

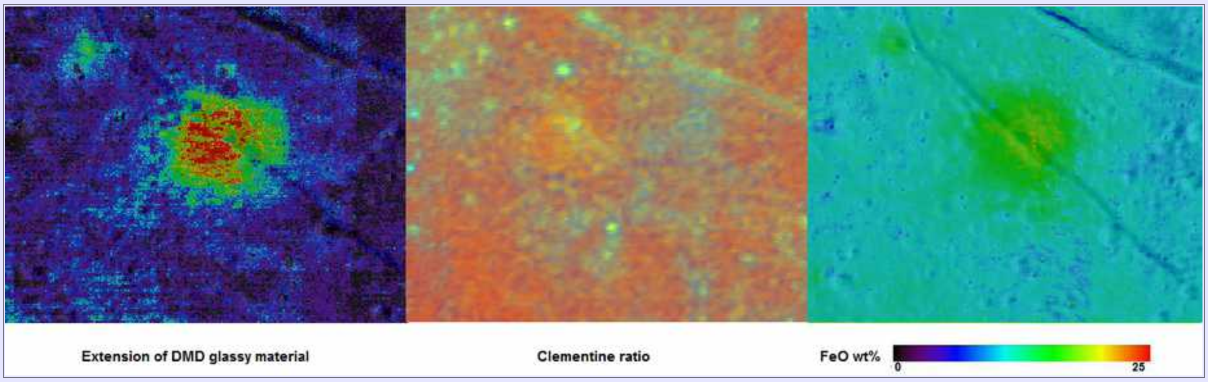


Figure 6: Extension of the pyroclastic deposit and comparison with the Clementine map and the derived FeO abundance in wt %.

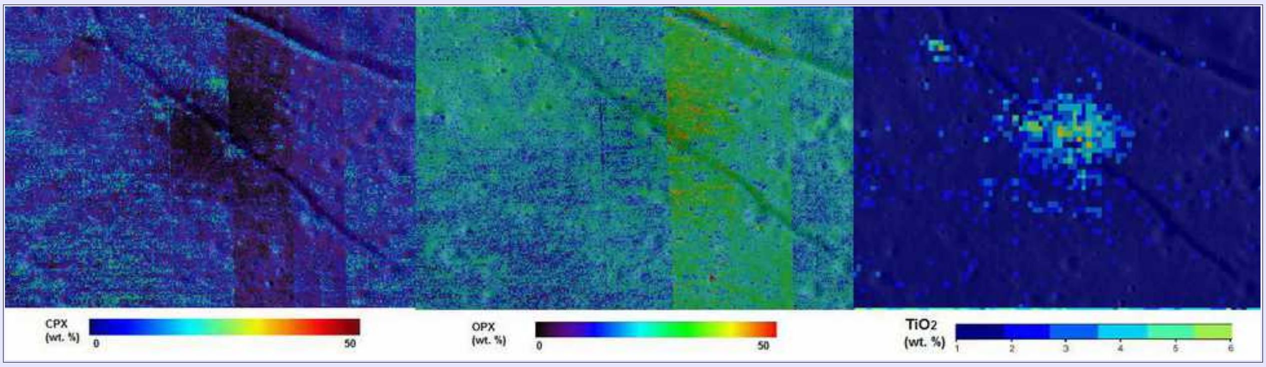


Figure 7: (left) clinopyroxene (CPX), (middle) orthopyroxene (OPX), (right) TiO_2. Derived abundance maps in wt%.

The pyroclastic deposit displays a FeO of 14.0-19.0 wt %, higher than the nearby mare units (Fig. 6). The TiO_2 varies from 1.0 wt % to 5.6 wt % (Fig. 7).

Conclusion

Similar results have been obtained by Jawin et al. (2015).Spectral modeling of the volcanic glass will also provide more detailed constraints on the emplacement, the distribution across various DMDs, and the mineralogical mixtures present in these deposits.

References

Besse, S., J. M. Sunshine, and L. R. Gaddis (2014), Volcanic glass signatures in spectroscopic survey of newly proposed lunar pyroclastic deposits, J. Geophys. Res. Planets, 119, doi:10.1002/2013JE004537.

Gustafson, J. O., J. F. Bell III, L. R. Gaddis, B. R. Hawke, and T. A. Giguere (2012), Characterization of previously unidentified lunar pyroclastic deposits using Lunar Reconnaissance Orbiter Camera data, J. Geophys. Res.,117, E00H25,doi:10.1029/2011JE00389

Jawin, E. R., S. Besse, L. R. Gaddis, J. M. Sunshine, J. W. Head, and S. Mazrouei (2015), Examining spectral variations in localized lunar dark mantle deposits, J. Geophys. Res. Planets, 120, 1310–1331, doi:10.1002/2014JE004759.

Lena, R., Wöhler, C., Phillips, J., Chiocchetta, M.T., 2013. Lunar domes: Properties and Formation Processes, Springer Praxis Books.

Sato et al., 2014, J. Geophys. Res. Planets, 119, 1775–1805, doi:10.1002/2013JE004580

Newcombe by Barry Fitz-Gerald.

Most craters are have fairly circular outlines, even those formed by low angle impacts, but local topography, the number of impactors and subsequent collapse and modification can produce non-circular examples and explaining them away can be quite a challenge in some cases. Heraclitus and Delaunay for instance *may* be low angle elongate craters, but this is just a guess, and I keep returning to Hainzel and Hainzel A to try to work out exactly what happened there, but have not really convinced myself that I am on the right lines. Another crater that has perplexed me recently is Newcombe, which I initially thought was an example of a binary impact of one large and one small body travelling in trail formation, but I am now of the opinion that this might be incorrect.

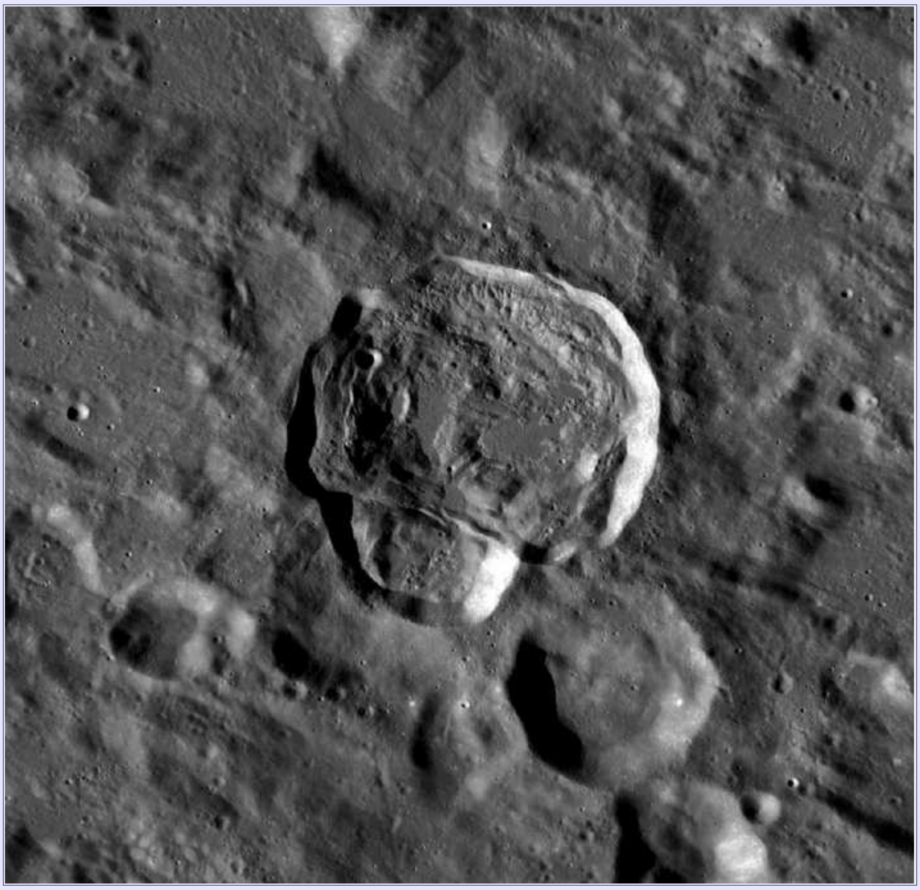


Fig.1 LRO WAC image of Newcombe, showing the semi-circular bulge in the rim to the south producing the appearance of a big crater to the north and a smaller partial crater to the south.

With a diameter of nearly 40kms Newcombe is located almost equidistant between Cleomedes and Posidonius and on the Montes Taurus. It is a young looking crater, but lacking a prominent ray system is probably in Eratosthenian. As you can see form Fig.1 Newcombe looks to be composed of two components with a larger crater to the north and a partial, smaller crater forming a prominent semi-circular bulge to the southern rim. There has been a fair amount of inward slumping onto the floor of Newcombe, much of this occurring immediately post impact, because pools of impact melt can be seen in between the slumped masses. On the subject of impact melt, extensive smooth deposits can be seen just outside the northern rim, possibly indicating a south to north trajectory for the impactor.

You will notice from Fig.1 that the crater has a rather angular look to it and of possible relevance here is what appears to be a number of aligned features in the adjacent terrain, giving the Taurus mountains the appearance of having a 'grain' orientated roughly from the NW to the SE. This is reflected in the straight northern rim of Newcombe, and the orientation of the line line separating the larger and smaller components of the crater.

Some of these alignments can be better seen in Fig.2 which a 'Terrain Hillshade' rendition from Quickmap, with lineations orientated from top left to bottom right (approximately NW-SE). This is undoubtedly related to the Imbrium Impact basin, and may represent scouring of the surface by low angle ejecta or the presence of faults radial to the basin.

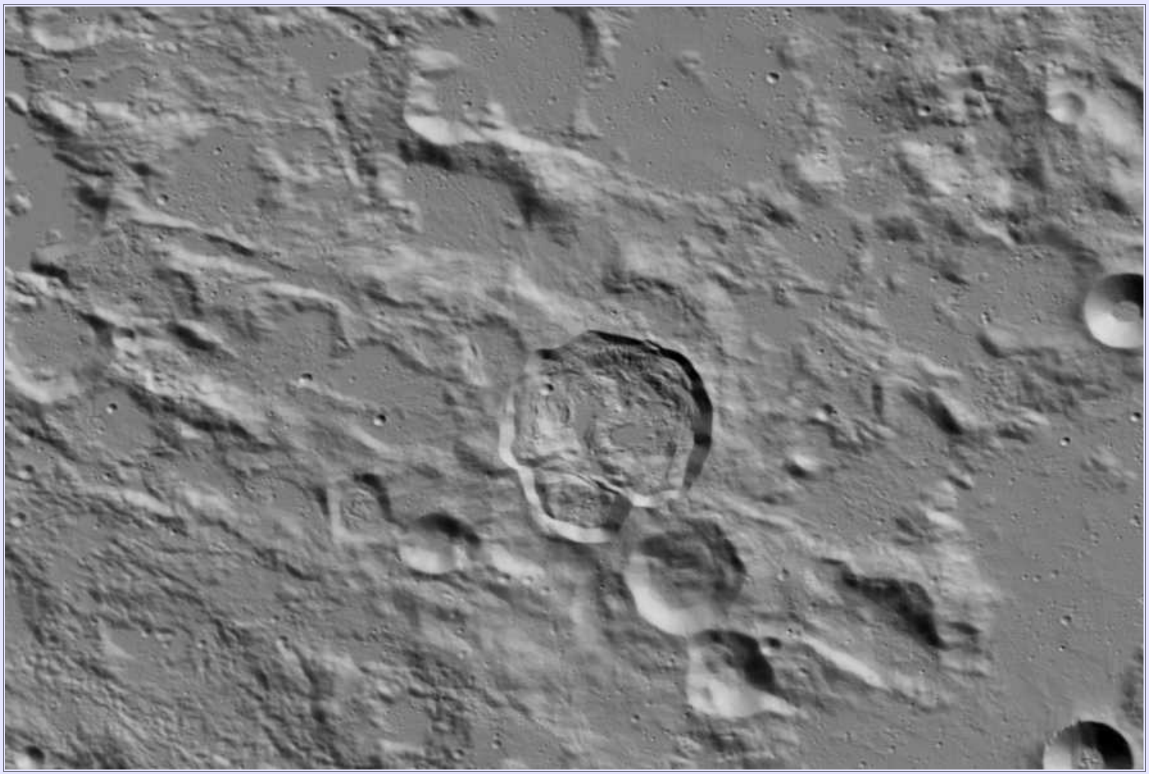


Fig.2 LRO 'Terrain Hillshade' rendition Newcombe and surroundings showing the alignment of topographic features along a NW-SE orientation and probably related to the formation of the Imbrium Basin.

Their orientation is not wholly consistent with the Imbrium Sculpture *if* the Imbrium Basin was formed by an impactor arriving from the NW, but not if the impactor arrived from the SW as I think it may have done*. The presence of this terrain structure may well have influenced the formation of Newcombe and the subsequent post impact modification involving slumping. Another example of alignment resulting from this Imbrium sculpting/faulting is the southern rim of Römer, which is conspicuously straight, whilst its somewhat crenellated north-western rim has the same rather step-like configuration to that seen in Newcombe.

So, is the semi-circular bulge in the southern rim a collapse feature or what? Well it might be, or alternatively it could be that the excavation process became asymmetric as the expanding shock wave encountered the NW-SE trending fault systems associated with the Imbrium Basin in the bedrock. But what can be said for sure is that this bulge was formed during the impact process and not some time afterwards, as the slumped rim deposits we see within this smaller component include impact melts which must have been emplaced very soon after the excavation process ceased. In addition, the south-western rim and glacis (which is part of the bulge) is smeared in impact melt, which has been thrown up and over the that rim, possibly after being displaced by collapsing rim material. The rim we see must therefore have formed during the impact process and not at a later time by ordinary rim collapse.

That this terrain of the Montes Taurus has been affected by the formation of the Imbrium Basin is demonstrated quite well by the presence of some rather intriguing ropey like deposits immediately to the SW of Newcombe. Here the surface is covered by elongate sinuous hills, again with an orientation almost radial to Imbrium. It is very similar to the sort of deposits you see peripheral to the Orientale Basin, which is not surprising as it is of comparable origin. Around Orientale, the Hevelius Formation is interpreted as fluidised ejecta, probably melt rich that spread out radially from the basin forming event.

The analogous facies or rock units associated with Imbrium Basin are the Fra Mauro Formation, named after the crater where they are most conspicuously seen. Fig. 4, which is taken from the Unified Geological Map overlay in Quickmap shows the extent of these deposits within the Montes Taurus area in lilac, and it is worth bearing in mind that whilst this is a whopping 900kms away from the rim of the Imbrium Basin, they are still conspicuous as a distinct unit.

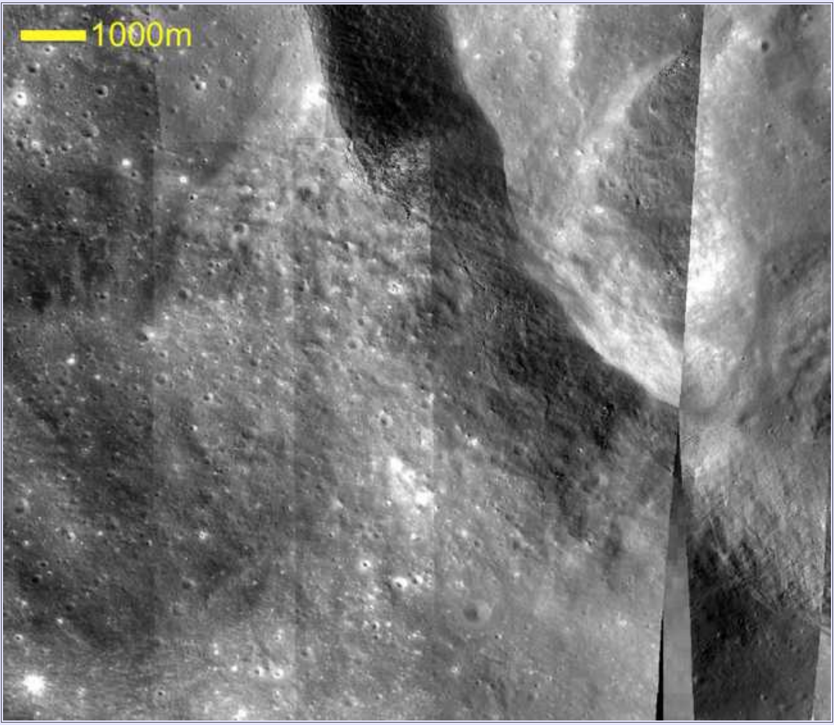


Fig.3 A detail of the SW rim of Newcombe showing where impact melt has been propelled up and over the rim and down the glacis, probably by the rim collapsing in the immediate post impact phase. The melt is represented by the darker material with the uneven surface.

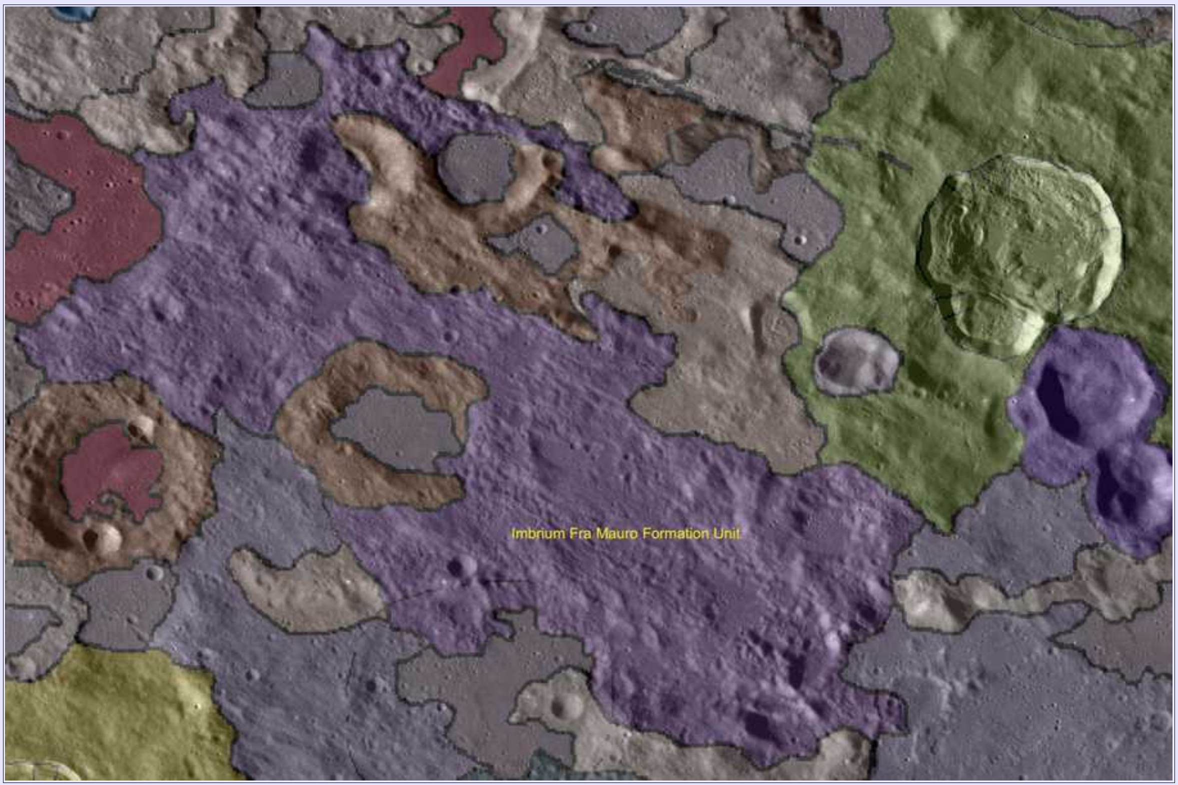


Fig.4 Unified Geological Map covering Montes Taurus taken from Quickmap and showing the Fra Mauro Formation Units in lilac and representing Imbrium ejecta.

***Mare Imbrium by Barry Fitz-Gerald. BAA Lunar Section Circular Vol. 59 No. 4 April 2022**

LUNAR GEOLOGICAL CHANGE DETECTION PROGRAMME

News: Alas a backlog of academic and other necessary work has hit me this month, so this LGC newsletter is limited to just a list of the observations received. We will cover these December observations and also those from January, in a lot more detail in next month's newsletter.

TLP Reports: No TLP reports were received for December though on 2023 Nov 24 UT 20:40 Massimo Giuntoli (BAA) observed that the western wall of Cavendish E was emerging into sunlight (the floor was still in shadow) – the northern part of the wall was very bright – almost as bright as Aristarchus. Massimo adds "it was not brilliant, but it was eye-catching". Was anybody else observing at this time? It is probably just a sun-facing slope catching the sunlight?

Routine reports received for December included: Alberto Anunziato (Argentina – SLA) observed: Aristillus, Copernicus, Eratosthenes, Plato, Vallis Schroteri. Massimo Alessandro Bianchi (Italy – UAI) imaged: several features. Maurice Collins (New Zealand - ALPO/BAA/RASNZ) imaged: Archimedes, Clavius, and several features. Walter Elias (Argentina – AEA) imaged: Kepler and Plato. Valerio Fontani (Italy – UAI) imaged: Cyrillus. Jean-Marc Lechopier (Teneriffe, Spain – UAI) imaged: Cyrillus. Bill Leatherbarrow (Sheffield, UK – BAA) imaged: Bullialdus, Burg-Lacus Mortis area, Catherina, Clavius, Copernicus, Fracastorius, Montes Recti, Piccolomini, Pitiscus-Hommel area, Pythagoras, and Theophilus. Euginio Polito (Italy – UAI) imaged: Aristarchus, Copernicus, Cyrillus, Ramsden and several features. Franco Taccogna (Italy – UAI) imaged: Aristarchus, Copernicus, Cyrillus, Plato, Ramsden, and several features. Aldo Tonon (Italy – UAI) imaged: Aristarchus, Mons Vinogradov, and several features. Alexander Vandenbohede (Belgium – BAA) imaged: Petavius. Fabio Verza (Italy – UAI) imaged: Plato and Ramsden. Ivan Walton (UK - BAA) imaged: Eudoxus. Luigi Zanatta (Italky – UAI) imaged: Plato and Ramsden.

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 .

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

---------§---------

Items for the March circular should reach the Director or Editor by the 25th February 2024 at the addresses show below – Thanks!

BAA LUNAR SECTION CONTACTS:
Director: Dr. Tony Cook (atc @ aber.ac.uk)
Lunar Section Circular Editor: Barry Fitz-Gerald (barry fitzgerald@hotmail.com)
Committee members:
Tony Cook (Coordinator, Lunar Change project) (atc @ aber.ac.uk)
Tim Haymes (Coordinator, Lunar Occultations) (occultations @ stargazer.me.uk)
Robert Gar finkle (Historical) (ragarf @ earthlink.net)
Raffaello Lena (Coordinator, Lunar Domes project) (raffaello.lena59 @ gmail.com)
Nigel Longshaw
Barry Fitz-Gerald (barry fitzgerald@hotmail.comm