

THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.

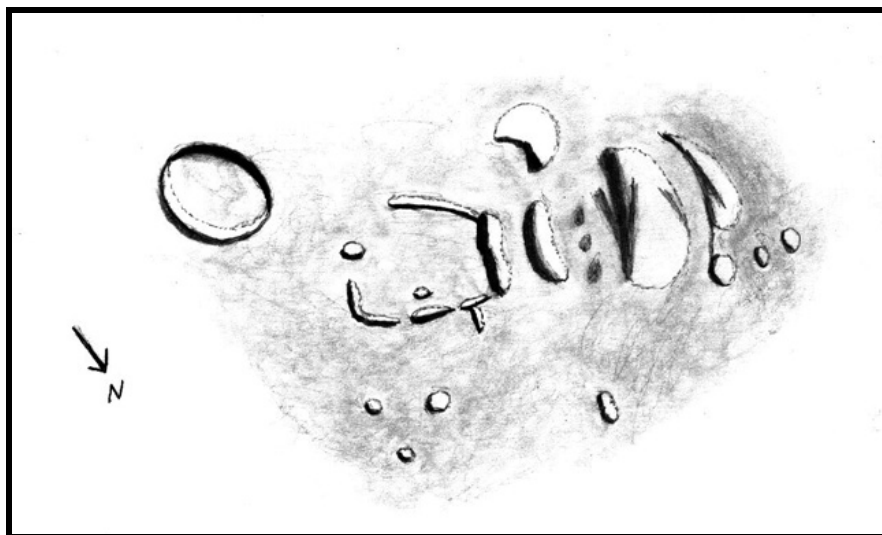
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RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – MARCH 2013

BAILY



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

November 2, 2012 06:32-06:56 UT, 15 cm refl, 170x, seeing 8/10

I sketched this crater and vicinity on the morning of Nov. 2, 2012 while the moon was hiding 106 Tauri. This crater is near the eastern end of Mare Frigoris north of Burg. Baily itself is a broken crater consisting of a variety of elevations. It looks like a box with an open lid. The northwest side of Baily is its highest. It appears as a wide ridge with substantial shadow. The rest of Baily is mainly narrow, nearly straight ridges and an isolated peak. Another isolated peak is inside the northeast rim of Baily near a short protruding ridge. The widest gap in Baily's rim is to the south. The crater Baily A is just to its southeast. Baily A is a crisp, fairly shallow crater with no detail noted on its floor, and seemingly no irregularities. Its symmetry contrasts markedly with the broken Baily. There are three bright peaks northeast of Baily, and another bright peak to the north. The area west and northwest of Baily is a collection of varied elevations at the edge of Mare Frigoris. One is a large mound about the size of Baily A, and another one looks like Pac-Man. The three westernmost peaks on this sketch are quite bright, similar to those northwest of Baily.

LUNAR CALENDAR

MARCH-APRIL 2013 (UT)

Mar. 02	15:00	Moon 3.3 Degrees S of Saturn
Mar. 04	21:54	Last Quarter
Mar. 05	06:42	Extreme South Declination
Mar. 05	23:21	Moon at Perigee (369,953 km – 229,878 miles)
Mar. 06	21:00	Moon 1.3 Degrees NE of Pluto
Mar. 10	13:00	Moon 5.5 Degrees NNW of Neptune
Mar. 10	22:00	Moon 2.2 Degrees N of Mercury
Mar. 11	12:00	Moon 5.9 Degrees NNW of Venus
Mar. 11	19:53	New Moon (Start of Lunation 1116)
Mar. 12	12:00	Moon 4.5 Degrees NNW of Mars
Mar. 13	01:00	Moon 4.0 Degrees NNW of Uranus
Mar. 18	01:00	Moon 1.5 Degrees S of Jupiter
Mar. 18	21:54	Extreme North Declination
Mar. 19	03:14	Moon at Apogee (404,261 km – 251,196 miles)
Mar. 19	17:26	First Quarter
Mar. 27	09:29	Full Moon
Mar. 29	20:00	Moon 3.4 Degrees S of Saturn
Mar. 31	03:56	Moon at Perigee (367,493 km – 228,350 miles)
Apr. 01	12:06	Extreme South Declination
Apr. 03	01:00	Moon 0.99 Degrees NNW of Pluto
Apr. 03	04:38	Last Quarter
Apr. 06	22:00	Moon 5.6 Degrees NNW of Neptune
Apr. 08	04:00	Moon 6.6 Degrees NNW of Mercury
Apr. 09	13:00	Moon 3.9 Degrees NNW of Uranus
Apr. 10	09:38	New Moon (Start of Lunation 1117)
Apr. 10	15:00	Moon 2.7 Degrees N of Mars
Apr. 10	19:00	Moon 3.2 Degrees N of Venus
Apr. 14	20:00	Moon 2.2 Degrees SSE of Jupiter
Apr. 15	05:30	Extreme North Declination
Apr. 15	22:23	Moon at Apogee (404,864 km – 251,571 miles)
Apr. 18	12:31	First Quarter
Apr. 25	19:59	Full Moon (Partial eclipse of Moon)
Apr. 26	00:00	Moon 3.5 Degrees SSW of Saturn
Apr. 27	19:49	Moon at Perigee (362,267 km – 225,102 miles)
Apr. 28	19:06	Extreme South Declination
Apr. 30	05:00	Moon 1.5 Degrees NW of Pluto

AN INVITATION TO JOIN THE A.L.P.O.

The Lunar Observer is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non-members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a nonmember you are invited to join our organization for its many other advantages.

We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

Our quarterly journal, **The Strolling Astronomer**, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Additional information about the A.L.P.O. and its [Journal is on-line at: http://www.alpoastronomy.org/index.htm](http://www.alpoastronomy.org/index.htm) I invite you to spend [a few minutes](#) browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.

To learn more about membership in the A.L.P.O. go to: <http://www.alpo-astronomy.org/main/member.html> which now also provides links so that you can enroll and pay your membership dues online.

When submitting observations to the A.L.P.O. Lunar Section

In addition to information specifically related to the observing program being addressed, the following data should be included (**Bold items are required**):

Name and location of observer

Name of feature

Date and time (UT) of observation

Size and type of telescope used

Magnification (for sketches)

Orientation of image: (North/South - East/West)

Seeing: 1 to 10 (1-Worst 10-Best)

Transparency: 1 to 6

Medium employed (for photos and electronic images)

CALL FOR OBSERVATIONS:

FOCUS ON: Mare Insularum

Focus on is a bi-monthly series of articles, which includes observations received for a specific feature or class of features. The subject for the **May 2013** edition will be **Mare Insularum**. Observations at all phases and of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or the moon for objects to your observing list and send your favorites to:

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

Deadline for inclusion in the Mare Insularum article is April 20, 2013

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for potential contributors the following targets have been selected:

<u>Subject</u>	<u>TLO Issue</u>	<u>Deadline</u>
Domes	July 2013	June 20, 2013

FOCUS ON: Wrinkles and Rilles

By Wayne Bailey

Coordinator: Lunar Topographical Studies

This month's topic covers a range of structures whose common feature is that they are low-relief, narrow, elongated features that, in most cases, are only visible under low angle illumination. These features are found with the names of dorsum, rima or rupes. However, within each of these categories, several different geologic mechanisms are involved.

Wrinkle Ridges or Dorsa are positive relief features, basically long narrow ridges, with fairly gentle slopes. The slope is often steeper on one side than the other. At times the character changes along the ridge, with the steep side seemingly randomly changing from one side to the other along the length of the ridge, which gives a twisted appearance. The slope angle is fairly small, on the order of 10-20 degrees, so they are only obvious at low sun angles, near the terminator. Typical height above the surroundings is around 100 meters.

They are commonly found around the edges of maria, although they also occur on the floors of flooded craters and at the boundaries of lava flows. Similar appearing features, usually referred to as ghost craters, mark the location of buried crater rims.

Figure 1 is an example of dorsa that are concentric with the edge of a mare. The usual explanation for these is that as the mare basin filled, the added weight caused the basin floor, and therefore the mare surface, to sink. The tilting and stretching that results causes the material near the mare edge to crack and/or slide inwards. Cracking produces rilles that will be discussed later. Sliding compresses the rock which bends to form the

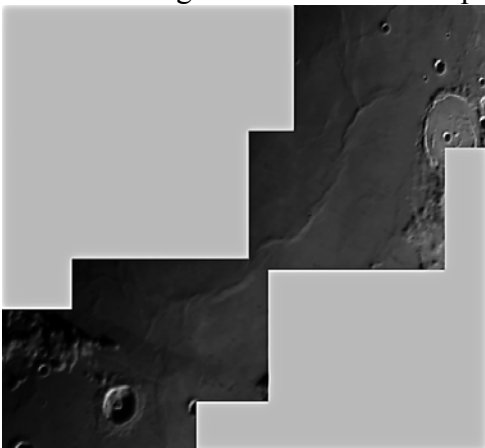
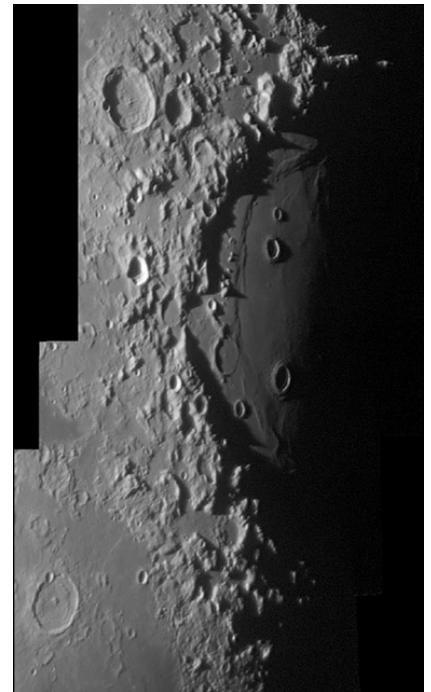
Figure 1. Mare Crisium. Rik Hill, Tucson, AZ USA. Oct. 03, 2012 06:45 UT. Seeing 7/10. TEC 8" Mak-Cass, f/20., 656.3nm filter, DMK21AU04.

ridges. It also is possible that cracking and shifting of the surface material could form fault scarps (instead of rilles) that are covered by later lava flows, forming ridges similar to the formation of ghost craters. Figures 2 & 3 show what is probably the best known example of a wrinkle ridge concentric to the mare rim, the Serpentine Ridge in Mare Serenitatis (Dorsum Smirnov and Dorsum Lister). These ridges run north-south, so are ideally oriented to create shadows, and extend from near Posidonius almost to Plinius. Figure 4 shows an example of ridges that seem to trace a buried

inner ring of the Mare Imbrium basin. Dorsum Grabau arcs from the southwest to just west of Montes Spitzbergen, then an un-named low, broad ridge continues on toward Kirch.F. Just northwest of Kirch F, another un-named ridge continues on, passing just west of Mons Pico β. There also seems to be an un-named ghost crater south of Plato, with Mons Pico on its rim.

Figure 2. Serpentine Ridge. Marnix Praet. Stekene, Belgium. Meade 10" SCT, 2.5x barlow. DMK21AU618.

The north-south ridge that divides the crater Alphonsus is shown in figure 5. This ridge includes the central peak and is accompanied through part of its length by a parallel rille to its west.





It's difficult for me to visualize the source of compressional forces that could form this ridge, since the usual subsistence explanation should produce radially symmetric compression, not bi-lateral symmetry. There are also numerous rilles on the crater floor, but this is the only ridge. It also has an irregular, braided appearance. I wonder if it marks the location of a buried fault, or series of vents, that were a source of the magma that flooded Alphonsus. A different pattern of ridges appears in Grimaldi (figure 6), more reminiscent of the mare marginal ridges.

Figure 3. Dorsum Smirnov. Colin Ebdon, Colchester, Essex, England. July 18, 1999 20:15-21:00 UT. Seeing AIII deteriorating, transparency moderate – good. Colongitude 336.8-337.1°. 10" f/6.5 Newtonian, 183x & 236x.

In the gap between the Caucasus and Apennine mountains, that connects Mare Imbrium and Mare Serenitatis, there's a double arc ridge that looks like the leading edge of a lava flow out of Mare Serenitatis (figure 7).

Close examination of the images presented will also show examples of ridges that deviate from the general descriptions given above. Examples are ridges that are perpendicular, rather than parallel to mare rims, ridges located near the center of mare, and tangled masses of ridges (the group of ridges northwest of Euclides is a good example of the latter).

Figure 4. Archimedes-Plato. Howard Eskildsen, Ocala, FL USA. Nov. 22, 2012 01:51 UT. Seeing 6/10, transparency 5/6. 6" f/8 Refractor, 2x barlow, IR & V-block filters, DMK 41AU02.AS.

Another class of features that sometimes appear similar to dorsa are rupes (scarps or cliffs). They differ from dorsa in that they only slope in one direction; one side is displaced vertically from the other. Rupes Altai (the Altai Scarp) is a well known example of a cliff like structure which forms part of the western outer rim of the Nectaris basin. Rupes are examples of geologic faults. There are several examples of faults with smoother structures however. The best known is Rupes Recta, the straight wall in Mare Nubium between Birt and Thebit (figure 8). Lesser known is Rupes Cauchy in Mare Tranquilitatis (figure 9). These look like straight versions of wrinkle ridges, but on closer examination it will be noted that since they only have one sloping face, they will either appear bright or dark, depending on whether the face is illuminated or shadowed. Dorsa, in comparison will have both light and dark sides, since one side will be shadowed while the other is illuminated.



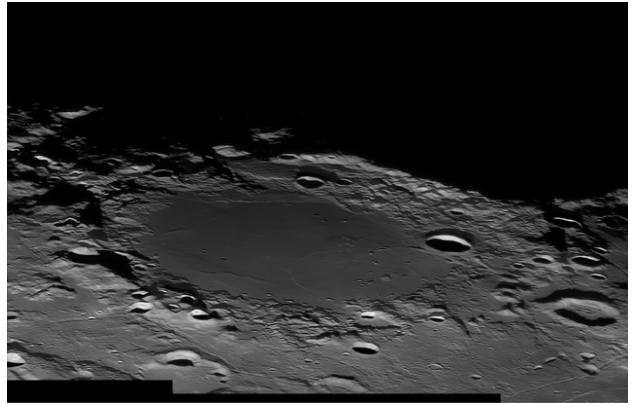
Figure 5. Alphonsus. Howard Eskildsen, Ocala, FL USA. Nov. 22, 2012 01:26 UT. Seeing 6/10, transparency 5/6. 6" f/8 Refractor, 2x barlow, IR & V-block filters, DMK 41AU02.AS.



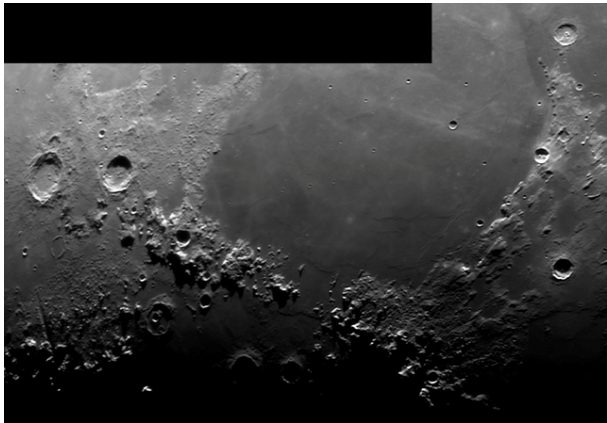
Rilles or Rimae are long, narrow, negative relief features. Like dorsa, there is more than one mechanism of formation involved. Some are nearly straight or smoothly curved. Others are sinuous, meandering back and forth like a terrestrial stream bed. And still others appear have ragged edges or are discontinuous, as though formed by connecting small craters or pits.

Arcuate rilles are found near the boundaries of mare surfaces (figures 10, 11 & 12, also see figures 8 & 9), where they apparently formed as the basalt filling the mare basin caused the basin floor to sink under its weight,

Figure 6. Grimaldi. Damian Peach. Selsey, West Sussex, UK. Dec. 26, 2012 19:26 UT.



bending and stretching the surface near the edge. When the rock breaks under this tension, the edges separate forming a rille. When parallel sets of cracks form, the blocks between them can shift downward, forming a graben, which also appears as a rille.



Rilles are also commonly found on the floors of flat-bottomed, flooded craters (figures 10 & 13). Gassendi and Hevelius are examples of floor-fractured craters. Here the rilles are formed by magma intrusion beneath the flooded crater floor causing the floor to stretch into a shallow dome.

Figure 7. Mare Serenitatis. Alexander Vandenbohede. Brugge, Belgium. Feb. 17, 2013 21:00 UT. 20cm f/15 refractor, Webcam.

Sinuuous rilles are formed by fluid lava flowing downslope and eroding the pre-existing surface, either by mechanical or thermal erosion. The result is similar to stream channels on the Earth, with a significant difference.

Terrestrial stream channels start out small and grow as they collect more water from a larger area, either from direct run-off or merging of tributary streams. Lava channels start out large at their source, but narrow as the lava solidifies. One of the best, and most visible, examples is Schröter's Valley near Aristarchus (figure 14) which starts at the Cobra Head and winds down the Aristarchus Plateau to terminate in Oceanus Procellarum. It was probably a significant source of the lava that filled northern Procellarum. The valley itself is several kilometers wide, but spacecraft have shown a narrow rille running the length of its floor, similar to terrestrial streams that have eroded large valleys.

Figure 8. Rupes Recta. Fykatas Stergios. Vienna, Austria. March 2, 2012 23:12 UT. Seeing 6/10. LX90 8", 2x barlow, Alccd5.



Another form of rille is created when a lava flow is deep and slow enough that the surface cools and solidifies, allowing the fluid lava below to drain away forming lava tubes. When the roof of the tube collapses or is punctured, the resulting channel is also a rille. Rima Hyginus (figures 15, 16 & 17) is a good example of this type of rille. The rille extending north from Hyginus has sections that appear to be a continuous string of overlapping collapse pits, and the southern portion has several sections where the roof appears to be intact. This is a good area to find rilles, with the Rimae Triesnecker, Hyginus & Ariadaeus all within a relatively small area, each showing different characteristics.

The dorsa and rimae are visually two different types of features. But within these classifications, there are examples that are formed by several different processes that result in superficially similar objects. They

are somewhat difficult to observe, since lighting is critical, but they are abundant on the moon, so some can be found whenever you chose to look.



Figure 9. Rupes Cauchy. Howard Eskildsen, Ocala, FL USA. Jan. 17, 2013 00:26 UT. Seeing 6/10, transparency 5/6. 6" f/8 Refractor, 2x barlow, IR & V-block filters, DMK 41AU02.AS.

Figure 10. Gassendi & Mare Humorum. Rik Hill, Tucson, AZ USA. TEC 8" Mak-Cass, f/20,. 656.3nm filter, DMK21AU04. Left: Oct. 27, 2012 04:09 UT. Seeing 7/10. Right: Oct. 26, 2012 03:47 UT. Seeing 8/10. See Observing Notes below for Rik's comments on these images.

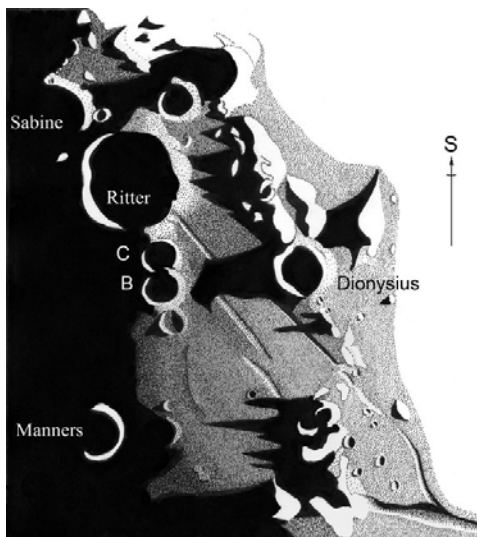
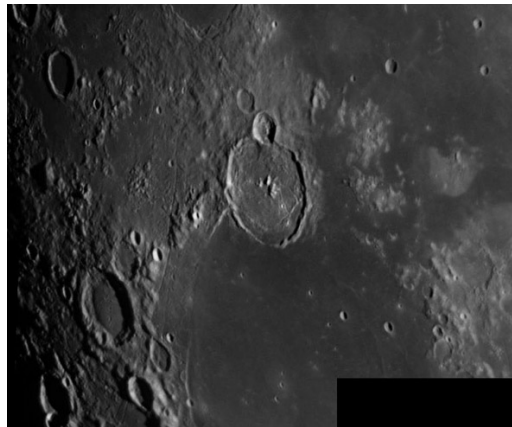


Figure 11. Sabine-Dionysius. Phil Morgan, Lower Harthall-Tenbury Wells, Worcestershire, England. Sept. 10, 2009 02:50-03:30UT. Seeing 6-8/10, transparency 4/5. Colongitude 160.0-160.4°. 305mm Newtonian, 400x.

Figure 12. *Goclenius*. Howard Eskildsen, Ocala, FL USA. Jan. 17, 2013 00:23 UT. Seeing 6/10, transparency 5/6. 6" f/8 Refractor, 2x barlow, IR & V-block filters, DMK 41AU02.AS.

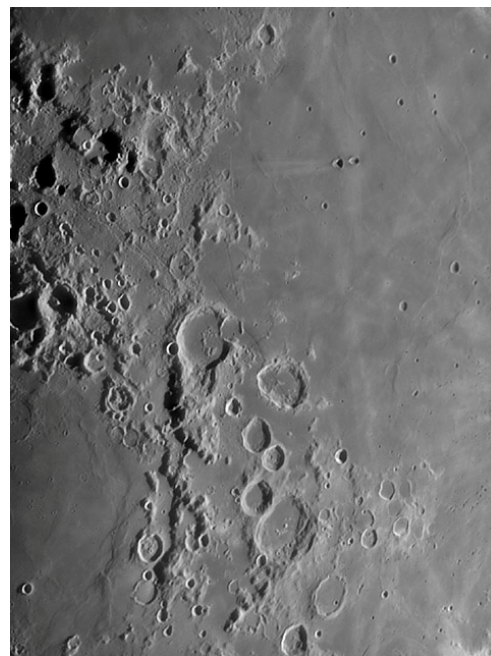


Figure 13. *Hevelius*. . Damian Peach. Selsey, West Sussex, UK. Dec. 26, 2012 19:15 UT.

Figure 14. *Aristarchus*. Maurice Collins-Palmerston North, New Zealand. February 23, 2013 08:57 UT. WO FLT-110, Refractor f/21.





Figure 15. *Rima Hyginus.* Ed Crandall – Lewisville, North Carolina, USA. October 23, 2012 00:03 UT. 110 mm f/6.5 APO, 3x barlow, ToUcam.

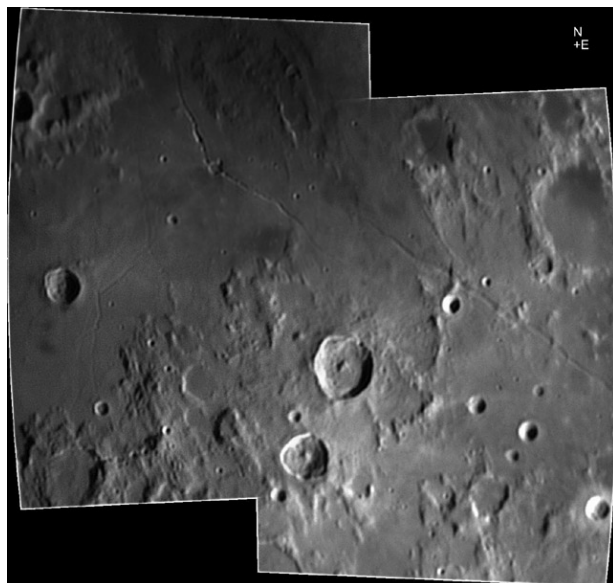


Figure 16. *Rima Hyginus.* Michael Sweetman. Tucson, AZ USA. January 20, 2013 06:44 UT. Seeing 3-4/10 Transparency 3/6. 6" MAK, f/24, 742 nm filter DMK21.

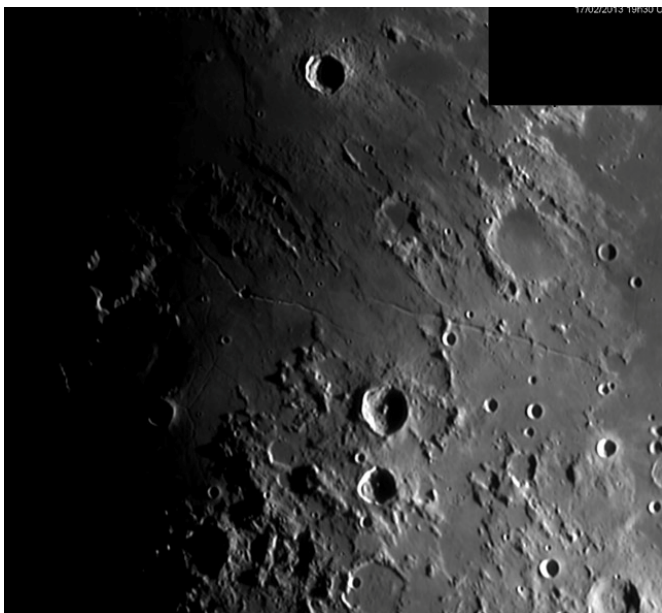


Figure 17. *Rima Hyginus.* Alexander Vandenbohede. Brugge, Belgium. Feb. 17, 2013 19:30 UT. 20cm f/15 refractor, Webcam.

ADDITIONAL READING

- Benton, Julius. 2002. A Manual for Observing the Moon: The ALPO Selected Areas Program. Association of Lunar & Planetary Observers. Downloadable version at <http://moon.scopesandscapes.com/sap-hdbk-5.pdf>.
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- The-Moon Wiki. <http://the-moon.wikispaces.com/Introduction>

ADDITIONAL OBSERVATIONS



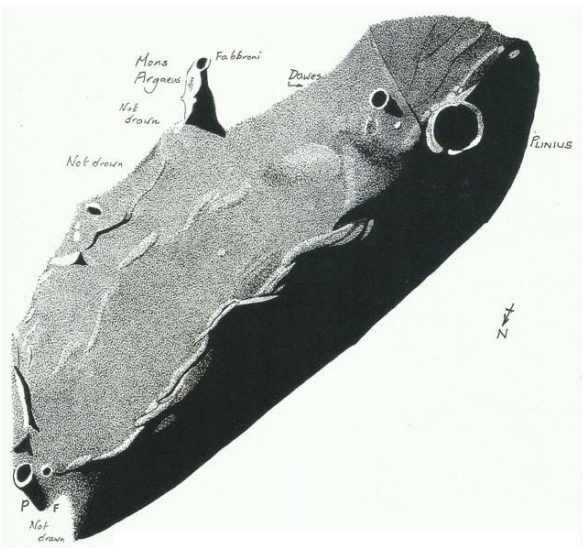
MARE NECTARIS & SINUS ASPERITATIS – Jay
Albert, Lake Worth, FL USA. November 3, 2012 06:45
UT. C-11 SCT, Nextimage 5.

This image shows wrinkle ridges in the Mare Nectaris and Sinus Asperitatis area with Theophilus the most prominent crater in the field. The Rimae Hypatia is dimly visible in the north near the crater Moltke and there appears to be a rille in Cyrillus and a very small rille in Theophilus just south of the central peaks.

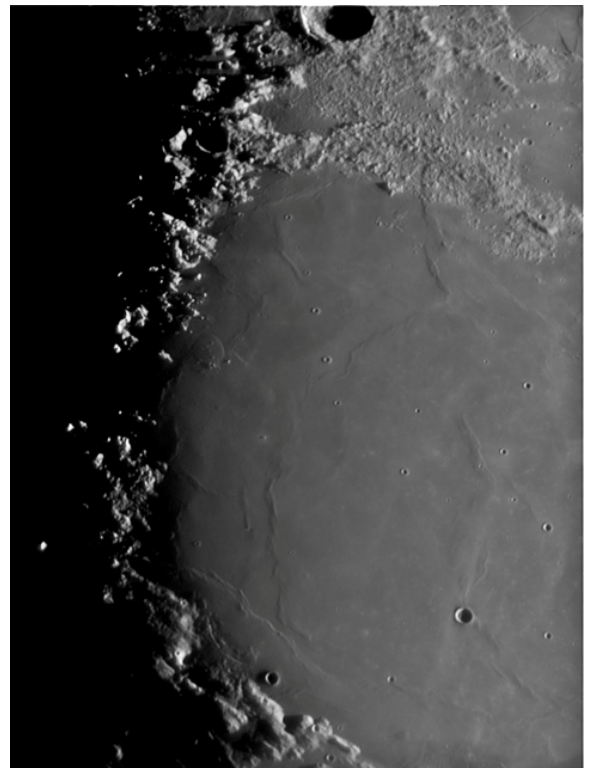
CASSINI-- Ed Crandall – Lewisville, North
Carolina USA. October 23, 2012 00:07 UT. 110
mm, f/6.5 APO, 3x barlow, Toucam.



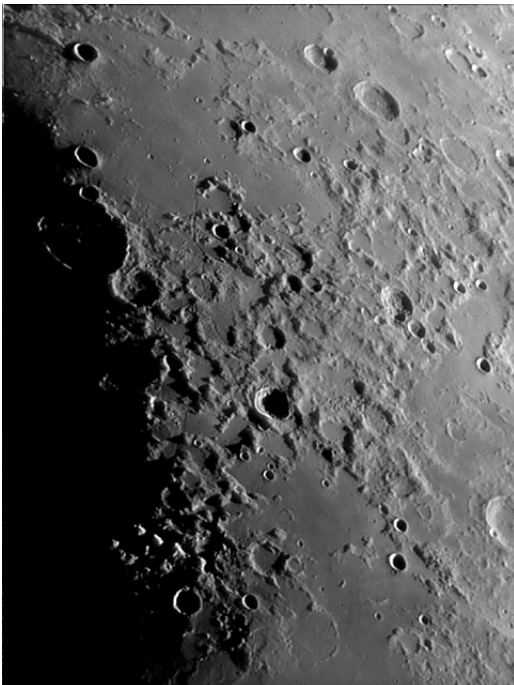
ADDITIONAL OBSERVATIONS



DORSUM SMIRNOV. Colin Ebdon, Colchester, Essex, England. May 20, 1999 21:20-22:05 UT. Seeing AII Deteriorating AIII, transparency good. Colongitude 336.3-336.5°. 10" f/6.5 Newtonian, 183x.



MARE SERENITATIS- Howard Eskildsen-Ocala, Florida, USA. October 22, 2012 UT 00:19 UT. Seeing 6/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR & V block filters.

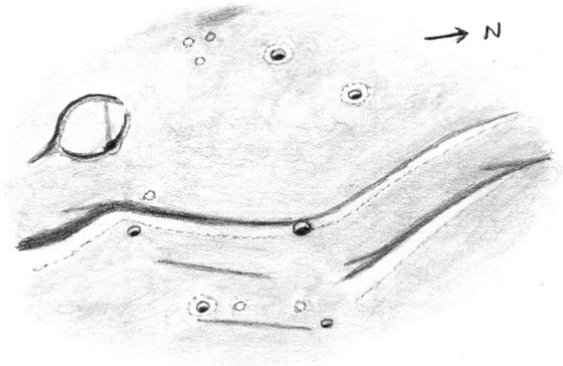


ROMER- Howard Eskildsen-Ocala, Florida, USA. January 17, 2013 UT 00:28 UT. Seeing 6/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR & V block filters.

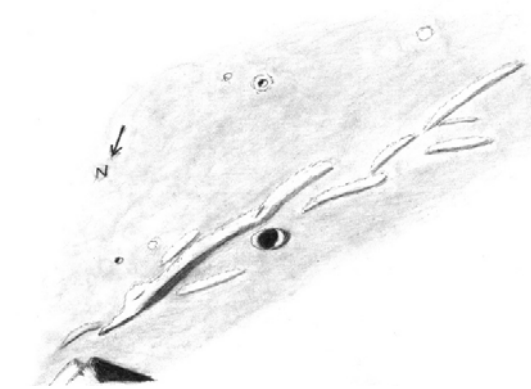
ADDITIONAL OBSERVATIONS

PUISEUX & WRINKLE RIDGES- Robert Hays, Jr-
Worth, IL USA . February 6, 2009 02:15-02:49 UT, 15
cm refl, 170x, seeing 7/10.

Puiseux is the largest crater in this sketch. This is a shallow crater with a high point on its east rim and a small break in its north rim. Its floor appears smooth, but there is a dusky streak extending northwestward from the high point. This streak is not dark, sharp shadow, so I can't think of what it might be, (I do know that it stayed in place regardless of how! looked at it.) A darker streak, looking more like shadowing, extends southward from Puiseux. The longest features are wrinkle ridges, part of a series of them in this mare and in others. The most prominent one begins east of Puiseux, angles to the northeast near Puiseux H and bends back to the northwest and north at Puiseux D. This wrinkle is quite substantial with rather dark shadowing south of Puiseux D, but is much lower with less shading north of D. Another wrinkle ridge starts east of Puiseux D and extends northward, roughly parallel with the low portion of the longer ridge. This second ridge appears quite wide at its southern end, but becomes narrower to the north. Its shading is also darker to the north where there is a short wrinkle branching off. The southern ends of both of these wrinkles also have short branches. There are two strips of shadowing east of Puiseux Hand D which may be more wrinkles. These strips appear straighter than the other wrinkle shadows, but they are not as crisp as those from rilles. There are several small craters scattered in this area besides Puiseux Hand D. Pro Kelvin F is near the southern end of a strip of shadow, and a tiny pit not' on the LQ map is near this shadow's north end. Two tiny bright dots are nearby. Puiseux C and B are northwest and west of Puiseux D, and Puiseux A may be one of three tiny bright dots north of Puiseux. A vague bit of shading is near this trio. There are haloes around Puiseux Band C as well as Pro Kelvin F, but not Puiseux D or H. The bright dots may be mini-pits whose shadows were too small for me to see, but had haloes evident.



WRINKLE RIDGES NEAR PROM. LAPLACE - Robert
Hays, Jr-Worth, IL USA . January 22, 2013 02:46-03:04; 03:12-
03:26 UT, 15 cm refl, 170x, seeing 8-6/10.



Laplace A is at the entrance of Sinus Iridum southwest of Pro Laplace. This is the prominent double peak at the far lower left on the sketch. The area was fairly near the terminator at the time, and Laplace A had substantial interior and exterior shadow. A collection of wrinkles are nearby, some of which are shown here. The longest wrinkle drawn extends from southwest of Laplace A, then just south of that crater, and has a fairly sharp point just south of Pro Laplace. This wrinkle has slight bends and curves, and relatively dark shadowing, especially at the point. A small pit, not on the Lunar Quadrant map, is near the pointed tip and a tiny bright spot is nearby. Very low wrinkles are near this spot and northeast of Laplace A, and a short, vague, tapering wrinkle is east of the aforementioned point. Additional wrinkles were noted and drawn southwest of Laplace A. One is just southwest of that crater. Two straight wrinkles farther southwest would have been one long one except for the gap between them. Two short wrinkles are west of this pair. I realized later that I may have seen two overlapping sets of parallel wrinkles angled about 30° apart. The prominent wrinkle is approximately parallel to the would-be long, straight one farther southwest (except for the gap). The wrinkles just northeast and southwest of Laplace A appear to be parallel to the pair west of the long, broken wrinkle. The terrain south of Laplace A appears very smooth with only a few features. The pit Helicon G is in this area, and is surrounded by a halo. A tiny, bright spot is just to its east. Helicon C is the larger bright spot farther southwest, not too far from the broken straight wrinkle. I could not detect any shadowing in or next to it, and the Lunar Quadrant map simply indicates it as a 'spot.' There are more wrinkles farther northwest and west which I started to draw, but the air was becoming less steady. It was also rather cold (6° F, -140 C). What I drew is basically an introduction to that area.

ADDITIONAL OBSERVATIONS



ARCHIMEDES– Richard Hill – Tucson, Arizona, USA
February 20, 2013 01:21 UT. Seeing 8/10. TEC 8" Mak-Cass, f/20,. 656.3nm filter, DMK21AU04

The attached image shows the Archimedes region of the moon dominated in this case by the four large craters: Archimedes, Aristillus, Autolycus and Cassini. Each crater is very different from the others in ages and morphology and the comparisons could fill many pages!

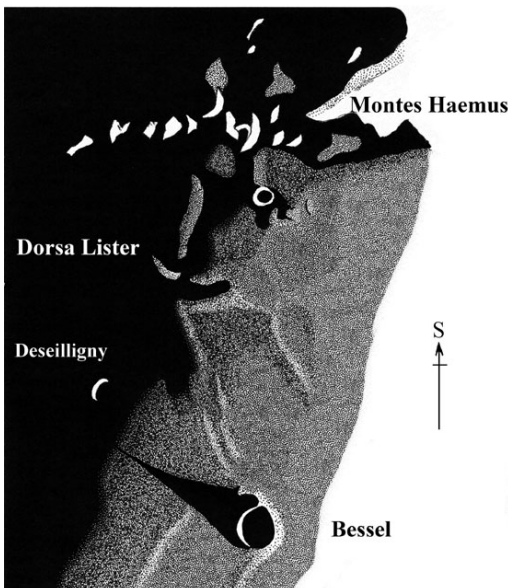
There are several other features that fascinate me and have for over four decades. At the top of this image you can see Mons Piton. I've always enjoyed this rampart ever since I first saw it in my small 2.4" refractor using Patrick Moore's book, The Moon, back in the early 1960s. It stands like a sentinel on the edges of Mare Imbrium looking like it is about as abrupt a rise as the Washington Monument or the

Tower of Pisa! I also like the isolated Montes Spitzbergen like little islands in Imbrium. They seem to sparkle when the tips catch the first rays of the rising sun.

At the bottom Rimae Archimedes can be seen and some of the Rimae Hadley as well. Adjacent to the northern wall of Aristillus is a ghost crater that apparently has no name. I was a bit surprised by this since it is fairly obvious. Just to the left of Aristillus here, about 1/3 of the way towards Archimedes, is the place where the Soviet Luna 2 impacted the lunar surface.

MARE FECUNDITATIS– Richard Hill – Tucson, Arizona, USA October 3, 2012 06:55 UT. Seeing 7/10. TEC 8" Mak-Cass, f/20,. 656.3nm filter, DMK21AU04

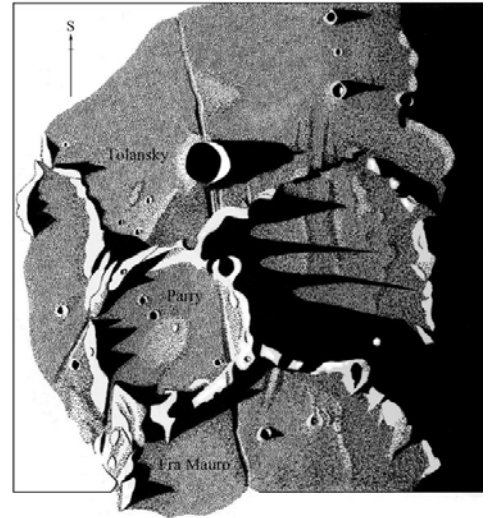
It shows Mare Fecunditatis as the sun sets on the eastern end. We see Bilharz already in deep shadow with only a trace of its western wall visible. This lighting is perfect for showing the domain of the dorsa. Nicely shown are Dorsa Mawson, Dorsa Geikie, Dorsa Andrusov (mostly in shadow), Dorsa Cato, and Dorsum Cayeux looking like great waves on this lunar sea. Left of center is the familiar Messier and Messier A, the lunar comets, with tails sweeping towards Leakey. Just south of Leakey the Gutenberg Rimae are well shown as are the rimae in and near Goclenius. Images like these were only a dream 20 years ago with amateur telescopes but today's high speed digital cameras make it possible.



DORSUM LISTER-BESSEL- Phil Morgan, Lower Harthall-Tenbury Wells, Worcestershire, England. October 6, 2012 05:15-05:45UT. Seeing 6/10, transparency 3/5. Colongitude 159.6-159.9°. 305mm Newtonian, 400x.

ADDITIONAL OBSERVATIONS

BOMPLAND- Phil Morgan, Lower Harthall-Tenbury Wells, Worcestershire, England. March 13, 2011 20:30-21:10UT. Seeing 8-9/10, transparency 5/5. Colongitude 18.5-18.9°. 305mm Newtonian, 400x.



PLATO- Marnix Praet. Stekene, Belgium. January 22, 2013. Seeing excellent. Meade 10" SCT, 2.5x barlow, Red interference filter. DMK21AU618.

OBSERVING NOTES ON FIGURE 10

Right: The faulted floor of Gassendi is always a treat but I particularly like the detail in the walls of the crater as they catch the first rays of the rising sun. The shadow of the central peak almost touches the far wall but down in Doppelmayer the shadow of it's central peak goes completely over the wall of this ruined old crater. There are beautiful dorsa running from Doppelmayer to Gassendi.

Just north of Gassendi you can just make out Rima Herigonius. Notice the shadow in Herigonius itself, it is not smoothly curved but quite ragged either due to the surface it falls on or the wall of the crater. A quick look at LROC data shows this crater to have a very smooth wall on the sunward side but a highly irregular floor and far wall.

Left: Here is the same region I sent out a little while ago, a night later. The quality of the night was a little less but still there are a lot of interesting things going on here.

Besides Gassendi and it's retinue of rimae there's the long Rimae Mersenius that run from De Gasparis (just off the lower edge of this image) almost to Letronne over 320 km as measured on LROC! Note the strong bulge to the floor of Mersenius itself.

In the previous mailing I mentioned the shadow in the crater Herigonius. The next night we can see irregularities in the floor in these images that were shown so well in the LROC images. Because of the higher sun and slightly poorer seeing the rima itself is not seen here. I do like the "islands" of mountains to the south of Herigonius surrounded in lighter mare material.

LUNAR TOPOGRAPHICAL STUDIES

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

OBSERVATIONS RECEIVED

JAY ALBERT – LAKE WORTH, FLORIDA, USA. Digital images of Mare Nectaris-Sinus Asperitatis wrinkle ridges.

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND. Digital images of 9, 10 12 & 13 day Moon, Aristarchus(2), Bullialdus, Copernicus, Mare Humorum, Pythagoras, Mons Rumker & Schickard.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA. Digital images of Agrippa-Godin-Dionysius, Grimaldi, Halley-Kant-Theon, Hevelius, Plato-Montes & Pytheas.

ROBERT HAYS - WORTH, ILLINOIS, USA. Drawings of Puiseus & Prom. LaPlace wrinkle ridges.

RICHARD HILL – TUCSON, ARIZONA, USA Digital images of Anaxagorus, Archimedes, Bullialdus, Clavius, Copernicus & Philolaus.

DAMIAN PEACH-SELSEY, WEST SUSSEX, UNITED KINGDOM. Digital images of Grimaldi & Hevelius.

FYKATAS STERGIOS-VIENNA, AUSTRIA. Digital image of Rupes Recta.

MICHAEL SWEETMAN – TUCSON, ARIZONA USA. Digital image of Rima Hyginus.

ALEXANDER VANDENBOHEDE-ASSEBROEK, BELGIUM. Digital images of Alexander-Eudoxus-Aristoteles, Mare Humboltianum, Triesnecker-Hyginus-Aridaeus rilles, Albatagnius-Theophilus, Messier-Taruntius rays, Delambre-Maskelyne, Posidonius, Proclus rays & western Mare Serenitatis.

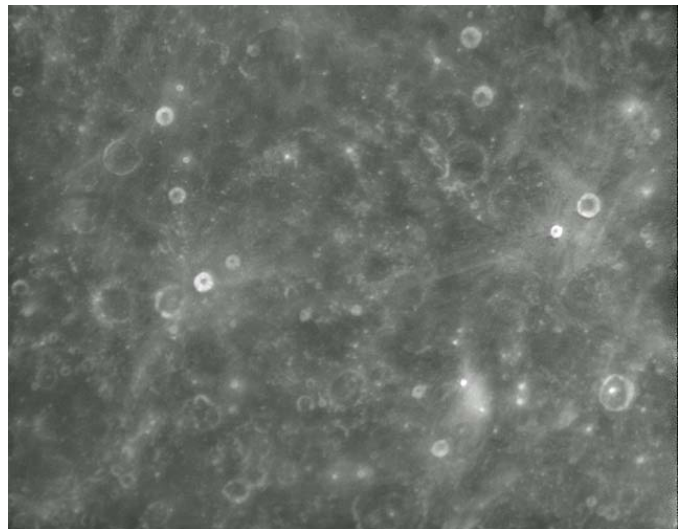
RECENT TOPOGRAPHICAL OBSERVATIONS



MONS RUMKER - Maurice Collins-Palmerston North, New Zealand. February 23, 2013 08:53 UT. WO FLT-110, Refr, f/21(3x barlow), LPI.

HALLEY-KANT-THEON- Howard Eskildsen-Ocala, Florida, USA. January 26, 2013 UT 02:06 UT. Seeing 4/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

On the left side of the image three small, bright craters aligned almost vertically stand out as beacons on the southern highlands of the full moon. They graze the east side of Hipparchus and are from bottom to top: Hipparchus C, Hipparchus G, and Pickering (formerly E.C. Pickering). Another Pickering, poor old W.H. Pickering, previously resided just west of Messier (now Messier A), but was later moved in with his older brother Edward Charles Pickering where they now both share the crater now named just plain old Pickering. To the lower left of Hipparchus C lies the shadowy figure of Hind, and immediately to the left of Hind the larger, "shadowy-er" form of Halley, of cometary fame.



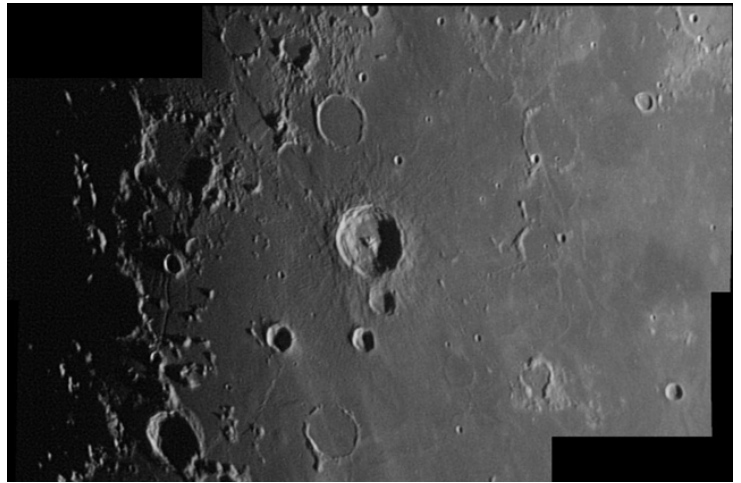
On the lower right of the image Kant and Descartes remain philosophical regarding the pitiful plight of the Pickerings. Kant is the distinct ring near the lower right margin with the bright craterlet "eye" gazing towards the blurry bright patch with two bright eyes about 4 crater diameters to the left of Kant. The shadowy apparition is on the northern margin of Descartes and is associated with a strong magnetic field.

Near the top of the photo, directly above the Descartes apparition are the Theon Junior and Theon Senior crater pair. Senior is above junior, of course, and they were named for Greek mathematicians that were born in the 1st and 4th centuries respectively. Finally, between the Greeks and the German philosopher Kant, the otherwise forgettable Alfraganus with its smaller sibling Alfraganus C appear bright in the overhead sunlight.

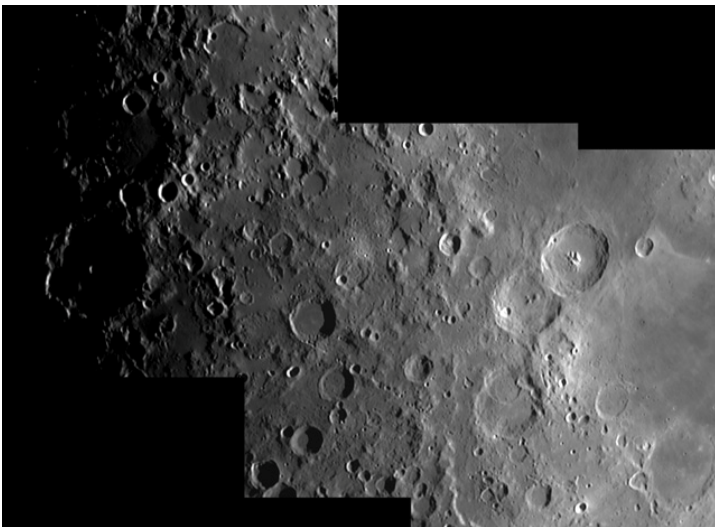
RECENT TOPOGRAPHICAL OBSERVATIONS

BULLIALDUS– Richard Hill – Tucson, Arizona, USA January 21, 2013 23:55 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

What we have is Bullialdus sitting in the middle of a graveyard. Every morphology of ancient crater exists in this image. From Kies below Bullialdus to Lubiniezky above, Gould and Opelt off to the right and Wolf below them, we see all different stages of degradation. There's even one that was filled with mare material, Wolf T, sitting between Bullialdus and Wolf like a small Wargentini. Between Gould and Opelt there appears to be the fragmentary portions of yet another crater wall now all but buried.



There are some other features I like too. To the left of Bullialdus the Rimae Hippalus can be seen catching the first rays of the sun and if you are sharp eyed you can see Rima Agatharchides. just above them..



ALBATAGNIUS-THEOPHILUS – Alexander Vandenbohede, Assebroek, Belgium. February 17, 2013 19:40 UT 20 cm f/15 refractor, webcam.

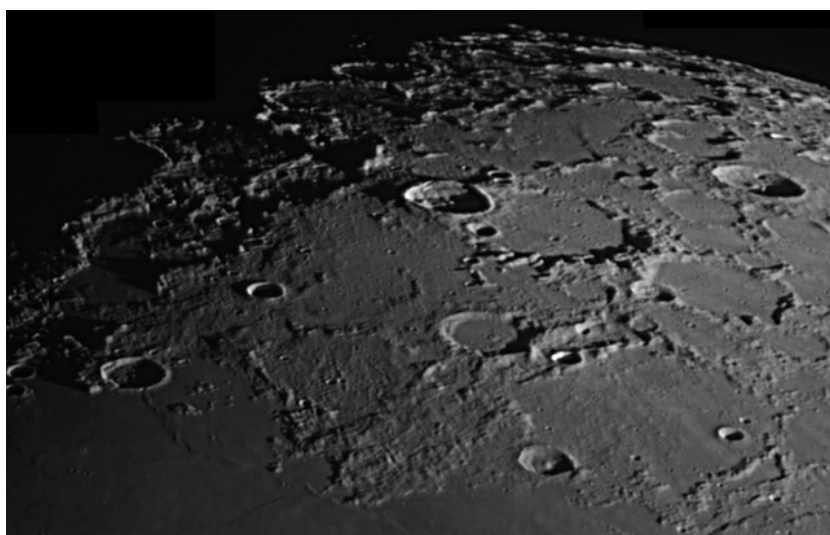
Region between Albatagnius and Hipparchus and the great trio at the shores of Mare Nectaris. Hipparchus is by the way the crater where man first set foot on the moon, albeit a famous Belgian comic book character...

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



12 day MOON - Maurice Collins-Palmerston North, New Zealand. February 22, 2013 08:18-08:24 UT. WO FLT-110, Refr, LPI.

HEVELIUS- Howard Eskildsen-Ocala, Florida, USA. January 26, 2013 UT 02:01 UT. Seeing 4/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



ANAXAGORAS– Richard Hill – Tucson, Arizona, USA February 20, 2013 01:16 UT. Seeing 8/10. TEC 8" f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

Here we have an image of the northern regions of the moon on Feb.20 UT. The lower half of this image is dominated by W Bond, Barrow, Goldschmidt and Anaxagoras. A twin to Anaxagoras, Scoresby, can be seen on the right edge of the frame. But these things are not the reason this

image was taken. This was a favorable libration for observing this limb. Clearly seen are Byrd and Peary but even beyond them is the shadow filled unpronounceable Rozhdestvenskiy. This may be my first image of this crater ever.

ADDITIONAL TOPOGRAPHICAL OBSERVATIONS

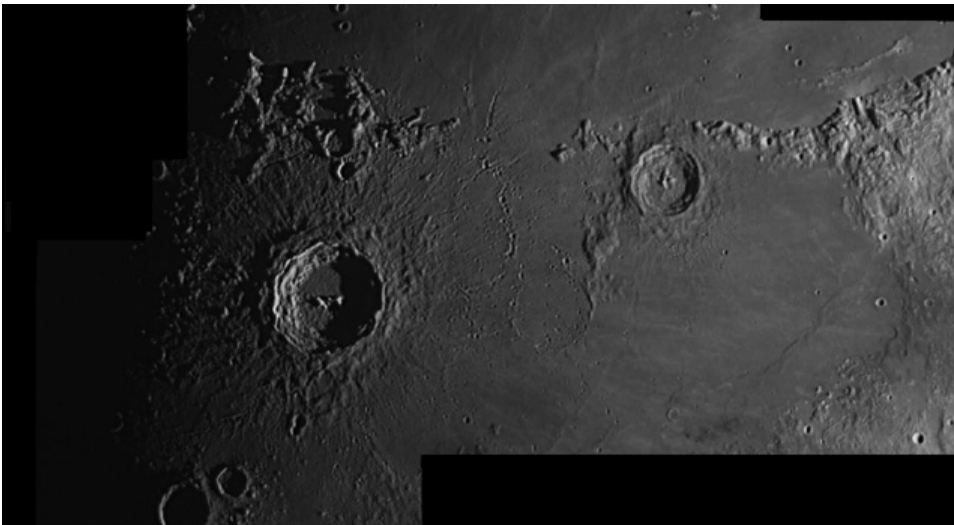
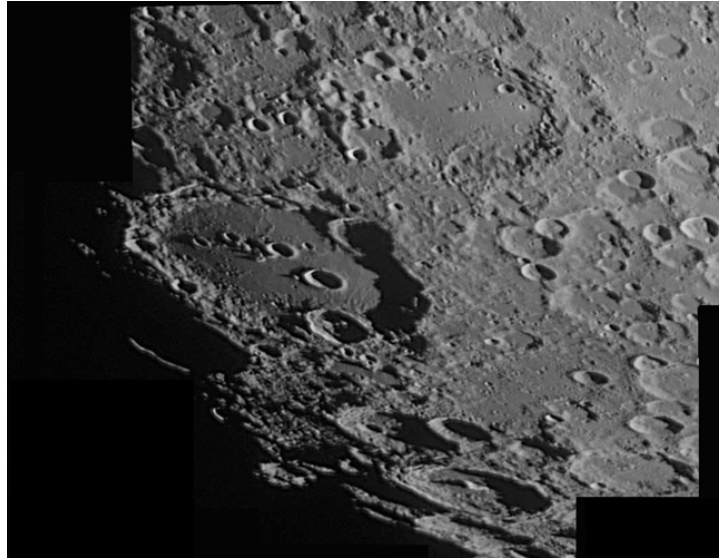
CLAVIUS– Richard Hill – Tucson, Arizona, USA
February 20, 2013 01:12 UT. Seeing 8/10. TEC 8”
f/20 MAK-CASS.. DMK21AU04. 656.3 nm filter.

On Tuesday night the moon was showing off some of its best features. I could not resist yet another set of images of these heavily imaged areas, Copernicus and Clavius.

Both were right on the terminator and the seeing was pretty good. I think the ol' 8" TEC did a pretty good job of it. In Clavius the radial ejecta around Rutherford is plainly visible as are the nice shadows from the interior craters. Just the top edge of the wall of Blaucanus can be seen to the left of Clavius as it comes into the sunlight. I want to call your attention to the linear feature on the north edge of Moretus that runs to Curtius B and at that point at almost a right angle another linear feature runs north to Zach C. The former one, which I've discussed before is an illusion created by crater walls and the lighting.

The latter linear feature appears on the LROC Quick Map as a very shallow trench made more visible by the lighting.

In the dramatic Copernicus image I think I caught my best image yet of the secondary craters running north of Stadius. Just south of Copernicus is the pair Fauth and Fauth A. Everytime I see these two my mind is drawn back to 1966 when all the newspapers showed the iconic Lunar Orbiter 2 image of Copernicus and there in the foreground were those two craters, mere pits in my RV-6 reflector and now revealed in stunning detail.



COPERNICUS– Richard Hill –
Tucson, Arizona, USA
February 20, 2013 01:30 UT.
Seeing 8/10. TEC 8” f/20 MAK-
CASS.. DMK21AU04. 656.3
nm filter.

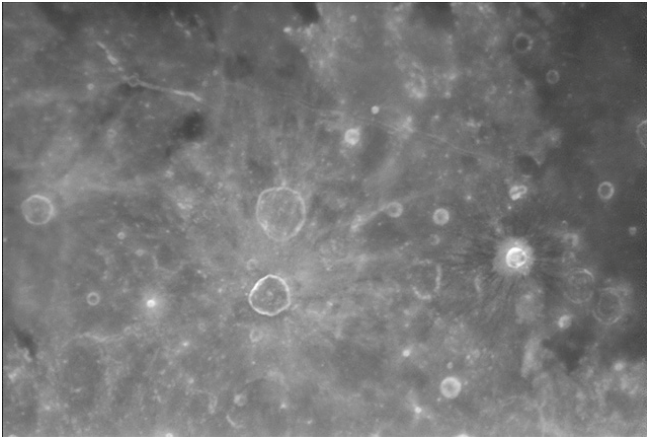
BRIGHT LUNAR RAYS PROJECT

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Bright Lunar Rays Website: <http://moon.scopesandscapes.com/alpo-rays.html>

RECENT RAY OBSERVATIONS



AGRIPPA-GODIN-DIONYSIUS- Howard Eskildsen- Ocala, Florida, USA. January 26, 2013 UT 02:06 UT. Seeing 4/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.

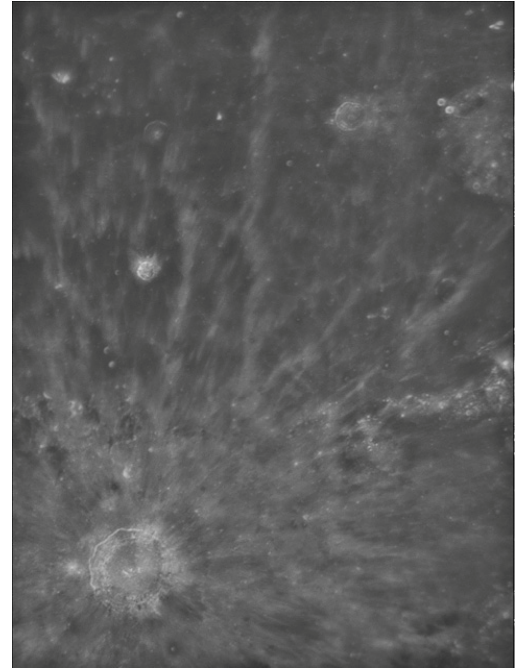
Near the central portion of this image the pair of Agrippa (upper crater) and Godin (lower crater) show irregular outlines of their rims with Godin's rim being the brightest. That plus its visible rays streaking across the dimmer Agrippa show that Godin is the younger of the two. The rays, of course, are the subtle, white wispy streaks that radiate outward from the crater center. On the right margin of the photo, forming an acute triangle with the pair, dark rays radiate outward from the smaller, brighter crater Dionysius. Note that the interior walls of that crater have both bright and dark areas suggesting that the impact which excavated the crater occurred at the boundary of mare basalts (dark) and highland anorthosite (bright). I wonder if that partly explains the existence of the dark rays.

Just above Dionysius, a couple of the distal filaments of the dark rays cross the small, bright crater pair, Ariadaeus and Ariadaeus A (right-most crater). Note the dark band crossing both of them that is nearly perpendicular to the dark rays. Just above the crater pair lays the eastern end of the faint Ariadaeus rille that angles upward and to the left almost to the left third of the photo. Slightly farther still to the left, the outlines of the Hyginus crater and rille extend in the general direction of the Ariadaeus rille.

On the left mid portion of the photo, Triesnecker lays directly opposite the pair of Agrippa and Godin from Dionysius. It also has associated rilles to its right, but unlike the Ariadaeus rilles and Hyginus rilles, they are not visible at this sun angle. Finally, the bright lower crater on the right side of the image is Theon Senior, and yes, this is the top half of the other image processed today. Each half had to be processed differently since the top area was considerably darker than the lower area, and I did not want to burn out the details of the brighter areas.

RECENT RAY OBSERVATIONS

PYTHEAS & COPERNICUS RAYS- Howard Eskildsen-Ocala, Florida, USA. January 26, 2013 UT 02:14 UT. Seeing 4/10, Transparency 5/6. 6" f/8 refractor, Explore Scientific lens, 2x barlow, DMK 41AU02.AS, IR block & V block filters.



MESSIER-TARUNTIUS RAYS – Alexander Vandenbohede, Assebroek, Belgium. February 17, 2013 19:45 UT 20 cm f/15 refractor, webcam.

PROCLUS RAYS – Alexander Vandenbohede, Assebroek, Belgium. February 17, 2013 20:55 UT 20 cm f/15 refractor, webcam.



LUNAR TRANSIENT PHENOMENA

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

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

LTP NEWSLETTER – MARCH 2013

Dr. Anthony Cook - Coordinator

The weather has again not been kind to us in January. Nevertheless observations were received from the following observers: Jay Albert (Lake Worth, FL, USA - ALPO) observed: Agrippa, Aristarchus, Copernicus, Earthshine, Mons Pico, and Posidonius. Raffaello Braga (Italy) observed: Agrippa, Aristarchus, Bessel, Gassendi, Picard, Plato, and Theophilus. Maurice Collins (New Zealand - RASNZ) observed: Aristarchus, Alphonsus, Mare Nectaris, Montes Appeninus, Theophilus, and imaged several other features. I observed Briggs (Newtown, UK). Marie Cook (Mundesley, UK - BAA) observed: Aristarchus and Schickard. Tony Deyes (Torrey Astronomical Society) sketched Gassendi. Rik Hill (Tucson, AZ – ALPO) imaged: Bullialdus, Clavius, Copernicus, Gemma Frisius, the Jupiter-Moon conjunction, Philolaus, Walther, and several other features.

News: Although nothing of interest LTP-wise has made it into the news recently, there has been some correspondence, as well as other information that might be of interest to you:

- An interesting theory on LTP was published in a past edition of the Royal Astronomical Society's Observatory (April 2012, Vol . 132, No. 2, p71-75). The paper purports to explain Herschel's sighting of lunar volcanoes on the night side of the Moon. In this paper, by Smith and Smith, they suggest that electrostatic levitation of dust particles formed two layers: 1) a mid altitude layer of 0.1 to 0.02 micron sized particles that invoked forward directional Mie scattering of star light from Capella (not too far away from the Moon in angular distance), 2) a layer of higher altitude, < 0.02 micron sized particles, which effectively formed a dusty screen (via isotropic Rayleigh scattering) onto which a diffuse image of Capella would be projected– this image would just happen to lie on the near side Earthlit part of the Moon at the position that Herschel saw one of his "volcanoes". The authors suggest that this should not normally happen, but infer from aurora reports at the time that the lunar surface was highly charged due to solar activity, and so this might explain some of the colored glows seen in Earthshine. The theory seems to be an overly complex way to produce the desired observational effect, and I am sure that someone will point out one or more pitfalls in the coming months.
- Once again, I would like to thank Alexandre Amorim, from Brazil for correcting some of the observer names mentioned in the NASA catalog by Cameron. These will be updated in due course. Although the NASA catalog is known to have many mistakes in it, it is the most comprehensive LTP catalog available, and a good basis on which to start improving information about the LTPs contained within it. The repeat illumination project is one part of this process, and re-investigating all archive material is the other avenue open to us.
- John Westfall checked out a video of his that is mentioned in the 2006 Extended LTP catalog by Cameron, where it was reported that John obtained a video of a LTP on the NW rim of Mare Crisium. Upon digging out the original video from his archive, John confirms that this was in fact not a LTP, but as he and I suspected, was just the usual bright spot from a ray crater on the slopes of the NW rim of Mare Crisium at 54.5E, 22.7N. So that problem has been solved and the LTP report has been removed from the ALPO/BAA catalog!
- In an email from Rik Hill, I was interested to read that about 4-5 years ago he was one of several local amateur astronomers helping out Dr. Roger Angel of the Optical Sciences Center at the University of

Arizona, Tucson, trying to image electrostatically levitated dust near the lunar terminator above the near lunar surface. I would be very interested to hear the outcome of this research if anybody knows of any details for example the number of total hours put into observing.

LTP Reports: On 2013 Jan 22; whilst on vacation from the UK, Tony Deyes (vacation location: Minusio, Switzerland, equipped with a 2.5" refractor, x175, viewing conditions excellent), when making a sketch (see Fig 1) of Gassendi (22:00-23:15UT), noticed at around 23:00 UT a white streak (possibly >10% brightness of the central peaks) on the floor of Gassendi extending from the central peak to the NE (NNE?). The location covered a small line of mounds. The observer felt that they would have noticed this effect earlier, had it been present before. The solar altitude was 2.3° at the centre of the crater and the selenographic colongitude was 42.8° . The [Hatfield Lunar Atlas](#) was checked, but the closest colongitude was at 43.0° and does not show this effect. Tony Deyes wondered if it was similar to a Sartory sighting of a red-orange wedge-shaped streak seen on 1966 May 30? However no color was seen this time (2013) and it was more of a streak than a wedge. Another color Gassendi LTP was seen under similar illumination on 1967 Jan 27/28 by Moore and others but was in several locations on the crater floor. Also on 1977 Jul 26 I saw both the central peak, and the NW floor of the crater to have some red on them – again under similar illumination. Although something has been seen here by Tony Deyes, in view of the small telescope used and lack of color, I will assign this LTP a weight of 1 for now as it might be a resolution issue. Anyway, please check this area again under similar illumination conditions in order to see if this streak effect is normal, and if not then we will increase the weight.



Figure 1. A sketch of Gassendi by Tony Deyes (Torbay Astronomical Society) from 2013 Jan 22 UT 22:00-23:15.

Routine Reports: Here is a selection of reports received during January that can help to re-assess some past LTP observations:

Briggs: On 2013 Jan 24 UT 0T23:01-23:10 I (ALPO/BAA) I attempted to observe the area to the east of Briggs crater under the same illumination conditions to a LTP report by Peter Grego from 2010 (see original description below) where he saw an E-W trending wrinkle ridge. Alas, although using a 20cm reflector, seeing conditions were so appalling, that I failed to see any of the necessary fine detail that Peter saw. Hopefully on the next apparition of similar illumination conditions, someone else, somewhere in the world, will have better atmospheric conditions to examine the area under!

On 2010 Apr 27 at UT 00:10-00:30 and 01:45-02:00 P. Grego (St Dennis, UK, 20 and 30cm reflectors) noticed a craterlet just to the east of Briggs and an E-W trending lineament or wrinkle ridge that did not show on NASA LAC charts. Further checks did not reveal it on Lunar Orbiter mosaics, or on very recent LROC images of the area. Possibly these are very low relief features that show only under very shallow illumination conditions. The ALPO/BAA weight=1 until we get confirmation at repeat illumination.

Kepler: On 2012 Jan 21 UT 01:20 Rik Hill (Tucson, AZ – ALPO) obtained an image mosaic of Copernicus, that just happened to encompass the Kepler area. This was under similar illumination to a LTP report from Morales from 1884 (see description below). Interestingly Kepler was not visible in the image mosaic from Rik as it was on the night side of the terminator, so the assumed UT given in the NASA catalog description below, might be wrong, or perhaps the Earthshine was especially strong that night making Kepler just visible – though this begs the question why the observer did not see Aristarchus too?. Anyway, for now the original LTP report will remain at a weight of 1 until we can find out further information about the original LTP report.

Kepler observed by Morales of France? on 1884-2-5 UT 20:00? - observed "an illumination" in Kepler. The Cameron 1978 catalog ID is 241 and the weight=1. The ALPO/BAA weight=1.

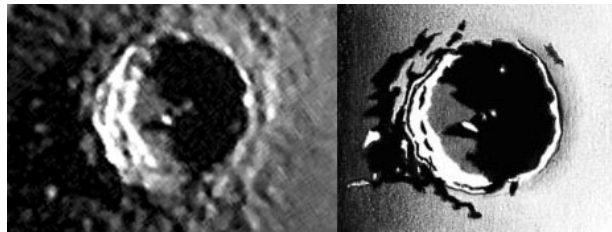


Figure 2: Comparison of two observations of Copernicus crater with north at the top, **(Left)** Image by Maurice Collins from 2013. **(Right)** sketch by Geoff Burt from 2006.

Copernicus: On 2012 Jan 21 UT 03:31 Maurice Collins imaged Copernicus crater (See Fig 2) under similar illumination to a LTP report from Geoff Burt from 2006 (see below for the description). It can be seen how similar the image and the sketch are, with the exception of the bright blob seen in shadow in 2006. This LTP report will remain at a weight of 3 because it is still unexplained. A higher weight is not possible because the effect seen in 2006 was not confirmed by a 2nd observer, despite a partial overlap in observing times with another observer.

On 2006 Jun 05 UT21:00-22:00 G.Burt was making a sketch of Copernicus crater, and after comparing the drawing with photos made under similar illumination was struck by the abnormality of a small white blob in the north east corner of the shadowed floor. There should be no raised topography between the wall and the central peaks that could give rise to this. The making of the sketch overlapped with an earlier drawing made by Rony de Laet (Belgium) which did not show this blob. Subsequent attempts to find sketches/images at very similar illumination angles have failed to show the blob in the north east corner of the shadowed floor. ALPO/BAA weight=3.

Schickard: On 2013 Jan 24 UT 22:45-22:55 Marie Cook (BAA) observed Schickard under similar illumination to that seen by H.P. Wilkins back in 1942 (see below for the NASA LTP catalog description), although the UT that the NASA catalog gives is estimated. Marie reports that the crater had no mist-like appearance inside it, and looked perfectly normal. Therefore the ALPO/BAA weight shall remain at 3.

However I am aware of several reports by experienced observers by the likes of Wilkins and Moore, concerning transient misty or milky appearances to the crater floor, but have some doubts. For example how could such an extensive expanse of the Moon's surface be affected? This would require presumably a very energetic process which would somehow have to be evenly distributed over a large area. It could perhaps be evidence of electrostatic dust cloud levitation which might give a more uniform distribution if there was a sufficiently large electric field perpendicular to the flat surface of the crater. On the down side, the solar altitude at the centre of the crater was about 7.5° , so the UV action from the Sun would be rapidly dissipating charge from any levitating dust particles, by this time, making them fall to the ground. Anyway these past Wilkins and Moore descriptions of the crater floor are certainly something we should look out for in future in order to solve this mystery.

Schickard 1944 Aug 31 UT 21:00? Observed by Wilkins (Kent, England) described in the NASA catalog as: "Saw a mist in it which was gone next nite. interior was dotted with white spots, contrasting sharply with dark areas. All very clear on Aug 15 at sunset". 8.5" reflector. NASA catalog weight=4 (high). NASA catalog LTP ID No. #492. ALPO/BAA weight=3.

Bessel: On 2013 Jan 18 UT 17:27-17:39 Raffaello Braga observed Bessel under similar illumination to an 1877 LTP report (see below for the original description). Raffaello used a 20cm telescope at 268x under Antoniadi III seeing and average transparency. He found the crater to be 2/3 shadow filled with a bright west wall – everything else looked normal. Therefore the 1877 report remains unexplained and I will not change the weight.

Bessel 1877 Jun 17 UT 22:30 Observed by Denett (England?, 2.75" reflector) "Tho't he could detect a minute pt. of light shining out of dark crater. (no high peaks in Bessel to catch light.)" NASA catalog weight=3 (average). NASA catalog ID #194. ALPO/BAA weight=3.

Aristarchus: On 2013 Jan 02 UT 04:50-05:15 Jay Albert (ALPO) observed Aristarchus under both similar illumination, and topocentric libration (to within $\pm 1^\circ$ each) to what Bartlett was observing under back in 1964 (see description of the original report below). Jay reported that he saw no hint of violet color in or around the crater, despite the crater being extremely bright, with a brilliant central peak and dark vertical bands. Jay commented that the southern floor was rough in appearance and this was perhaps an analogous description to Bartlett's description of "granular". As for yellow color, Jay suspected a tinge of yellow, but this was everywhere he looked on the Moon and may have been due to a combination of the Moon's low altitude and the local haze. Jay's observation shows that the granulated effect on the floor is perfectly normal. It maybe that the violet is seen only when the Moon is at a good altitude, where there is less scattering of short wavelength light in our atmosphere, making the color easier to see. The yellow seen by Bartlett though was unusual, and he does not often report this, therefore the weight of this observation shall remain at a 2.

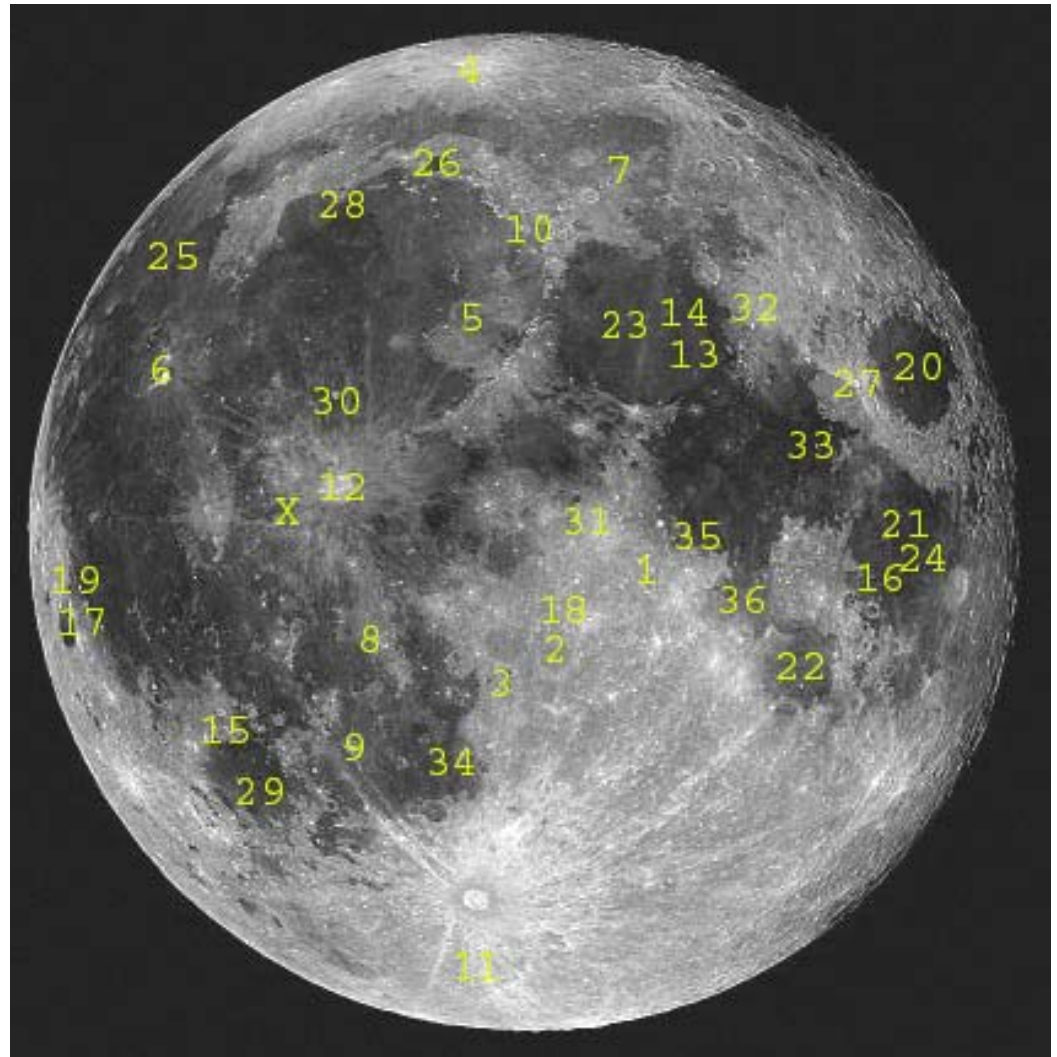
1964 Jul 29 UTC 05:40-06:06 Observed by Bartlett (Baltimore, MD, USA) "Nimbus only -- dark viol. hue. S.floor granulated, dull -- 6 bright. Faint yellow-brown tinge. Rest of crater 8." S=6, T=3-2. NASA catalog weight=4 (high). NASA catalog ID #838. ALPO/BAA weight=2.

Suggested Features to observe in March: For repeat illumination LTP predictions for the coming month, these can be found on the following web site: <http://users.aber.ac.uk/atc/tlp/tlp.htm>. By re-observing and submitting your observations, we will get a clear understanding of what the feature ought to have looked like at the time. Only this way can we really fully analyze past LTP reports. For members who do not have access to the internet, please drop me a line and I will post predictions to you. If you would like to join the LTP telephone alert team, please let me know your phone No. and how late you wish to be contacted. If in the unlikely event you see a LTP, please give me a call on my cell phone: +44 (0)798 505 5681 and I will alert other observers. Note when telephoning from outside the UK you must not use the (0). When phoning from within the UK please do not use the +44! Twitter LTP alerts can be accessed on <http://twitter.com/lunarnaut>.

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KEY TO IMAGES IN THIS ISSUE

1. Agrippa
2. Albatagnius
3. Alphonsus
4. Anaxagoras
5. Archimedes
6. Aristarchus
7. Baily
8. Bompland
9. Bullialdus
10. Cassini
11. Clavius
12. Copernicus
13. Dorsum Lister
14. Dorsum Smirnov
15. Gassendi
16. Goclenius
17. Grimaldi
18. Halley
19. Hevelius
20. Mare Crisium
21. Mare Fecunditatis
22. Mare Nectaris
23. Mare Serenitatis
24. Messier
25. Mons Rumker
26. Plato
27. Proclus
28. Prom. Laplace
29. Puiseux
30. Pytheas
31. Rima Hyginus
32. Romer
33. Rupes Cauchy
34. Rupes Recta
35. Sabine
36. Sinus Asperitatis



FOCUS ON targets

X = Mare Insularum (May)
Domes (July)